BLM
Medford District

Medford BLM

District Analysis and 2008 Biological Assessment of Forest Habitat

Photo by Dave Roelofs

may be cited as DA 08 BAFH

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1. Introduction

The Medford District Bureau of Land Management (BLM) is submitting this Biological Assessment (BA) to the U.S. Fish and Wildlife Service (Service) pursuant to section 7 (a)(2) of the Endangered Species Act (ESA). Section 7 (a)(2) requires Federal agencies to consult with the Service to ensure their actions will not jeopardize the continued existence of any listed species or adversely modify designated critical habitats.

1.1 Definitions

NW Forest Plan Land Use Allocations (USDA and USDI 1994b)

AMAs (Adaptive Management Areas) generally follow Matrix guidance, but encourage adaptive management approaches to forest management.

AMRs (Adaptive Management Reserves) are AMAs that overlap Late-Successional Reserves. AMR generally follow LSR guidance but encourage adaptive management approaches to forest management.

LSRs (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.

100-acre Cores (LSR) are the best 100 acres around northern spotted owl activity centers that were documented as of January 1, 1994 on Matrix and AMA lands, and are managed as LSR.

LSOG MMR add-on (Late-Successional and Old-Growth Marbled Murrelet Add-on) is LSR managed for marbled murrelets (USDI 1995, 9).

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

Congressionally Reserved Areas require Congressional enactment for their establishment, such as national parks, wilderness, and wild and scenic rivers (USDI 1995, 103).

Administratively Withdrawn Areas include areas withdrawn from scheduled timber harvest such as recreation areas, rights-of-way corridors, and timber production capability classification withdrawals (USDI 1995, 39).

Matrix consists of those Federal lands not in the categories above. Matrix includes northern and southern General Forest Management Areas. Green tree retention ranges from 6 to 25 trees per acre following regeneration harvest in Matrix lands (USDI 1995, 38-39).

Northern Spotted Owls

Spotted Owl Sites

Documented Spotted Owl Sites are defined as locations with evidence of continued use by spotted owls, including breeding, repeated location of a pair or single birds during a single season or over several years, presence of young before dispersal, or some other strong indication of continued occupation. Documented spotted owl sites are tracked in the Bureau of Land Management (BLM) northern spotted owl database. The majority of the known sites were established through protocol level surveys completed in the late 1980s and early 1990s. Currently, owl sites are recorded in an opportunistic manner, because protocol surveys are no longer required. Additional site locations have been established through a demographic study taking place on portions of the Medford District BLM land. All documented sites, except sites found non-nesting through protocol surveys, receive seasonal protection (see Appendix C, PDC).

Generated ("G") Sites are estimated locations of spotted owl activity centers that were created by the use of a methodology developed by an interagency team in order to estimate take in areas where sufficient survey information is not available. The entire set of owl sites used for OEM (Owl Estimation Methodology) analysis includes the generated sites and documented sites. *Methodology for Estimating the Number of Northern Spotted Owls Affected by Proposed Federal Actions* (USDA et al. 2007, corrected 9_2008) was used to provide a reasonable basis for estimating potentially occupied spotted owl habitat on a given landscape along with estimating the number of northern spotted owls likely to occur within the area affected by proposed Federal actions.

The methodology relied on known spotted owl locations derived from spotted owl surveys as the foundation for the template of occupied owl locations. Survey data, in some cases, was not sufficient to estimate the number and distribution of spotted owls on a given area. Known spotted owl locations were supplemented with generated spotted owl locations derived from an analysis of survey data from similar areas within the range of the spotted owl and information on the configuration of habitat in the subject area.

To estimate likely occupied habitat outside of known home ranges, nearest-neighbor distances and known spotted owl density estimates were used to "place" potential spotted owl occupied sites in habitat. The template of known sites and the generated potential sites then became the foundation on which to conduct an effects analysis (see Section 4, Effects). Both known spotted owl locations and habitat information were factored into the consultation process to provide a more comprehensive accounting of likely owl distribution and potential adverse effects.

Provincial Home Range is defined, for analysis purposes in this document, by a circle located around an activity center and represents the area owls are assumed to use for nesting and foraging in any given year. The home ranges of several owl pairs may overlap. Provincial home range radii vary based on the physiographic province in which they are located: Klamath Mountains Province = 1.3 miles (approximately 3,400 acres), and Cascades West Province = 1.2 miles (approximately 2,900 acres). Although this BA has no projects in the Cascades East Province, the Medford District BLM also has lands in the Cascades East Province. The provincial home range is the same as the Cascades West Province.

Core Area is a 0.5-mile radius circle (approximately 500 acres) from the nest or center of activity to delineate the area most heavily used by spotted owls during the nesting season; it is included in the provincial home range circle. Core areas represent the areas which are defended by territorial owls and generally do not overlap the core areas of other owl pairs. Recent evaluation of owl telemetry literature indicates most spotted owl activities are focused within the 0.5-mile radius around the nest tree (Appendix D, OEM).

Nest Patch is the 300-meter radius area around a known or likely nest site; it is included in the core area. Disturbance or treatments that reduce canopy of habitat within this area could potentially affect the reproductive success of nesting birds. Exceptions to this are noted in some site-specific situations.

Owl Activity Periods

Table 1. Northern Spotted Owl Breeding Periods
(see also PDCs, Appendix C)

Entire Breeding Period	Critical Breeding Period	Extended Breeding Period
March 1-September 30	March 1-June 30	July 1-September 30

Northern Spotted Owl Habitats

We defined four categories of forest land in this BA. These categories are distinct and non over-lapping.

- Non-habitat
- Capable
- Dispersal
- NRF (Nesting, Roosting and Foraging

Nesting, Roosting, and Foraging (NRF) Habitat for the northern spotted owl consists of habitat used by owls for nesting, roosting, *and* foraging. NRF habitat also functions as dispersal habitat. Generally, this habitat is multistoried, 80 years old or more (depending on stand type and structural condition), and has sufficient snags and down wood to provide opportunities for nesting, roosting, and foraging. The canopy closure generally exceeds 60 percent, but canopy closure or age alone does not qualify a stand as NRF. Other attributes include a high incidence of large trees with various deformities (e.g., large cavities, broken tops, mistletoe infestations, 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). NRF habitat in southwest Oregon is typified by mixed-conifer habitat, recurrent fire history, patchy habitat components, and a higher incidence of woodrats, a high quality spotted owl prey species in our area.

Forsman et al. (1984) described some of the differences in the Klamath Mountains Province, typical of large parts of the Medford District,

> "Eighty-one percent of all nests in northwestern Oregon were in cavities, compared to only 50 percent in the Klamath Mountains. These differences appeared to reflect regional differences in availability of the different nest types. Dwarf mistletoe infections in Douglas-fir (and numerous debris platforms that were associated with dwarf mistletoe infections) were common in the mixed coniferous forests of the Klamath Mountains and the east slopes of the Cascades, but did not occur in western Oregon."

NRF in southwest Oregon varies greatly. It may consist of somewhat smaller tree sizes. Tree species are more diverse within each stand than owl habitat in the BLM Districts and National Forests located on the west side of the Cascade Mountains in northern Oregon. One or more important habitat component, such as dead down wood, snags, dense canopy, multistoried stands, or mid-canopy habitat, might be lacking or even absent in portions of southwest Oregon NRF. However, southwest Oregon NRF can support nesting owls if those components are available across the immediate landscape. Forsman et al. (1984) documented the range of nest trees for platform nests (from table) (n=47) range equals 36 to 179 centimeters (cm) (14.2 to 70.5 inches) in diameter at breast height (dbh) averaging 106 cm (41.7 inches) dbh. Mistletoe is occasionally used as a nesting substrate in southwest Oregon, which makes smaller trees suitable as nest trees. The BLM Resource Area wildlife biologists make site-specific determinations and delineations of NRF habitat.

For spotted owls, features that support nesting and roosting habitat typically include a moderate to high canopy (60 to 90 percent); a multistoried, multi-species canopy with large overstory trees (greater than 30 inches in diameter); a high incidence of larger trees with various deformities, including mistletoe, large snags, large accumulations of fallen trees and wood on the ground; and flying space (Thomas et al. 1990).

Habitat Capable for the northern spotted owl is forest land that is currently not habitat but can become NRF or dispersal in the future, as trees mature and canopy fills in.

Dispersal is a subcategory of "all dispersal" habitat for northern spotted owls. Throughout this document, "dispersal" will be used to describe dispersal-only habitat. Thomas, et al. 1990, defined dispersal habitat as forested habitat more than 40 years old, with canopy closure more than 40 percent, average diameter greater than 11 inches, and flying space for owls in the understory but does not provide the components found in NRF. It provides temporary shelter for owls moving through the area between NRF habitat and some opportunity for owls to find prey, but does not provide all of the requirements to support an owl throughout its life. Dispersal will be used throughout this document to refer to habitat that does not meet the criteria to be NRF habitat, but has adequate cover to facilitate movement between blocks of NRF habitat. Owls also disperse through NRF habitat. The term "all-dispersal" will be used when both dispersal and NRF are intended.

Spotted Owl Habitat Treatment Types

Forest stands in southwest Oregon are often multiple-aged with multiple canopy levels that have resulted from previous harvesting or from past natural stand disturbance such as repeated historic low intensity fire (USDI 1992a, Vol. II, 2-37). The actual interpretation of treatment impacts to owls will be defined by the Resource Area wildlife biologists in collaboration with their Interdisciplinary Team and Field and District Managers. Effects of individual activities will be determined by the BLM following these descriptions.

Treat and Maintain NRF or Dispersal Habitat means an action or activity will occur within NRF or dispersal habitat that will not change the owl habitat function. The NRF stand retains large trees, multistoried canopy, standing and down dead wood, diverse understory adequate to support prey, and may have some mistletoe or other decay. Dispersal stands continue to function as dispersal habitat. Noise and activity is evaluated as part of this treatment type and is not discussed separately.

The effects determination for treating and maintaining habitat is "may affect, not likely to adversely affect" (NLAA) the spotted owl because spotted owls will be able to use the stand as before. Some change to understory vegetation and dense trees may occur. NRF habitat will retain 60 percent canopy cover, large trees and snags, large down wood, and structural diversity important to northern spotted owls. Dispersal habitat will continue to provide at least 40 percent canopy, flying space, and trees 11 inches dbh or greater, on average, following treatment. The habitat classification of the stand following treatment will be the same as the pretreatment habitat classification. Many NLAA fuels, silviculture, and timber projects may have a long-term benefit because they reduce the unnaturally high brush and dense trees that have resulted from years of wildfire suppression. Resulting treated stands are more ecologically sustainable for high fire return interval ecosystems. The OEM suggests any NRF habitat treatment, including NRF maintenance, in the nest patch may be an adverse effect (LAA). This Biological Assessment (BA) will offer site-specific information to explain situations when NRF maintenance at the nest patch is an NLAA.

Downgrade Habitat means to alter the function of spotted owl NRF habitat so the habitat no longer supports nesting, roosting, and foraging behavior. Downgraded NRF habitat has enough tree cover to support spotted owl dispersal. Downgrading NRF habitat is usually considered an adverse affect (LAA) to owls, although it can lead to long-term improvement in owl habitat by making a stand healthier, more open, and more fire-resilient. A more open stand that has been downgraded to dispersal is more likely to develop NRF conditions faster than a dense, untreated stand.

Remove Habitat means to alter known spotted owl NRF or dispersal habitat so the habitat no longer supports nesting, roosting, foraging, or dispersal. Removal of NRF is usually considered an adverse affect (LAA) to owls. Removal of dispersal habitat is usually not considered an adverse action (NLAA) to owls because dispersal habitat is abundant in the Medford District and is not thought to impact individual owls. Removal of dispersal habitat from critical habitat is considered an adverse effect (LAA) to critical habitat units (CHU) because it removes a portion of a defined primary constituent element of spotted owl CHU (see Critical Habitat).

Spotted Owl Designated Critical Habitat

The final rule for Revised Designation of Critical Habitat for the northern spotted owl was published by the US Fish and Wildlife Service (the Service) in the *Federal Register* and became effective on September 12, 2008. Critical Habitat 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 NRF habitat in the future (57 FR 10:1796-1837)

Treat and Maintain Critical Habitat means no primary constituent elements are removed or reduced and primary constituent elements of critical habitat are retained. The Endangered Species Act (ESA) consultation handbook (USDA et al. 2002, 4-33), as amended, provides the following information regarding designated critical habitat:

> **Primary Constituent Elements**
>
> The physical and biological features of designated or proposed critical habitat essential to the conservation and recovery (amendment due to *Gifford Pinchot* lawsuit[1]) of the species, including, but not limited to the following:
>
> 1) space for individual and population growth, and for normal behavior;
> 2) food, water, air, light, minerals, or other nutritional or physiological requirements;
> 3) cover or shelter;
> 4) sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and
> 5) habitats that are protected from disturbance or are representative of the historic geographic and ecological distributions of a species [50 CFR 424.12(b)].

It further defines critical habitat for listed species as "(1) the specific areas within the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the Act, on which are found those physical or biological features [constituent elements] (I) essential to the conservation of the species and (II) which may require special management considerations or protection ; and (2) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the Act, upon a determination by the Secretary that such areas are essential for the conservation of the species" [16 U.S.C. § 1532(5)(A)]. Designated critical habitats are described in 50 CFR part 17 and part 226.

In the final CHU rule specifically for owl critical habitat, the Service defined the following elements of Primary Constituent Elements, as described in the proposed ruling: **32458 Federal Register** / Vol. 72, No. 112, June 12, 2007 / Proposed Rules

Sites for Breeding, Reproduction, and Rearing of Offspring (Nesting Cover or Shelter (Roosting)
Food or Other Nutritional or Physiological Requirements (Foraging)
Habitats That Are Representative of the Historical Geographical and Ecological Distributions of the Northern Spotted Owl

[1] *Gifford Pinchot Task Force et al.* v *U.S. Fish and Wildlife Service et al.*, 378 F.3d 1059, 1069-71

(1) Forest types known to support the northern spotted owl across its geographic range

(2) Forest types as described in PCE 1 of sufficient area, quality, and configuration, or that have the ability to develop these characteristics, to meet the home range needs of territorial pairs of northern spotted owls throughout the year.

(a) Nesting Habitat
(b) Roosting Habitat
(c) Foraging Habitat

(3) Dispersal habitat

Downgrade and Removal of NRF in Critical Habitat usually results in an adverse effects determination (LAA) to critical habitat because it decreases the quantity or quality of a primary constituent element of critical habitat.

Removal of Dispersal in Critical Habitat usually results in an adverse effects determination (LAA) to critical habitat because it removes some quantity of a primary constituent element of critical habitat.

Agencies should ensure activities will not adversely modify proposed critical habitat. An agency can choose to confer on activities within proposed critical habitat; however, the BLM is not conferring on proposed critical habitat because no adverse activities are proposed to occur within proposed critical habitat in this BA.

Marbled Murrelets

Marbled Murrelet Suitable Habitat

Marbled murrelet suitable habitat includes the conifer-dominated stands generally 80 years old or more with trees averaging 18 inches dbh or more. Murrelet suitable habitat must include potential nesting structure as described below and by the Level 2 policy of March 26, 2004. At least one potential nest tree must be present in a stand of trees at least 1 acre in size and the stand trees must be at least one-half the height of the site-potential tree.

We used the spotted owl NRF habitat layer to identify areas that have the potential to provide the forest structure necessary to provide for nesting of murrelets. This is an overly broad category of suitable potential marbled murrelet habitat, but we have no corporate data system in place to evaluate large branches and special site-specific criteria that would qualify as potential marbled murrelet habitat. Any project in murrelet habitat, as we have described here, has been evaluated in the field to refine project-level marbled murrelet habitat conditions.

Marbled Murrelet Potential Structure

Potential marbled murrelet nest trees occur within 50 miles (81 kilometers) of the coast (USDI 1997, p. 32) and below 2,925 feet (900 meters) in elevation (Burger 2002). Murrelets nest in one of four tree species: western hemlock, Douglas-fir, Sitka spruce, or western red cedar (Nelson and Wilson 2002, p. 24 and 44). Nest trees are 19.1 inches (49 centimeters) or more dbh and more than 107 feet (33 meters) in height, have at least one platform 5.9 inches (15 centimeters)

or more in diameter, contain nesting substrate (e.g., moss, epiphytes, duff) on that platform, and have an access route through the canopy that a murrelet could use to approach and land on the platform (Burger 2002; Nelson and Wilson 2002, p. 24, 27, 42, 97, 100). The tree has a tree branch or foliage, either on the tree with potential structure or on a surrounding tree, that provides protective cover over the platform (Nelson and Wilson 2002, p. 98 and 99).

Marbled Murrelet Occupied Habitat

Occupied habitat is suitable habitat or potential structure found to meet the definition of occupied by interagency established survey protocol (Evans Mack et al. 2003). Survey data collected by the Rogue River-Siskiyou National Forest (Forest Service) and BLM in southwestern Oregon (9,795 survey visits for murrelets between 1988 and 2001) indicate murrelets inhabit forested areas relatively close to the ocean. Murrelets have not been found more than 32 miles (51.5 kilometers) inland on the Powers Ranger District or more than 16 miles (25.7 kilometers) inland on the Gold Beach or Chetco Ranger Districts of the Rogue River-Siskiyou National Forest, located adjacent to Medford BLM (Dillingham et al. 1995; USDA and USDI 1996; USDA and USDI 2003, Appendix I). Occupied behaviors were observed during 221 surveys on the Siskiyou National Forest from 1988 through 2001, and presence was observed during an additional 491 surveys. The 221 observations of occupied behaviors may represent 125 or more distinct forest stands. Murrelets were not detected on the Medford BLM or the Rogue River National Forest.

The Forest Service and BLM completed a study to better quantify the likelihood of murrelet occurrence beyond the eastern boundary of the western hemlock/tanoak vegetation zone in southwest Oregon (USDA and USDI 2001). This study refined the existing survey zone boundaries to better reflect known murrelet occurrence. Area A encompasses the known range of the marbled murrelet. Approximately 82,400 acres of suitable habitat are located in Area A. NWFP LSRs and other reserved areas contain 90 percent of the suitable habitat in Area A; any stands of suitable habitat in Matrix subsequently found to be occupied are designated as additional “Murrelet” LSR. Area B is a “buffer” to Area A and includes all land 6.2 miles (10 kilometers) east of Area A. Surveys are conducted only in Areas A and B. Federal land east of Area B is assumed to not contain murrelet habitat and is no longer surveyed. The Action Area is within Area B. To date, no murrelets have been found in Area B (other than in the transition zone between Areas A and B). The Service concurred with our study conclusions in a letter: *Technical Assistance on the Final Results of Landscape Level Surveys for Marbled Murrelets in Southwest Oregon* (USDI Fish and Wildlife Service reference: 1-7-02-TA-6401).

Marbled Murrelet Treatment Types

Projects occurring near marbled murrelet habitat that do not alter the habitat itself have the potential to disturb murrelets that may be nesting nearby. Projects of this type are noted as “disturbance” projects in the Proposed Action table. PDC, including protocol surveys, seasonal restrictions, and field evaluation of habitat (see Appendix C, PDC) reduce chances of disturbance to nesting murrelets. The noise and activity associated with habitat treatments also have the potential of disturbance. For clarity in this BA, those disturbances are evaluated as interrelated and interdependent effects associated with the harvest project. PDC in habitat treatment projects reduce the chance of adverse impact in all cases.

Treat and Maintain Marbled Murrelet Suitable Habitat means to affect the quality of murrelet habitat and maintain its ability to serve as nesting habitat. Treating trees in the understory—not the actual nest trees—is an example of treating and maintaining marbled murrelet nesting habitat.

Remove Suitable Murrelet Habitat is an adverse effect to both marbled murrelets and marbled murrelet critical habitat.

Potential disturbance can occur from projects occurring near marbled murrelet sites that do not directly affect the marbled murrelet habitat itself. Disturbance is also a possibility when marbled murrelet habitat is treated, but PDC reduce the chance of impact. All disturbance activity related to harvest of habitat is considered an interrelated and interdependent effect associated with the harvest and is not evaluated separately.

Marbled Murrelet Activity Period

Table 2. Marbled Murrelet Breeding Period
(see also PDC, Appendix A)

Entire Breeding Period	Critical Breeding Period	Extended Breeding Period
April 1-September 15	April 1-August 5	August 6-September 15

Marbled Murrelet Designated and Proposed Critical Habitat

Critical Habitat for the marbled murrelet was designated by the Service on May 24, 1996 (61 FR 26256), and includes the primary constituent elements that support nesting, roosting, and other normal behaviors that are essential to the conservation of the marbled murrelet. The Service proposed revised Critical Habitat for marbled murrelets on August 13, 2008. Anticipating the revised Critical Habitat may be final when the biological opinion is evaluated, we include analysis for the proposed marbled murrelet CH as well as the current CH.

Primary Constituent Elements

Primary constituent elements of marbled murrelet critical habitat include

(1) individual trees with potential nesting platforms, and

(2) forested areas within 0.5 miles (0.8 kilometers) of individual trees with potential nesting platforms and a canopy height of at least one-half the site-potential tree height.

Designated critical habitat also includes habitat that is currently unsuitable but has the capability of becoming suitable habitat within 25 years.

1.2 Purpose of the Biological Assessment (BA)

The Medford District BLM has prepared this BA to evaluate proposed activities that “may affect” northern spotted owls, their designated critical habitat, or both for projects described in the Proposed Action section. We analyze projects in this BA that “may affect” marbled murrelets

or marbled murrelet critical habitat that were not included in previous BAs. No other listed species are evaluated in this BA.

1.3 Consultation History

Lawsuits on ESA consultation for the northern spotted owl (*Strix occidentalis caurina*) have resulted in withdrawn consultation documents and consequently the need to reinitiate consultation. Some of the activities included in the Proposed Action here were originally analyzed in previous BAs prepared by the Medford BLM or jointly by Medford BLM and the Forest Service (Appendix B, Reinitiation Projects). The U.S. Fish and Wildlife Service (Service) evaluated the activities included in these previous BAs in Letters of Concurrence (LOC) or Biological Opinions (BO).

In this reinitiation of formal consultation, the Medford BLM includes all remaining projects from previous BAs and new projects as identified in the Proposed Action section which the Medford BLM has determined "may affect" spotted owls, marbled murrelets, spotted owl designated critical habitat, or marbled murrelet critical habitat.

The Medford BLM reinitiated informal consultation and analyzed the majority of remaining NLAA projects for spotted owl and murrelets or related critical habitat in two separate BAs. Medford presented the Service with information on 07 NLAA projects on April 27, 2007, and the Service issued an LOC on June 13, 2007 (FWS Filename MED BLM LOC 6-13-2007). Medford BLM provided a BA analyzing 08 NLAA projects on September 11, 2007, and the Service issued an LOC dated September 28, 2007 (FWS Log #1-15-06-1-165).

Some NLAA projects are included in this LAA BA because they are associated with the National Environmental Policy Act (NEPA) document for LAA timber projects. We are reinitiating on one project that had been evaluated in the 08 NLAA BA (Anaktuvuk) in order to provide improved analysis of updated murrelet information. None of the other NLAA projects analyzed in this document are duplicated from the 08 NLAA BA and corresponding LOC dated September 2007.

Initial Consultation

The agencies have completed numerous ESA consultation efforts specifically related to the Northwest Forest Plan (NWFP) and the spotted owl resulting in non-jeopardy BOs.

NWFP Scale: The Service issued the Forest Service and BLM a BO for the NWFP and its effect on the spotted owl and murrelets in 1994. Agencies deferred analysis addressing incidental take to future project-scale consultations where more specific information would be available on baseline conditions and project-related activities (FWS Log #1-7-94-F-14).

Subprovincial Scale: The Service issued the Forest Service and Medford BLM a Programmatic BO in 1996 that addressed the forest management program for the southwest Oregon administrative units (FWS Log #1-7-96-F-392).

Subprovincial Scale for Fiscal Years 1999-2000: The Service issued the Forest Service and Medford BLM a Programmatic BO in 1998 to cover the forest management program for the

southwest Oregon administrative units, including two years of timber sales (FWS Log #1-7-98-F-321).[2]

Subprovincial Scale for Fiscal Years 2001-2003: The Service issued the Forest Service and Medford BLM a Programmatic BO in 2001 to cover the forest management program for the southwest Oregon administrative units, including two years of timber sales (FWS Log #1-7-01-F-032).[3]

Subprovincial Scale for Fiscal Years 2004-2008: The Service issued the Forest Service and Medford BLM a Programmatic BO with an embedded LOC in 2003 for multi-year forest management activities on the southwest Oregon administrative units (FWS Log #1-15-03-F-511).[4]

Litigation and Reinitiated Consultation

Gifford Pinchot Task Force v. *USFWS*

In response to *Gifford Pinchot Task Force et al.* v *U.S. Fish and Wildlife Service et al.*, 378 F.3d 1059, 1069-71 (9th Cir. 2004) (hereafter *Gifford Pinchot*), the U.S. Court of Appeals for the Ninth Circuit issued an opinion on August 6, 2004. The Ninth Circuit found the Service's definition of destruction or adverse modification of critical habitat in its regulations did not follow the statutory direction in the ESA and, therefore, the findings of no adverse modification in multiple BOs named in that case were invalid. In a letter dated December 13, 2004, the Service requested the Forest Service and BLM reinitiate consultation on any planned or ongoing timber sales affecting spotted owl critical habitat in BOs listed in the *Gifford Pinchot* decision. Relevant to southwest Oregon administrative units, this included reinitiating consultation for any remaining work planned under the FY 1999-2000 Programmatic BO (FWS Log #1-7-98-F-321).

Flying Lost Reinitiation: This Medford BLM timber sale under the FY 1999-2000 Programmatic BO was not completely implemented at the time of the reinitiation request related to *Gifford Pinchot*. In May 2005, the Medford BLM reanalyzed the impacts of remaining harvest on critical habitat and completed the BA. The Service responded with a new BO for the Flying Lost Timber Sale (FWS Log #1-15-05-F-438).

ONRC v. *Allen*

In light of the *Gifford Pinchot* decision, the Ninth Circuit issued a remand on March 9, 2005, in a separate but related lawsuit on ESA consultation for the spotted owl, *Oregon Natural Resources Council* v. *Allen/U.S. Fish and Wildlife Service, No. 04-35242 (9th Cir.),* (hereafter *ONRC* v. *Allen).* In view of the Ninth Circuit ruling and *ONRC* v. *Allen's* relationship to *Gifford Pinchot* regarding the definition of adverse modification, the Service specifically requested in a letter dated April 14, 2005, that the Forest Service and the Medford BLM reinitiate consultation on ongoing or yet to be implemented portions of projects that occur within designated spotted owl critical habitat for the FY 2001-2003 Programmatic BO (FWS Log #1-7-01-F-032).

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[2] Original BO litigated in *Gifford Pinchot Task Force* v. *USFWS*, No. 00-5462 (W.D. Wash.). Lawsuit filed in August 2000.

[3] Original BO litigated in *ONRC* v. *Allen/USFWS*, No. 03-0888 (D. Or.). Lawsuit filed in July 2003.

[4] Original BO litigated in *NEDC* v. *Allen/USFWS* (*NEDC I*), No. 05-1279 (D. Or.). Lawsuit filed in August 2005.

Fiscal Years 2002-2003 Reinitiation: In June 2005, the Forest Service and the Medford BLM jointly submitted a request for reinitiation of consultation in spotted owl critical habitat on projects that had not yet been implemented. In July 2005, the Service responded with an LOC which evaluated the Medford BLM's Conde Shell NLAA timber sale (FWS Log # 1-15-05-I-0582). The Service issued a separate BO to evaluate the five sales that had LAA activities, including the following four located on Medford BLM: North Trail, Poole Hill, Deer Lake, and Cotton Snake (FWS Log #1-15-05-I-581[5]).

CHU OR-72/South Deer Landscape Project: In June 2005, Medford BLM reinitiated on a portion of the FY 2004-2008 program of work for the South Deer Landscape Project and to update analysis of CHU OR-72. The Service responded with an LOC in June 2005 (FWS Log #1-15-05-I-484).

NEDC v. *Allen*

A third and related lawsuit on ESA consultation for the spotted owl is *Northwest Environmental Defense Center et al.* v. *Allen/U.S. Fish and Wildlife Service* (hereafter *NEDC I*). Under *Gifford Pinchot*, the Court recommended reevaluation of critical habitat based on the statutory concepts in the ESA, sections 3 and 7 (a)(2). The FY 2004-2008 Programmatic BO challenged in *NEDC I* also contained similar language with respect to adverse modification in critical habitat as was contained in the BOs challenged in *Gifford Pinchot*. The Service sent a letter on November 2, 2005, recommending the Forest Service and the Medford BLM reinitiate and reevaluate critical habitat impacts using critical habitat definitions of the ESA, rather than the Service's regulations (50 CFR Part 402).

FY 2006-2008 Reinitiation: In August 2006, the Forest Service and Medford BLM jointly submitted reinitiation of the FY 2004-2008 Programmatic BA for all remaining projects proposed to occur in FY 2006 through 2008. The Service responded with separate BO and LOC consultation documents for both agencies. The Service responded with a BLM BO (FWS Log #1-15-06-F-162) and a separate BLM LOC (FWS Log #1-15-06-I-0165) in August 2006.[6]

Prior Sold Sale Reinitiation: In September 2006, the Medford BLM also reinitiated on remaining sold sales that the District had modified from their initial offering, including the Lost Cow, Indian Soda, Deer Mom, Cenoak, and Willy Slide timber sales (originally in FWS Logs #1-7-96-F-392 and #1-7-96-F-321). The Service responded to Medford BLM's request with two separate BOs in October 2006 (FWS Log #1-15-06-F-0223 for Willy Slide and FWS Log #1-15-06-F-0224 for the other sales identified above).

The Ninth Circuit issued an opinion in *ONRC* v. *Allen*, No. 05-35830 (9th Cir.) on February 16, 2007, finding the incidental take statement (ITS) for the challenged BO invalid. In response, the Service began a series of withdrawals of consultation documents[7] where the Service had used the

[5] Reintiated BO litigated in *Bark* v. *Lohoenfener/USFWS*, No. 06-1190 (D. Or.). Lawsuit filed in August 2006.
[6] Reinitiated BO and LOC litigated in *NEDC* v. *Lohoenfener/USFWS* (*NEDC II*), No. 06-1584 (D. Or.). Lawsuit filed in November 2006.
[7] The Service prioritized withdrawal of consultation documents based on litigation consideration and demands.

incidental take analysis process the Ninth Circuit found inadequate. The Service withdrew the following documents as they relate to the northern spotted owl and its critical habitat and requested reinitiation of ESA section 7 consultation:

March 1, 2007:	ITS portion of BLM's Reinitiated FY 2002-2003 Programmatic BO (FWS Log #1-7-01-F-0581).
March 13, 2007:	BLM's Reinitiated FY 2002-2003 Programmatic BO (FWS Log #1-7-01-F-0581).
March 15, 2007:	FS/ BLM FY 2004-2008 Programmatic BO (FWS Log # 1-15-03-F-0511).
March 26, 2006:	Reinitiated BO for BLM's remaining FY 2006-2008 LAA projects and Reinitiated LOC for remaining FY 2006-2008 NLAA projects (FWS Log #1-15-06-F-0162 and Log #1-15-06-I-0165, respectively).
May 3, 2007:	FS/BLM FY 2001-2003 Programmatic BO. (FWS Log #1-7-01-F-032).

Appendix B in this BA contains a list of the proposed projects included in this BA and the previous consultation documents that apply to them.

1.4 Implementation

Harvest activities, primarily timber sales, are implemented over a series of years. Once a sale is sold, purchasers usually have three years to implement (harvest) the sale, but contracts can be extended for seasonal clearances and other reasons. Purchasers have the option to log the entire sale in one season or they may log portions of the sale in different years.

All Medford District timber sales are scheduled to be sold following the receipt of a BO for this BA. Minor changes in sale dates may occur due to timber harvest scheduling, but overall impacts will be within the timelines, acres, and locations described in this BA.

Most projects in this BA were analyzed under one or more previous consultations that were withdrawn by the Service. These projects are listed in Appendix B. When the BOs were withdrawn, the BLM issued stop work orders on some of these projects that were partially harvested. We are reinitiating consultation on those sold sales that have no adverse effects to critical habitat in this BA. If a sold sale has been partially implemented (i.e., some units have been cut), only the remaining unharvested acres are evaluated in this BA. Previous consultations are incorporated by reference. The continued harvest of these sales would be expected to occur shortly after the BO is received.

Non-harvest activities associated with timber sales evaluated in this BA will either be initiated in fiscal year 2009, have NEPA documents signed in fiscal year 2009, or will have task orders or contracts obligated in fiscal year 2009. Implementation of projects described in this BA may be extended through 2010.

The Medford BLM anticipates the projects analyzed in this BA will be completed within a 10-year timeframe from the date of the BO. This timeline may be less if significant new science, litigation, or changes in effects, as determined through the Level 1/Level 2 team process, triggers reinitiation.

We define implementation as

the date a project is sold .....Timber Sale

when work is conducted.....Maintenance Organization Road Maintenance

the decision document date .....Right-of-Way

when contracted .....Fuels and Stewardship Projects

The effects of activities on plants and fairy shrimp were evaluated in a separate BA for FY04-08 Programmatic Consultation, July 11, 2003 (USDA and USDI 2003) and adverse effects are avoided by the use of PDC. A botany BA has been submitted to the Service for activities beginning October 1, 2008, that affect plants (USDI 2008). Listed fish are evaluated in separate project-level consultations. No other listed species or designated critical habitat will be affected by the activities identified in this BA.

This BA was reviewed by the Level 1 team, which includes the USFS Forest Biologist, the Medford BLM District Biologist, and the Roseburg Office USFWS Biologist (USDA, USDC, and USDI 1999) and was developed with input from Medford District BLM Resource Area biologists and staff. The process included oversight from the Level 2 team which consists of the USFS Forest Supervisor, the Medford BLM District Manager, and the Roseburg Office USFWS Supervisor. Additional input was provided by an interagency team that consists of USFWS at the local, state and regional office and BLM representatives at the state level to evaluate the approach to the owl site analysis and concerns from a private timber company, Rough and Ready Lumber. Rough and Ready Lumber purchased one of the sold sales in a previous BO that was withdrawn by the Service. As a confirmed purchaser of a reinitiated sale, Rough and Ready Lumber requested and received applicant status under ESA.

1.5 Description of the Action Area

The Action Area is 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 402.02). The Action Area for this BA includes all public lands managed by the Medford BLM as well as all lands subject to increased ambient noise levels caused by activities associated with the Proposed Action. Bureau of Reclamation (BOR) lands within the Medford District BLM boundary are part of the Action Area for this BA because projects are located on or adjacent to their lands; the environmental baseline for BOR lands will be tracked separately in this BA. The Medford BLM administers forest activities on BOR lands through an interagency agreement (USDI BOR and USDI BLM 1982).

2. Description of the Proposed Action

Proposed projects (Table 3) are described, as appropriate, in terms of type of activity; acres of impacts or changes to significant habitat(s); and acres, extent, duration, and timing of disturbance. Determination of effects of these projects is displayed in Section 4, Effects, in this document. The combined acres of habitat impacts are summarized and evaluated in Section 4, Effects, in this BA, without further repeating individual project descriptions. Except where noted, the described activities can occur in any land use allocation.

Project Design Criteria (PDC) are conservation measures developed to reduce impacts to listed species (see Appendix C, PDC). 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 this BA. 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. If recommended PDC cannot be incorporated, the project will still be in compliance with this BA. PDC help Medford BLM comply with their responsibilities to conserve listed species under the ESA, Section 7(a)1.

All project acres presented in this BA are from GIS planning-level shapefiles (overlay maps) and associated attribute files. These shapefiles will also be used to conduct the OEM analysis. At this stage of the planning process, not all layers in GIS line up perfectly. Some slivers suggest small acreages in incorrect land use allocations (as compared to the proposed unit acres), but these line “errors” are noted. Prior to the timber sale being sold, field layout and on-the-ground mapping will clean up boundary issues. Analysis of effects is based on the proposed actions, ignoring boundary issues to the extent possible.

2.1 Proposed Action Tables

Table 3 displays the proposed projects by physiographic province, BLM resource area, land use allocation, and project type.

Table 3. Acres of Proposed Projects by Province, Resource Area, Land Use Allocation, and Project Type

Land Use Allocation	Project Name	Other (Quarries)	ROW	Timber Harvest	Vegetation Management	Total
Cascade West Physiographic Province						
Ashland Resource Area						
Matrix	Conde Shell			1,193		1,193
	Deer Lake			722		722
	Lucky Lake			1,012		1,012
	Plateau Thin			1,973		1,973
	Total Matrix			**4,900**		**4,900**
	Total Ashland Resource Area			**4,900**		**4,900**
Butte Falls Resource Area						
	Camp Cur			809	24	833
	Flounce Around			352		352
	Total Matrix			**1,161**	**24**	**1,185**
	Total Butte Falls Resource Area			**1,161**	**24**	**1,185**
	Total Cascade West Physiographic Province			**6,061**	**24**	**6,085**
Klamath Mountains Physiographic Province						
Ashland Resource Area						
AMA	Bald Lick			1,089		1,089
	China			1,121		1,121
	Total AMA			**2,210**		**2,210**
Matrix	Birdseye			344		344
	Galls Foot			1,073		1,073
	Total Matrix			**1,417**		**1,417**
	Total Ashland Resource Area			**3,627**		**3,627**
Butte Falls Resource Area						
	North Trail			65		65
	Total Matrix			**65**		**65**
	Total Butte Falls Resource Area			**65**		**65**

Table 3. Acres of Proposed Projects by Province, Resource Area, Land Use Allocation, and Project Type

Land Use Allocation	Project Name	Other (Quarries)	ROW	Timber Harvest	Vegetation Management	Total
Glendale Resource Area						
Matrix	Anaktuvak				251	251
	Big Jim			4		4
	Boney Skull			417		417
	Caboose			229		229
	Chew Choo			437		437
	Five Cows			389		389
	Five Rogues Thin			284		284
	Five Rogues Timber Sale			365		365
	Fizzy Stew			13		13
	Fortune Stew			31	12	43
	Mari Kelsey			233		233
	Slotted Pen Quarry	14				14
	Small Fortune			132		132
	Swampwood			210		210
	Total Matrix	**14**		**2,744**	**263**	**3,021**
	Total Glendale Resource Area	**14**		**2,744**	**263**	**3,021**
Grants Pass Resource Area						
AMA	Cheney Slate			2,326		2,326
	Pickett Charge			49		49
	Total AMA			**2,375**		**2,375**
AMR	Cheney Slate			315		315
	Total AMR			**315**		**315**
Matrix	Althouse Sucker			473	1,262	1,735
	Anderson West			0	54	54
	Birdseye Jones			792		792
	East Fork Illinois			164	172	336
	Granite Joe			913	1,115	2,028
	Granite Horse			1,213		1,213
	Indian Hill ROW		2			2
	Josephine County Brass Joe ROW		<1			1

Table 3. Acres of Proposed Projects by Province, Resource Area, Land Use Allocation, and Project Type

Land Use Allocation	Project Name	Other (Quarries)	ROW	Timber Harvest	Vegetation Management	Total
	Josephine County Waterbrook ROW		<1			1
	Mount Baldy ROW		4			4
	Pickett Charge			307	200	507
	Pickett Snake			1,380	980	2,360
	South Deer			375		375
	South Deer Stew				1,247	1,247
	Tennessee Lime			316	308	624
	West Fork Illinois			241		241
	Total Matrix		**6**	**6,174**	**5,338**	**11,518**
	Total Grants Pass Resource Area		**6**	**8,864**	**5,338**	**14,208**
Total Klamath Mountains Physiographic Province		**14**	**6**	**15,300**	**5,601**	**20,921**
Total All Projects and Physiographic Provinces		**14**	**6**	**21,351**	**5,625**	**26,996**

NOTE: GIS discrepancies between tables are due to rounding.

In addition to the projects proposed on BLM lands in Table 3, one project located on Bureau of Reclamation lands is designed to improve forest health. The BLM cooperatively manages some aspects of BOR resources under mutual agreement to comply with the regulations and commitments of both agencies. BOR lands are tracked separately than the BLM land base, although the project will occur within the confines of the Ashland Resource Area (Table 4).

Table 4. Proposed Forest Health Project Administered by the BLM Ashland Resource Area on BOR Lands

Project Name	Acres
BOR	611
Total within Ashland Resource Area boundary	611
Total Cascades West Physiographic Province	611
Total	**611**

Table 5 shows the proposed actions occurring in spotted owl CHU.

Table 5. Proposed Projects by Spotted Owl CHU

CHU	Project	Project Type
Rogue/Umpqua 14	Boney Skull	Timber Harvest
	Mari Kelsey	Timber Harvest
	Picket Snake	Timber Harvest
	Small Fortune	Timber Harvest
	Cheney Slate	Timber Harvest
Klamath Intra-Province 16	Cheney Slate	Timber Harvest
Southern Cascades 17	Plateau Thin	Timber Harvest
	BOR (on BOR land)	Timber Harvest
Various	MO Road Maintenance	Road Maintenance

2.2 Detailed Project Descriptions

Timber Harvest

Timber harvest includes commercial and occasionally noncommercial removal of mature overstory and/or understory trees and can include regeneration harvest, seed-tree cuts, selective harvest, density management, commercial thinning, and individual tree removal. The Medford BLM has highly diverse forest ecosystems and most project areas include a range of forest harvest prescriptions and techniques, often in the same project unit. Tree harvest also includes miscellaneous projects such as the removal of hazard trees for public safety, commercial firewood cutting, and salvage harvest. Salvage may result from blowdown (other than hazard trees), disease, or small fires. Typically, a blowdown salvage project may cover 500 acres or more along at least 50 miles of roadway.

Harvest can result in the removal of a few trees within a stand or the removal of the majority of trees within the Timber Sale Unit. Openings may occur in an even or patchy distribution, depending on the objectives of the treatment and the 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 of the trees to be removed from the site. Trees are hauled to landings by cable or heavy equipment or helicopter. Trees are removed from decks or landings by logging trucks or helicopters. Access to the timber sale involves the use of existing roads in areas where roads already occur, and can also involve the design and development of new roads or redevelopment of old roads. New road construction may entail cutting trees from the road prism. Trees removed from road prisms are often decked for inclusion in the timber sale, 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.

Timber harvest is seasonally restricted around known spotted owl sites and suitable marbled murrelet habitat (see Appendix C, PDC). Harvest could occur in suitable matrix and AMA habitat that has not been surveyed for northern spotted owls because the BLM is not required to survey these lands. All timber sale contracts will contain special provision E-4 (BLM), a standard contract provision which requires purchasers to discontinue operations upon receiving written notice from the BLM that listed species may be affected by the action. For example, a previously unknown spotted owl nest discovered in an active timber sale.

Vegetation Management

Vegetation management associated with timber projects in this BA include various types of thinning, density management, or selective harvest and can occur in all land use allocations if the harvest meets the objective of the land use allocation, as specified in the NWFP. Selective harvest techniques can result in project areas that may cover large acreages (several thousand acres. These projects may be commercial or non-commercial depending on the size of material to be removed.

Historically, Medford had frequent natural fire return intervals, but years of fire exclusion and management actions have resulted in habitat conditions much brushier and denser than would have occurred under historic fire regimes. Fuels management has three primary purposes: fuels reduction to reduce wildfire hazard, site preparation/slash reduction for improving conifer planting, and restoration of ecosystem function where wildfire has been suppressed.

Bureau of Reclamation (BOR) Project

The BOR project focuses on forest health using selective forest thinning. It is designed to establish and maintain a forest diverse in age, structure, species, and spacing that would provide a variety of habitat types for local native plant and wildlife species. At the same time, the selective forest thinning would minimize the potential risks of wildland fire, insects, and forest pathogens.

Road Maintenance

Road Maintenance refers to the Medford BLM's Maintenance Organization (MO), which maintains existing roads on a schedule and responds to unanticipated repairs due to weather, accident, or landslide. Road maintenance activities consist of grading, brushing, culvert maintenance and repair, installing and repairing water bars, minor resurfacing, hazard tree removal, or minor road rerouting. Table 6 shows the miles of road maintenance activities anticipated to occur in 2009.

Most road maintenance activity is limited to short periods of time (i.e., up to three passes with a grader). Road grading generally affects the ditch and a foot or so of the cut-slope; some loose material may spill over the fill-slope. Maintenance brushing generally entails mechanically cutting brush down to less than 1 foot high within 4 feet of the edge of the road tread. Brush more than 4 feet from the edge of the road tread is not treated. Heavy trucks and heavy equipment such as graders, gravel trucks, backhoes, and chainsaws or brush removal machinery can increase noise in the area of activity for short, but intense, periods of time. Most activities

would require a few hours of work or less within any 0.25-mile road segment in a 24-hour period, but could occur for up to 1 week in time. Some road projects may require blasting to remove unstable portions of the cut-slope, often at rock faces.

Road Use Permits and Right-of-Way Grants

Landowners or their agents are required to obtain Road Use Permits to build roads across BLM managed land for commercial purposes or to haul commercial products on BLM maintained road systems. Federal discretion to influence the implementation of recovery efforts for threatened or endangered species may be limited where certain Road Use or Reciprocal Right-of-Way agreements already exist between private landowners and the Medford BLM. Reciprocal Right-of-Ways with private parties already cover most existing road activities in the Action Area and the Medford BLM no longer has discretion. This BA does not address nondiscretionary activities. For the purpose of this BA, private lands refer to privately-owned or other non-Federal government parcels located as inholdings or adjoining property through which access is traditionally granted across federally-managed lands.

On January 30, 2003, a multi-agency Road Use Permit policy (*Application of the Endangered Species Act to Proposals for Access to Non-Federal Lands across Lands Administered by the Bureau of Land Management and the Forest Service*) was instituted. The BLM, Forest Service, Fish and Wildlife Service, and NOAA (National Oceanic and Atmospheric Administration) Fisheries are signatories to this policy. The provisions of this agreement apply only when a Forest Service special use authorization or a BLM right-of-way (ROW) grant is required for the reconstruction or construction of a road, for either private or commercial purposes, to secure access to a parcel of non-Federal land. The key components of the interagency agreement are:

- The agreement applies to grants of ROW across National Forest System and/or public lands administered by the BLM, under their respective authorities, for purposes of access to non-Federal lands.
- The “proposed federal action” to which the agreement applies is the authorization for access across Federal land and subsequent activities on Federal land – it does not include any actions on non-Federal lands.
- At the applicant’s discretion, the agreement provides applicants an option to include the effects of those activities that will be facilitated by the proposed access and conducted on the applicant’s non-Federal lands as part of a Federal agency ESA consultation on the access application.
- ESA sections 9 and 10 still apply to all activities on non-Federal land.
- The agreement applies to applications for new authorizations for access that are processed by the Forest Service and BLM after January 30, 2003.

Road building (construction or reconstruction) will be authorized on federally-managed land under the terms of individual road use permits. Road construction, maintenance, and restoration activities were described under “Road Maintenance.” Harvest of private lands normally consists of clear-cut or salvage operations, or removal of individual large diameter trees in young stands.

Each discretionary ROW activity has distinct characteristics and effects. We include the following specific ROW proposals:

- The Indian Hill China Garden ROW application involves construction of an access road on Medford BLM land in T40S, R7W, section 13 (NE of NE) in the Grants Pass Resource Area. The ROW grant would allow construction of 428 feet of natural surface road with a 50-foot clearing width. The ROW construction on BLM occurs in spotted owl dispersal habitat.
- The Josephine County Waterbrook ROW application involves construction of an access road on Medford BLM land in T35S, R5W, section 3 (NE of NE) in the Grants Pass Resource Area. The ROW grant would authorize construction of 225 feet of natural surface road with a 50-foot clearing width. The ROW construction on BLM occurs in spotted owl dispersal habitat.
- The Josephine County Brass Joe ROW application involves construction of an access road on Medford BLM land in T34S, R5W, section 23 (SE of SE and NE of NE) on the Grants Pass Resource Area. The ROW grant would allow construction of 2 separate natural surface road spurs totaling 359 feet long with a 50-foot clearing width. The ROW construction on BLM occurs in spotted owl dispersal habitat.
- The BLM-initiated Mount Baldy ROW involves 0.7 miles of new road construction on Medford BLM land in T36S, R5W, sections 27 and 34 (SW of SE in section 27 and NW of NE in section 34) in the Grants Pass Resource Area. The ROW grant would involve construction of 3,480 feet of a new full bench, natural surface road with a 50-foot clearing width. The ROW construction on BLM would remove approximately 4 acres of spotted owl suitable NRF habitat.

These projects are defined under “ROW” in Table 6, Proposed Action Summary.

Subsequent applications during the life of the programmatic within the discretionary authority of the Medford BLM will be analyzed under separate consultations.

Quarry

We analyze an action at the Slotted Pen Creek Quarry in this BA (activities at other existing quarries are evaluated in the NLAA BA, dated September 30, 2007). The purpose of the operation at Slotted Pen Quarry is to loosen material in the existing quarry at T32S, R8W, section 5 (NE of NE). Initially, it includes drilling approximately 800 holes deep into the face of the quarry, inserting explosives, and detonating several blasts. Loosened substrate would then be hauled on the heavily traveled, paved West Fork Cow Creek Road.

2.3 Adaptive Management

The Medford BLM practices adaptive management as described in Section C of the NWFP (USDA and USDI 1994). Adaptive management allows minor project variations to meet site-specific conditions or landscape objectives. Therefore, there may be minor deviations in the description of projects over the life span of this BA. All projects in this BA are designed to

comply with the following criteria. Any deviations will be analyzed by the Level 1 team to ensure

1. the project complies with the NWFP,
2. the project complies with the RMP to which it is tiered. Project has been designed under the NWFP and 1996 RMP.
3. impacts and extent of the project are within parameters of described activities in this BA,
4. minor deviations are reviewed by the Level 1 team to ensure impacts to listed species remain the same or less than those described within this BA,
5. mitigation measures proposed for the project are consistent with the intent and impacts of actions described in this BA. Application of PDC's ensure no adverse disturbance impacts will occur,
6. project impacts are reported to the Service in annual monitoring reports, and
7. mandatory PDC are implemented to reduce impacts to the species or habitat.

Separate consultation will be required to meet ESA compliance if the project cannot be revised to comply with this consultation; if site-specific NEPA evaluations indicate the project may affect and will likely adversely affect the northern spotted owl or its critical habitat, or if the Level 1/Level 2 teams cannot reach consensus that the project deviation meets the intent, extent and impacts addressed in the BA and subsequent BO.

The BLM is revising its resource management plans for Western. The final management plan may change the land use allocations evaluated in this BA. Any harvest or project activities developed under the new plan that would affect owl or murrelet habitat would require consultation before those activities could proceed. Even though the land use allocations may change with a new RMP, the projects evaluated in this BA will be implemented under the current RMP and NWFP.

Table 6. Proposed Action Summary	
Habitat Treatments	
Project Category	**Scope**
Timber Harvest Follow PDC • CHU Subset • Most Matrix or AMA; • One sale in AMR • Klamath Mountains and Cascades West Provinces	21,351 acres 1,035 acres (CHU) 315 acres (AMR)
Vegetation Management Follow PDC • All Matrix • Klamath Mountains and Cascades West Provinces	5,625 acres
Road Maintenance by BLM's Maintenance Organization Follow PDC • LSR/AMR Subset • CHU Subset • Murrelet Habitat Subset • Klamath Mountains and Cascades West Provinces	Maximum 800 miles annually Maximum 200 miles annually Maximum 300 miles annually Maximum 100 miles annually
ROW • Indian Hill China Garden, Josephine County Waterbrook, Josephine County Brass Joe, Mount Baldy • All Matrix • No CHU • Klamath Mountains Province	Less than 20 acres
Quarry Follow PDC • Slotted Pen Quarry (blasting outside critical breeding season). • All Matrix • No CHU • Klamath Mountains and Cascades West Provinces	15 acres
Potential Disturbance	
• Noise would be kept to an insignificant level through implementation of seasonal and distance PDC. • 200 acres Cascades West Province • 2,000 acres Klamath Mountains Province	

3. Environmental Baseline

3.1 Introduction

Regulations implementing section 7 of the ESA (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 that have undergone section 7 consultation, and the impacts of state and private actions which are contemporaneous with the consultation in progress. Such actions include, but are not limited to, previous timber harvests and other land management activities. The Forest Ecosystem Management Assessment Team (FEMAT) (USDA et al. 1993) documents, *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (USDA and USDI 1994a), and *Record of Decision for Amendments to Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (USDA and USDI 1994b) are relevant to addressing the environmental baseline for this action.

The NWFP, the Service's Critical Habitat designation, and listing determinations for the marbled murrelet and spotted owl identified habitat considered necessary for the long-term conservation and recovery of owls and murrelets. The Critical Habitat baselines are described for each species below. Under the NWFP, LSRs, riparian reserves, and other protected habitats will be managed for long-term recovery. The baseline information shows that not all reserved habitat is currently functioning as suitable late-successional habitat (Table 12). The NWFP guides the Medford BLM to develop lands in LSR that are capable of producing old growth characteristics into those conditions over time. Projects in the LSRs are limited to those activities neutral or beneficial to the objectives of LSRs (USDA and USDI BLM 1994b, C-16).

Natural plant community types within the Medford District are diverse. In the lower elevations, Oregon white oak woodlands and grasslands, chaparral, scattered ponderosa pine, and Douglas-fir occur up to about 2,400 feet in the interior valleys. The higher elevations of the Klamath Mountains Province support the mixed evergreen zone, dominated by Douglas-fir and madrone up, to about 4,500 feet. The Cascade Provinces support a mixed-conifer zone dominated by ponderosa pine, Douglas-fir, incense cedar, and white fir in more mesic sites. In both areas, dense chaparral (sclerophyllous type) communities composed primarily of wedge-leaf ceanothus (*Ceanothus cuneatus*) and manzanita (*Arctostaphylos* species) can occupy large patches of the landscape. Above 4,500 feet, the white fir zone transitions into a Shasta red-fir zone up to about 6,500 feet. Above this, areas of mountain hemlock and whitebark pine can be found up to the open rocky herbaceous grasslands on the highest peaks above timberline.

The ecological diversity of communities and species on the BLM is attributed to its physiographic setting at the confluence of the Klamath Mountains and Cascade Provinces. Many eastern Cascade and Great Basin species are on the periphery of their range in the Klamath subbasin and spill into the southern edge of the Rogue River valley from the east. The juxtaposition of these regions has led to a diverse array of species including species whose distributions are centered south into the Sierra Mountains of California, east into the Great Basin, or north up the Cascades and Coast ranges.

The Environmental Baseline for owls on the Medford BLM was reevaluated in 2008 using existing information, Interagency Vegetation Mapping Project (IVMP) imagery from 1996 (as corrected through 2003), and several additional steps of refinements (see Appendix A, Environmental Baseline Process). Much of the forested habitat in the Medford BLM is mixed-age, mixed-conifer habitat, which makes it difficult to delineate listed species habitat using traditional photo or satellite imagery or by depending solely on data from the Forest Operations Inventory (FOI), the BLM silvicultural data system. The Environmental Baseline update incorporated photos, field information, and FOI data into the IVMP environmental baseline update. Field verified information was used for effects determinations for each project and for geographic information system (GIS) shapefile attributes. The Environmental Baseline was corrected to match the field-evaluated habitat used for shapefiles.

Analysis is conducted by physiographic province. Land managed by the Medford BLM occurs in three physiographic provinces: Klamath Mountains, Cascades West, and Cascades East (Table 7). Although we have no projects currently proposed in the Cascades East Province, baseline information is provided for reference.

Table 7. Land Use Allocations for BLM Lands and Land Ownership by Physiographic Province within the Action Area

NWFP LUA	BLM	BOR	USACE	USFS	Local Govt.	NPS	Private	State	ODF	Action Area Total
Cascades East Physiographic Province										
				3,095			12,520			15,615
Administratively Withdrawn	2,081									2,081
Other	2,058									2,159
Province Total	**4,139**			**3,095**			**12,520**			**19,754**
Cascades West Physiographic Province										
		3,099	829	263,422	1,426	429	441,964	229	353	711,751
Administratively Withdrawn	50,854									50,859
LSR	23,004									23,003
Other	151,458	165	572							152,207
Province Total	**225,316**	**3,264**	**1,401**	**263,422**	**1,426**	**429**	**441,964**	**229**	**353**	**937,804**
Klamath Mountains Physiographic Province										
			409	633,006	318	465	856,094	3,511	16,319	1,510,122
AMA	115,739									115,739
AMR	32,523									32,523
Congressionally Reserved	15,188									15,188
LSR	133,408									133,443

Table 7. Land Use Allocations for BLM Lands and Land Ownership by Physiographic Province within the Action Area

NWFP LUA	BLM	BOR	USACE	USFS	Local Govt.	NPS	Private	State	ODF	Action Area Total
Other	336,648									340,368
Province Total	**633,507**		**409**	**633,006**	**318**	**465**	**856,094**	**3,511**	**16,319**	**2,143,629**
Action Area Total	**862,962**	**3,264**	**1,810**	**899,523**	**1,744**	**894**	**1,310,578**	**3,740**	**16,672**	**3,101,187**

SOURCE: GIS Ownership in the Action Area, 8/08, BLM GIS, Desraye Assali

NOTE: Forest Service acres are not broken out by land use allocations. BOR land tenure baseline is an older GIS layer than the habitat baseline layer.

Ownership:
BLM - Bureau of Land Management
BOR - Bureau of Reclamation
USACE - US Army Corps of Engineer s
USFS - Forest Service
Local Govt. - Local Government
NPS - National Park Service
ODF - Oregon Department of Forestry

The total land footprint of the Action Area occurs in a checkerboard pattern of mixed private and Federal ownership. The Medford District BLM manages 28 percent in the Action Area (see Table 7). Not all of these lands are capable of providing spotted owl or marbled murrelet habitat. The BLM has allocated the lands under their jurisdiction into several land use allocations including LSR, Riparian Reserve, Matrix, and Adaptive Management Areas, (AMA). LSRs that occur in AMA are referred to as AMR and are managed to meet LSR objectives. Acres of BLM by land use allocation are shown in Table 7. Approximately 30 percent of BLM lands within the Action Area are within LSRs, AMRs, or Congressionally Reserved (CR) areas that are often managed to maintain or improve owl habitat. Congressionally Reserved lands include, among other areas, the Cascade-Siskiyou National Monument and the Wild and Scenic Rogue River corridor. Note: NLAA Projects in the Monument have been evaluated in a separate consultation (USDI BLM 2006, and received a separate LOC (USDI USFWS 2006).

Human populations in the Action Area are centered in the cities of Medford, Grants Pass, and Ashland, which account for most the local government lands in Table 7. State (including Oregon Department of Forestry (ODF) and local government lands make up less than 1 percent of the Action Area. Much of the local government lands in Table 7 are within residential townships or municipalities and support no spotted owl or murrelet habitat.

Private lands comprise approximately 42 percent of the total Action Area (Table 7). The harvest areas for private forested lands managed for timber production follow State Forest Practices Act standards. As of 2002 (Biomapper owl habitat data – Appendix A), there were approximately 198,000 acres of NRF on private land. The conversion of intact suitable habitat in the low elevation woodlands and grasslands into pastures, vineyards, orchards, and home sites has increased throughout the Rogue River valley with human population growth.

Northern Spotted Owl Recovery Plan

The Service finalized the Recovery Plan for the northern spotted owl on May 13, 2008. *Recovery plans are not regulatory documents; rather, they provide guidance to bring about recovery and establish criteria to be used in evaluating when recovery has been achieved*. BLM continues to work with the Service to incorporate Recovery Goals and Actions that are consistent

with BLM laws and regulations. The Recovery Plan has 33 Recovery Actions. BLM is a participant in the inter-organizational spotted owl working group (Recovery Action 1), and will continue demographic monitoring to address Recovery Actions 2 and 3. The revised RMP will address Recovery Actions 4 and 5 by evaluating the establishment of a network of MOCA's and their management. The proposed action included in this BA does not remove or downgrade habitat in any MOCA. In the Oregon and California Klamath Provinces, this Plan calls for an adaptive management approach to fire management and spotted owl recovery. BLM is participating with others to address the fire-related Recovery Actions 8-10, to better understand spotted owl habitat and prey relationships (Recovery Action 11) and to standardize habitat definitions (Recovery Action 12). BLM is also a collaborator in the many of the Recovery Actions that address barred owl issues.

The BLM and the Service are discussing Recovery Plan Action 32: *to maintain substantially all of the older and more structurally complex multi-layered conifer forests on all Federal lands outside of MOCAs….* Medford BLM has 380,741 acres of NRF, pre-project and 369,376 post-project. Over 43% of Medford's land base will remain in NRF habitat post-project to support owls.

Of the 862,964 acres administered by Medford BLM in the Action Area, 188,841 acres, or 22 percent, are in LSRs allocated for late seral conditions conducive to spotted owls. The proposed action in this BA will avoid any habitat removal from LSRs, LSRs currently support 98,526 acres of NRF habitat and 24,058 acres of dispersal habitat. Current LSR and AMR allocations are composed of 188,841 acres, or 51% NRF.

There are additional acres of NRF in the former NSO CHU and unmapped LSRs that will not be downgraded or removed in this BA. Our projects also do not remove or downgrade NRF from the current CHU. AMRs and CHUs (including the former spotted owl critical habitat), and will avoid 100 acre cores of the 1994 historic owl sites that have LSR designation.

Riparian reserves, Connectivity Blocks, and Congressionally Reserved areas are also managed to favor owls and listed species, where areas are capable of providing owl habitat. All NRF downgrade and removal harvest activity in the proposed action are in matrix or AMA land use allocations, consistent with NWFP and Medford RMP objectives.

Recovery Action #32: The revised RMP may provide additional evaluation of "high quality" owl habitat to incorporate into that final Record of Decision. These areas will be identified in the final ROD of the new RMP, in development. No changes to current NRF, other than the projects evaluated in this BA (and other BA's completed prior to new RMP Record of Decision), will occur without further consultation. Any activities that occur in "high quality habitat" in the future would be analyzed in the baseline and effects analysis of future consultations for those activities.

3.2 Northern Spotted Owls - Threatened

General Life History of Northern Spotted Owls

Northern spotted owls were listed as a threatened species in 1990 (55 FR 123:26114-16194; USFWS 1990), and their status was reviewed and upheld in 2004 (68 FR 76:19569-19571). They are associated with forests that support large trees, multi-canopies, snags and down wood, adequate prey, and flying space. Prey consists of small mammals, primarily dusky-footed woodrats, flying squirrels, red tree voles, deer mice, and other small rodents. Woodrats are the primary prey in the Medford District.

Spotted owls are relatively long-lived birds (over 10 years in the wild). They are territorial and have strong ties to nest sites, often staying at their nesting site or a nearby alternate nest site throughout their adult lives. The strong site tenacity makes site evaluations an appropriate way to estimate demographics when individual bird counts are not possible. Spotted owls tend to mate for life and females usually do not breed until they are at least three years old. They generally have one to two young, but one to four eggs have been documented. They are biologically capable of breeding every year, but most pairs breed in alternate years or less often. Birds remain close to nest patches when they are nesting because they need to feed young. Both males and females share egg incubation and feed young, but females spend the early breeding period on the eggs and are fed by the male. Brood patches on females provide a fairly good indication of nesting behavior. Young remain on the platform or cavity nest until they fledge, usually in late July, but parental care continues into September. Forsman et al. (2002) found the mean date of dispersal (when young leave to find their own territories) was September 19 in Oregon. Juvenile mortality is high and post-fledgling survival is low, based on band recovery.

The *Northern Spotted Owl Five-Year Review: Summary and Evaluation* (USDI FWS 2004, 15) summarizes new information on dispersal:

> "Natal dispersal is the movement of an owl from its territory of birth to a new territory where it may potentially breed. Breeding dispersal is the movement of a territorial, non-juvenile owl between territories where it may potentially breed. Since 1990, expanded and more comprehensive analysis of radio-marked owls in Oregon and Washington (Forsman et al. 2002) and expanded analysis of re-observed color-banded birds across the species range (Forsman et al. 2002, Diller and Hibbard 1996) have provided new information about both types of dispersal by northern spotted owls.
>
> The distribution of natal dispersal distances measured was skewed towards shorter distances with median dispersal distance of females (24.5 km for banded and 22.9 km for radio-marked owls) greater than that of males (14.6 km for banded and 13.5 km for radio-marked owls). Only 8.9 percent of juveniles dispersed > 50 km (range 0.6 – 111.2 km) (Forsman et al. 2002)."
>
> "In general, owls did not disperse across the Willamette, Umpqua nor Rogue Valleys of Oregon, but did disperse between the Coast Range and Cascade Mountains through forested foothills between the non-forested valleys (Forsman et al. 2002).

> An average of 6 percent of banded, non-juvenile owls exhibited breeding dispersal annually. Probability of breeding dispersal was greater for females, younger owls, owls without mates in the previous year and owls that lost their mates from the previous year through death or divorce (Forsman et al. 2002). Of radio-marked owls that were alive, 44 percent of females and 22 percent of males were paired at 1 year of age, and 77 percent of females and 68 percent of males were paired at 2 years of age. Among owls banded as juveniles, 9 percent were first re-observed as territorial individuals at ≥5 years of age (Forsman et al. 2002)."

Spotted owls vocally defend territories and their territorial calls are useful in finding nest sites. Reducing noise and activities around the nesting birds (or young prior to fledging) is an important strategy to reduce the potential impacts of disturbance while birds are close to the nest area.

Northern Spotted Owl Likelihood of Occupancy

Owl sites in Medford BLM

The Medford BLM identified 595 owl sites in the Medford Action Area from historic information, protocol surveys, NEPA field evaluations, incidental observation, or OEM. All known sites are incorporated into the OEM. Protocol owl surveys for pre-project clearances are not required in matrix or AMA lands under the NWFP, although field biologists may opportunistically locate nests during NEPA field evaluations. Nest sites located up to 1994 were designated as "unmapped" LSRs in the NWFP and protected with a 100-acre no-harvest zone. The NWFP did not presume these small patches would support viable owl nesting; rather, they were retained to serve, along with riparian areas and other reserve areas, as connectivity blocks and short-term habitat. Any owl that has changed its nesting location or moved into matrix or AMA lands since 1994 receives no mandatory protection, except protection of the nest tree and seasonal operating restrictions during the critical nesting period of active nest sites.

Medford BLM tracks habitat and habitat changes through forest inventory data. The BLM presents the environmental baseline information in terms of habitat and predicts effects using habitat. Information from the demographic study areas, across the range of the spotted owl, helps support the relationship between owls and habitat. The OEM documents the published relationship between owl sites and habitat (Appendix D). We assume spotted owls are present if habitat, as described in the literature, is available in adequate amount, condition, and pattern to support owls.

Surveys for owls, such as those in demographic study areas, are reliable methods to indicate population trends when consistently conducted according to protocols over multiple years and across large areas. They are designed to even out annual fluctuations in spotted owl breeding patterns. Fluctuations can include the tendency for many owls to successfully nest every other year, regional or local weather influences such as (cold or rain that can kill nestlings), prey fluctuations, or individual site behavior such as older owls that may attempt to nest but cannot produce viable nestlings. The long-term trend data obtained from demographic studies (or other owl site surveys) are valuable to display population trends; they are not adequate to assess the reasons for those trends. Cause-and-effect studies require much more rigorous research, very

large sample size, and quantitative analysis of factors known or suspected to affect spotted owl productivity.

The majority of other spotted owl surveys conducted throughout western Oregon were not long-term type surveys. Most were 1- or 2-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 are generally not long enough to document alternate nest sites or to determine which peripheral habitat patches are important to floaters. Also, they were not designed to document the habitat patches in a given landscape likely to be occupied by spotted owls in the future; long-term studies have confirmed this limitation.

Site-specific surveys can indicate contradictory patterns to the demographic trend studies because they are more highly influenced by local conditions, behavior of individual owls, and other facts that cannot be documented. Therefore, site-specific surveys cannot be used for trend indication. Occupancy data alone cannot adequately describe cause-and-effect relationships. The relationship between owl habitat and owl occupancy has not been quantitatively established because of the many other factors influencing wildlife populations, although it has been documented to be a major contributing factor to owl trends (Dugger et al. 2005; Olson et al. 2004).

Demographic Studies

The Medford BLM and Roseburg BLM share management of the Klamath Study Area, a 340,224-acre area located northwest of Medford, Oregon. The Klamath Study Area is one of eight long-term studies which assess trends in spotted owl populations and habitat. The study area consists of 144 sites that have been systematically surveyed since 1997.

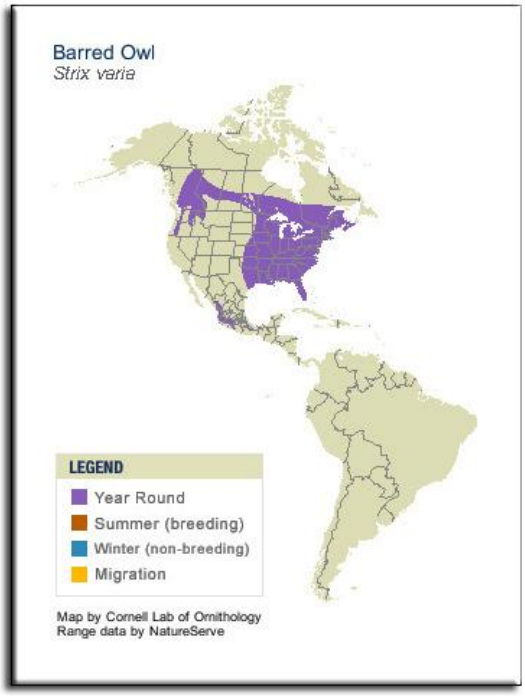
In the Medford portion of the study area, 91 sites were monitored over the past 5 years. Most sites have data for 5 years, although 1 site (North Lawson) has only 2 years of data. (Rob Horn, personal communication, 11/26/07).

Within the Medford portion of the Klamath Study Area during 2007, 39 sites had pair status, compared to 46 sites in 2006, 48 sites in 2005, 48 sites in 2004, and 50 sites in 2003. It is important to note that annual variation between sites and yearly variation at the same site can be very great and is not necessarily a reflection of the “health” of that site or the birds at that location. Longer trends over multiple years helps to compensate for seasonal differences (e.g., wet year, good or poor nesting year, or poor prey year).

Barred Owls

The 2008 Final Recovery Plan for the Northern Spotted Owl identifies competition from the barred owl as a important threat to the spotted owl.(USFWS 2008). Barred owls (Strix varia) are native to eastern North America, but have slowly moved west into spotted owl habitat. Since barred owls are less selective about the habitat they use and the prey they feed on, they are out competing northern spotted owls for habitat and food.

At the time the northern spotted owl was listed in 1990, little was known about the threat posed by barred owls. Since listing, information on the effects of barred owls on spotted owls has increased. However, the 2004 *Northern Spotted Owl Five-Year Review* noted, "data are currently lacking that would allow accurate prediction of how barred owls will affect northern spotted owls in southern, more xeric, portion of the range (i.e., California and Oregon Klamath regions)" (USFWS 2004, 35).



The effects of the barred owl on spotted owl survival and reproduction is unknown, however, there is a trend of increasing numbers of barred owls within the Medford portion of the Klamath Study Area. Barred owls are detected opportunistically. In 2000, four sites had at least one detection, the first year more than 2 sites had detections. Barred owls were detected at 7 sites in 2003, 11 sites in 2004, 10 sites in 2005, 17 sites in 2006, and 15 sites in 2007.

Forsman et al. (2007) notes,

> "Barred owls compete with spotted owls for space. In some study areas where barred owl populations are higher than the Tyee DSA, spotted owl populations are declining more rapidly (Anthony et al. 2006). The Tyee "study area has experienced rapid increases in barred owls recently and it appears that this may be causing increased social instability with the spotted owl population."

Northern Spotted Owl Sites in Medford District BLM Action Area

Table 8. Ownership and Number of Spotted Owl Sites (point centers) within the Medford District BLM Action Area by Resource Area, Land Use Allocation, and Physiographic Province

LUA (BLM only)	Ownership	Physiographic Province		Total
		Cascades West	Klamath Mountains	
Ashland Resource Area Boundary				
	Forest Service	5	15	20
	Non-Federal	1	6	7
AMA	BLM	0	41	41
AW	BLM	24	0	24
Matrix	BLM	30	17	47
	Total Ashland	**60**	**79**	**139**
Butte Falls Resource Area Boundary				
	Forest Service	12	1	13
	Non-Federal	8	11	19
LSR	BLM	20	0	20
Connectivity Block	BLM	5	5	10
Matrix	BLM	39	37	76
	Total Butte Falls	**84**	**54**	**138**
Glendale Resource Area Boundary				
	Forest Service	0	9	9
	Non-Federal	0	11	11
	OR Dept of Forestry	0	2	2
CR	BLM	0	4	4
LSR	BLM	0	32	32
Connectivity Block	BLM	0	19	19
Matrix	BLM	0	82	82
	Total Glendale	**0**	**159**	**159**
Grants Pass Resource Area Boundary				
	Forest Service	0	11	11
	Non-Federal	0	4	4
AMA	BLM	0	16	16
AMR	BLM	0	22	22
CR	BLM	0	1	1

Table 8. Ownership and Number of Spotted Owl Sites (point centers) within the Medford District BLM Action Area by Resource Area, Land Use Allocation, and Physiographic Province

LUA (BLM only)	Ownership	Physiographic Province		Total
		Cascades West	Klamath Mountains	
LSR	BLM	0	36	36
Connectivity Block	BLM	0	1	1
Matrix	BLM	0	55	55
	Total Grants Pass	**0**	**146**	**146**
Other				
	Forest Service	2	6	8
	OR Dept of Forestry	0	1	1
LSR	BLM	0	3	3
Connectivity Block	BLM	0	1	1
	Total Other	**2**	**11**	**13**
	Total Sites	**146**	**449**	**595**

NWFP land use allocations:
AW - Administratively Withdrawn AMA - Adaptive Management Area AMR - AMA that overlaps LSR
LSR - Late-Successional Reserve (BLM lands only) CR – Congressionally Reserved

Northern Spotted Owl Habitat in the Medford District

Table 7 displays acres across all ownerships across the Action Area. Medford BLM administers approximately 28 percent of the Action Area (Table 9). As of August, 2008 (D. Assali, 08/08), Medford GIS confirms 44 percent of all Medford District BLM ownership is NRF habitat, , and 15 percent dispersal habitat (Table 9 and Figure 1). Since NRF also functions as dispersal, 59 percent of all Medford BLM lands support dispersal. Capable lands have the capability of developing into at least owl dispersal habitat or better over time, if not altered by harvest or fire. When combined with current habitat, 88 percent of Medford District BLM has the capability of becoming habitat over time.

Table 9. Spotted Owl Habitat on Medford District BLM lands

Habitat Category	Acres	Percent
Non-habitat*	100,457	12
Capable*	252,548	29
Dispersal	129,218	15
NRF	380,741	44
Total	**862,964**	**100**

*Capable and Non-habitat acres are subject to additional verification and are likely to change. These changes will not affect BA analysis.

Figure 1. Northern spotted owl habitat in Action Area by physiographic province.

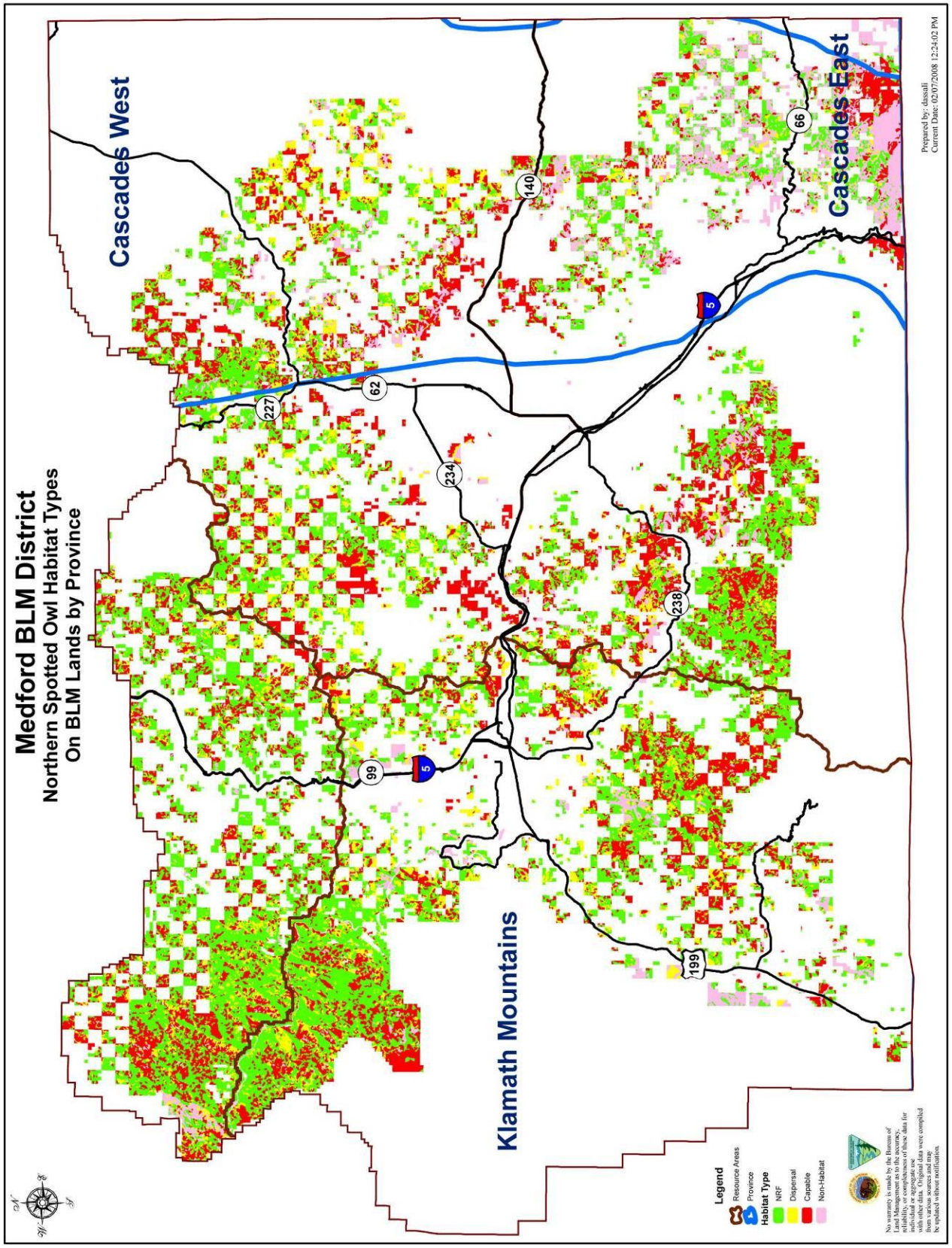


Table 10. Acres of 2008 Baseline Spotted Owl Habitat on Medford District BLM Lands by Physiographic Province

Habitat Category	Physiographic Provinces (BLM only)			Grand Total
	Cascades East	Cascades West	Klamath Mountains	
Non-habitat	2,977	62,159	35,321	**100,457**
Capable	571	59,383	192,594	**252,548**
Dispersal	30	30,002	99,186	**129,218**
NRF	562	73,773	306,406	**380,741**
Total	**4,140**	**225,317**	**633,507**	**862,964**

SOURCE: BLM GIS data (Assali August, 2008). GIS carried to 5 decimals. Numbers from GIS are corrected to sum correctly on the table.

Table 11. Acres of 2008 Baseline Habitat on BOR Lands within the Medford District BLM Boundary

Habitat Category	Klamath Mountains Physiographic Province
Non-habitat*	2,526
Capable*	17
Dispersal	201
NRF	519
Total	**3,264**

SOURCE: BLM GIS data (Assali August 2008).

*BLM validated baseline data on BOR for owl habitat only. Non-habitat and capable acres may need additional validation. Land tenure (Table 7) and environmental baseline acres have small GIS discrepancies due to older land tenure base layers.

The Medford BLM will administer a project on BOR lands within the boundaries of the Ashland Resource Area. The BOR baseline owl habitat category has not been classified outside of the Medford BLM field-evaluated project units. Only total ownership on BOR lands within the Medford BLM boundary is displayed.

Northern Spotted Owl LSRs

The intent of LSRs 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 and USDI 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 Interagency Scientific Committee (ISC) (Thomas et al. 1990), then adopted and refined by the *Final Draft Recovery Plan for the Northern Spotted Owl*, *Forest Ecosystem Management: An Ecological, Economic, and Social Assessment* (the FEMAT Report), and the Record of Decision for the NWFP. All or parts of seven LSRs contribute to the network of reserves designed for the conservation of the spotted owl within the Action Area (Appendix E). 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 managed to improve late-successional forest conditions. We expect habitat for northern spotted owls should improve accordingly over time.

Table 12. Spotted Owl Habitat in LSRs on Medford BLM by Physiographic Province

LSR Number	Non-habitat		Capable		Dispersal		NRF		Total
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	
Cascades West Physiographic Province									
RO224	665	3	9,159	40	2,300	10	10,854	47	22,978
Klamath Mountains Physiographic Province									
LSOG/MMR Add-On	531	15	433	13	683	20	1,810	52	3,457
RO223	694	3	7,081	27	3,019	11	15,307	59	26,101
RO249 (AMR portion)	1,131	3	12,364	38	4,356	13	14,672	45	32,523
RO249 (LSR portion)	1,216	6	6,082	33	2,793	15	8,575	46	18,666
RO255	17	3	344	63	80	15	103	19	544
RO258	1,576	2	24,964	30	10,827	13	47,177	55	84,544
RO259	0	0	0	0	0	0	28	100	28
Klamath Total	**5,165**	**3**	**51,268**	**31**	**21,758**	**13**	**87,672**	**53**	**165,863**
Total	**5,830**	**3**	**60,427**	**32**	**24,058**	**13**	**98,526**	**52**	**188,841**

NOTE: All tables were generated to 5 decimals in GIS. Minor discrepancies in GIS acres are inherent in GIS analysis, depending on the GIS analysis run

Table 12 displays habitat within AMRs and large LSRs on Medford District BLM lands in the Action Area, LSRs and AMRs are managed to maintain or improve spotted owl habitat, as described in the Medford Resource Management Plan (USDI, 1995). A total of 22 percent of BLM land within the Action Area are in one of these LUAs. Most LSRs are currently providing NRF habitat (Table 12). Approximately 52 percent of the LSRs on Medford BLM are NRF habitat. The NWFP proposed managing capable LSRs into functional late-successional habitat over time. Some minor tree harvest (light thinning and fuels reduction), designed to improve late-successional habitat by expediting large tree establishment and structure over the long-term, has occurred within LSRs since 1994. Stand-replacing fires have been the greatest loss of NRF habitat within LSRs in the Action Area.

Northern 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 NWFP identified several management areas, in addition to matrix, AMA, and LSR/AMR lands that meet canopy conditions, that serve as dispersal habitat

for spotted owls: riparian reserves, 15 percent leave trees in harvest units, 100-acre LSRs (known spotted owl activity centers), and 15 percent Late-Successional/Old Growth (LS/OG) retention guideline. Dispersing owls use habitats classified as NRF and dispersal habitat.

Dispersal habitat provides cover, food, and protection on a temporary basis to non-nesting owls moving between and among patches of NRF habitat. Dispersal habitat must be adequate both spatially and structurally 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 and 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 NRF habitat, the more likely spotted owls will successfully complete the journey (Thomas et al. 1990).

The Medford BLM reports dispersal habitat by physiographic province (Table 13). We calculated dispersal habitat (as described in Appendix A) across Medford BLM lands. All-dispersal habitat includes dispersal habitat (those lands that allow an owl to disperse but do not include nesting characteristics), plus NRF habitat (which also functions as dispersal).

Northern Spotted Owl Critical Habitat

Designation of critical habitat serves to identify lands considered essential for the conservation and recovery of listed species. The functional value of critical habitat is to preserve options for the species' eventual recovery. On September 12, 2008, the Service finalized the revised critical habitat for the spotted (57 FR 10:1796-1837). The Service's primary objective in designating critical habitat was to identify existing spotted owl habitat and highlight specific areas where management considerations or protections may be required. Based on the ISC's conservation strategy (Thomas et al. 1990), the Service designated CHUs to protect clusters of reproductively capable spotted owls. CHUs were distributed in a manner that would facilitate demographic interchange.

The Service has determined the physical and biological habitat features, referred to as the primary constituent elements that support nesting, roosting, foraging, and dispersal, are essential for the conservation of the northern spotted owl [50 CFR 17.95(b)]. Spotted owls use a wider array of forest types for foraging and dispersal including more open and fragmented habitat, although less is known about the characteristics of foraging and dispersal habitat. Habitat that meets the species' needs for nesting and roosting also provides for foraging and dispersal. The term "dispersal" frequently refers to post-fledgling movements of juveniles; for the purposes of this rule, the Service is using the term to include all movement and to encompass important concepts of linkage and connectivity among owl subpopulations.

Northern Spotted Owl Critical Habitat in the Action Area

Table 13. Spotted Owl Dispersal, NRF, and All-Dispersal Habitat on Medford BLM Land by CHU (2008)

CHU	Total BLM Acres	Dispersal		NRF		All-Dispersal	
		Acres	Percent	Acres	Percent	Acres	Percent
Klamath Intra-Province 16	38,457	6,269	16%	17,326	45%	23,594	61%
Oregon Klamath Mountains 15	549	81	15%	106	19%	186	34%
Rogue/Umpqua 14	95,615	13,278	14%	59,515	62%	72,793	76%
Southern Cascades 17	54,095	2,468	5%	14,000	26%	16,468	31%
Total	**188,716**	**22,095**	**12%**	**90,946**	**48%**	**113,040**	**60%**

*As calculated by GIS(D. Assali). Full integers noted on table to account for GIS rounding issues.

There are four Critical Habitat Units on Medford BLM lands (Table 13). All CHUs have at least 31 percent habitat that meets All-Dispersal habitat conditions, as described in the literature (see Section 1.1, Definitions). Two CHUs have over 60% habitat that functions as dispersal.

3.3 Marbled Murrelet - Threatened

Introduction

The marbled murrelet is a small seabird (*Alcidae*) that nests along the Pacific coast from Alaska to central California, and winters as far south as Baja California, Mexico. Murrelets forage at sea where they consume a diversity of prey species including small fish and invertebrates, but nest on large limbs in old growth coniferous forests, sometimes up to 50 miles from the coast.

The 2006 status review (USFWS 2006) reconfirmed the murrelet's status as a threatened species and summarized the terrestrial habitat. Throughout the forested portion of their range, marbled murrelet habitat use is positively associated with the presence and abundance of mature and old growth forests, large core areas of old growth, low amounts of edge and fragmentation, proximity to the marine environment, and increasing forest age and height (McShane et al. 2004, 4-39; Binford et al. 1975, 315-316; Hamer and Nelson 1995b, 72-75; Ralph et al. 1995, 4). In all cases, marbled murrelets focus on the presence of platforms used for nesting. Platform presence is more important than the size of the nest tree, and tree size alone is not a good indicator of the abundance of platforms (Evans Mack et al. 2003, 3). The presence of platforms is the most important characteristic of marbled murrelet nesting habitat (Burger 2002, 40 and 43; McShane et al. 2004, 4-45–4-51, 4-53, 4-55, 4-56, 4-59; Nelson 1997, 6; Huff et al. 2006, 12-13, 18). Individual tree attributes that provide platforms suitable for nesting include large or forked branches, deformities caused by broken tops or mistletoe infection, or other structures large enough to provide a platform for a nesting adult murrelet (Hamer and Nelson 1995b, 79).

Platforms are defined as limbs 4 inches (10 centimeters) in diameter or more and 33 feet (10 meters) or more above ground (Burger 2002, 41-42; McShane et al. 2004, 4-31). Tree diameter and height have been positively correlated with platform size and the abundance of platforms, but the relationship may change depending on the variety of tree species and forest types marbled murrelets use for nesting (Huff et al. 2006, 12). Overall, nest trees in Washington, Oregon, and northern California have been greater than 19 inches (48 centimeters) dbh and greater than 98 feet (30 meters) tall (Hamer and Nelson 1995b, 81). Other important attributes of the platform are vertical and horizontal cover and substrate. Known nest sites have platforms that are generally protected by branches above (vertical cover) or to the side (horizontal cover)(Huff et al. 2006, 14). Marbled murrelets appear to select limbs and platforms that provide protection from predation (Luginbuhl et al 2001, 558; Marzluff et al. 2000, 1135; Raphael et al. 2002b, 226 and 228) and inclement weather (Huff et al. 2006, 14). Substrate, such as moss, duff, or needles, on the nest limb is important for protecting the egg and preventing it from falling (Huff et al. 2006, 13)

We map MAMU habitat using spotted owl NRF habitat as a preliminary screen. During project development, field verification will take place to determine if conditions such as large limbs, potential nesting platforms and tall trees are present.

Range-wide habitat loss is by far the greatest terrestrial threat to murrelets. Timber harvest has reduced the amount of old growth forest habitat within western Oregon and Washington by more than 80 percent and it is likely disproportionate harvesting has occurred within the range of the murrelet compared with forests further inland (USDI FWS 1992b). The NWFP establishes all murrelet occupied stands on Federal lands as LSRs, which greatly restricts the habitat modification activities that can occur. In 1996, the Service designated murrelet critical habitat, which largely overlaps mapped LSRs within the murrelet range on Federal lands.

There is potential for disturbance to breeding murrelets from activities in adjacent non-murrelet habitat. The majority of information on disturbance to nesting marbled murrelets has been from anecdotal observations and inferred from studies on other seabird species (Long and Ralph 1997). Professional opinions vary on the subject but it is the Service's and the BLM's positions to approach the issue cautiously until such data exist to support a less restrictive approach to disturbance issues. The sensitivity of an individual to disturbance is likely related to the baseline level of disturbance the bird is accustomed to, the level and proximity of disturbance (Hamer and Nelson 1998), and the timing of the disturbance within the nesting cycle and daily activity periods. Many bird species, including murrelets, can habituate to relatively high levels of disturbance over time (Long and Ralph, 1997; Hamer and Nelson 1998). However, for murrelets, the adverse effects of disturbance may also lead to nest abandonment by adults, reduced nest attentiveness (leading to increased vulnerability of predation), aborted feeding visits, premature fledging, and avoidance of otherwise suitable habitat (Hamer and Nelson 1998).

An account of the taxonomy, ecology, and reproductive characteristics of the marbled murrelet can be found in the 1988 species status review (Marshall 1988), the final rule designating the species as threatened (USDI FWS 1992b), the final rule designating critical habitat for the species (USDI FWS 1996), *Ecology and Conservation of the Marbled Murrelet* (Ralph et al. 1995), *Recovery Plan for the Marbled Murrelet* (USDI FWS 1997), and the Service's BO for

Alternative 9 (USDI FWS 1994) of the *Final Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (USDA and USDI 1994a). For a detailed discussion of the life history of the marbled murrelet, see the *Rogue River/South Coast Biological Assessment 18 July/27 September 2001, FY 01/02/03 Timber Sale Projects for the Medford District, Bureau of Land Management Rogue River and Siskiyou National Forests*.

In 1995, it was estimated 1,077 occupied murrelet sites occurred within Washington, Oregon, and California. Suitable habitat for the murrelet was estimated at 2,561,500 acres of Federal lands in the listed range of this species (Ralph et al. 1995). Murrelet habitat is protected on Federal land under the NWFP.

The loss of significant amounts of suitable, unoccupied murrelet habitat may hamper efforts to stabilize and recover this species. The Federal listing of the murrelet as Threatened was primarily based on the loss of late-successional forest and the subsequent reduction in the number of nest sites available to murrelets (USDA and USDI 1994a; Carter and Erickson 1992; Sowls et al. 1980). This loss of habitat may also explain gaps in their inland distribution.

Likelihood of Marbled Murrelet Occupancy

The Medford BLM has never confirmed murrelet occupancy, although lands west of the District on the Rogue River-Siskiyou National Forest lands in the Coast Range portion of the Klamath Mountains Province contain 200 occupied murrelet sites and 491 sites where presence has been detected; all were detected within 32 miles of the coast and are well distributed within that zone. No murrelets were detected more than 32 miles from the coast during more than 9,700 surveys conducted from 1998 through 2001 within the known murrelet range in the Province.

The Service (71 FR 176: 5384) summarized data showing marbled murrelets occupied sites with greater percentages of old growth forest and large saw-timber within 0.5 miles (0.8 kilometers) of nest sites [501-acre (203-hectare) circles]. Raphael et al. (1995, 189) suggested tentative guidelines based on this analysis that sites with 35 percent old growth and large saw-timber in the landscape are more likely to be occupied. Detections of marbled murrelets at inland sites and densities offshore were found to be higher in or adjacent to areas with large patches of significant old growth, and in areas of low fragmentation and isolation of old growth patches (Raphael et al. 1995, 188-189; 2002a, 221; 2002b, 337; Burger 2002b, 54; Meyer and Miller 2002, 763-764; Meyer et al. 2002, 109-112; Miller et al. 2002, 100).

In California and southern Oregon, areas with abundant numbers of marbled murrelets were farther from roads, occurred more often in parks protected from logging, and were less likely to occupy old growth habitat if it was isolated [greater than 3 miles (5 kilometers)] from other nesting marbled murrelets (Meyer et al. 2002, 102-103). Marbled murrelets are no longer known to occur in areas without suitable forested habitat [sites with 35 percent old growth within 0.5 miles (0.8 kilometers) of nest sites], and they appear to abandon highly fragmented areas over time (areas highly fragmented before the late 1980s generally did not support marbled murrelets by the early 1990s) (Meyer et al. 2002, 103; 71 FR 176:53841).

Marbled Murrelet Critical Habitat

Critical habitat for marbled murrelets was designated in May 1996 (61 FR 102:26256-26320). The Service has designated approximately 3.9 million acres of land as critical habitat, of which 78 percent (3.0 million acres) is located on Federal lands within the area covered by the NWFP boundary.

Within the Action Area, 421,000 acres have been designated as marbled murrelet critical habitat (Figure 3). Of this total, 150,000 acres are suitable marbled murrelet habitat; 66,726 acres of suitable habitat are located within the known range (Area A) mostly within LSRs and CHUs. Approximately 1,639 acres of suitable habitat in the known range was removed in the 2002 Biscuit Fire. An additional 7,000 acres of critical habitat included in this BA are managed by the Coos Bay District BLM.

The Service considers two components of marbled murrelet habitat to be biologically essential: (1) terrestrial nesting habitat and associated forest stands and (2) marine foraging habitat used during the breeding season. Within areas essential for successful marbled murrelet nesting, the Service has focused on the following primary constituent elements: (1) individual trees with potential nesting platforms and (2) forested areas within 0.5 miles (0.8 kilometers) of individual trees with potential nesting platforms, and with a canopy height of at least one-half the site potential tree height. Within the boundaries of designated critical habitat, only those areas that contain one or more primary constituent element are, by definition, critical habitat.

Reductions or removal of marbled murrelet habitat and critical habitat on Medford BLM has been minimal since 2003. To date, no suitable habitat has been removed and no suitable habitat within critical habitat has been removed due to management activities since the marbled murrelet was listed. Wildfires have reduced 37,089 acres of suitable habitat on a combined baseline of Rogue River National Forest/Medford BLM (320,707 acres) since 1994 (USDA and USDI 2006).

Proposed Revised Marbled Murrelet Critical Habitat

The Service has published a revised marbled murrelet critical habitat proposal on July 31, 2008. There are 10,052 acres of potential marbled murrelet habitat within the proposed CHU revision in the Glendale and Grants Pass Resource Areas.

Figure 2. Marbled murrelet critical habitat.

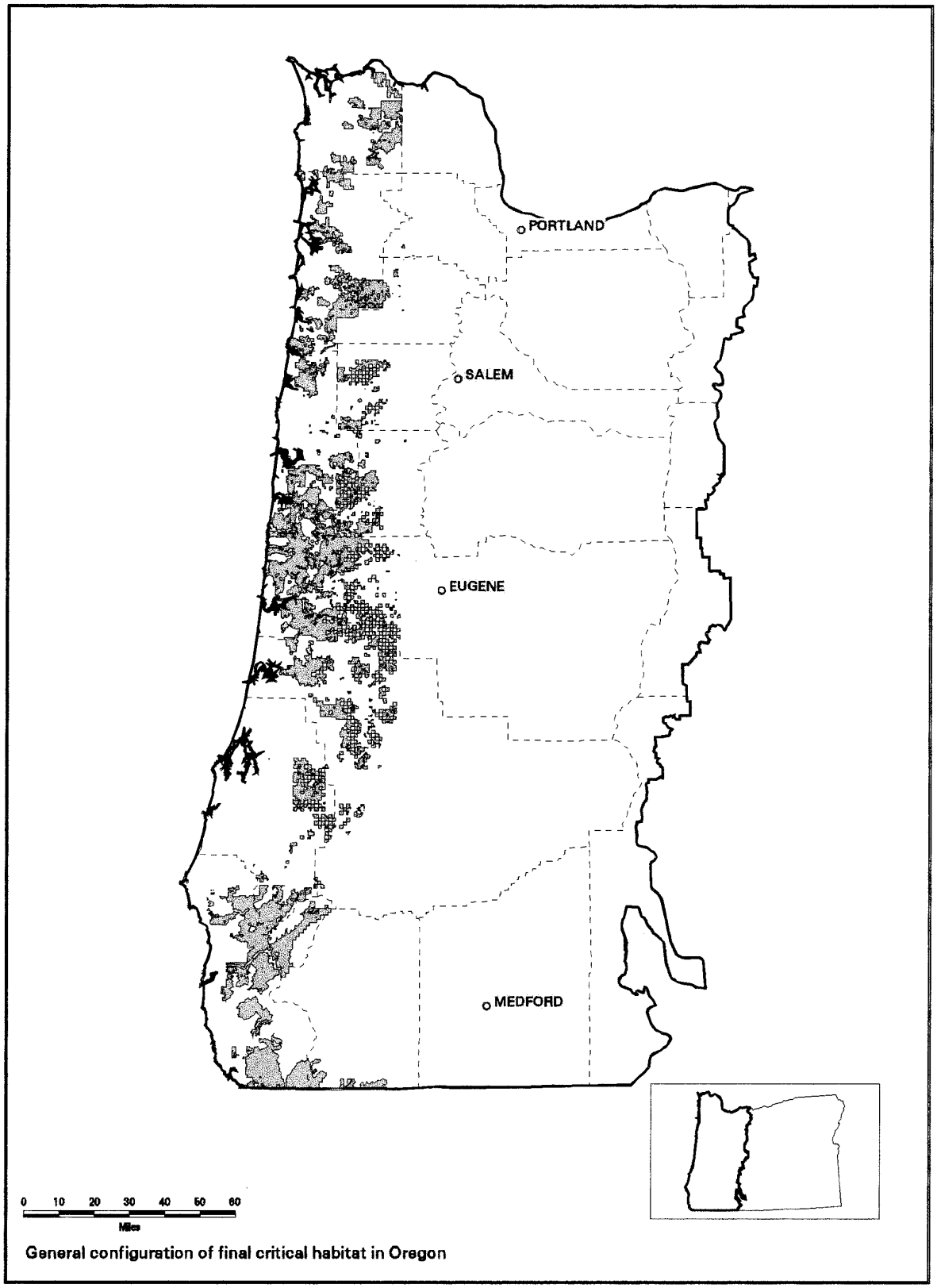
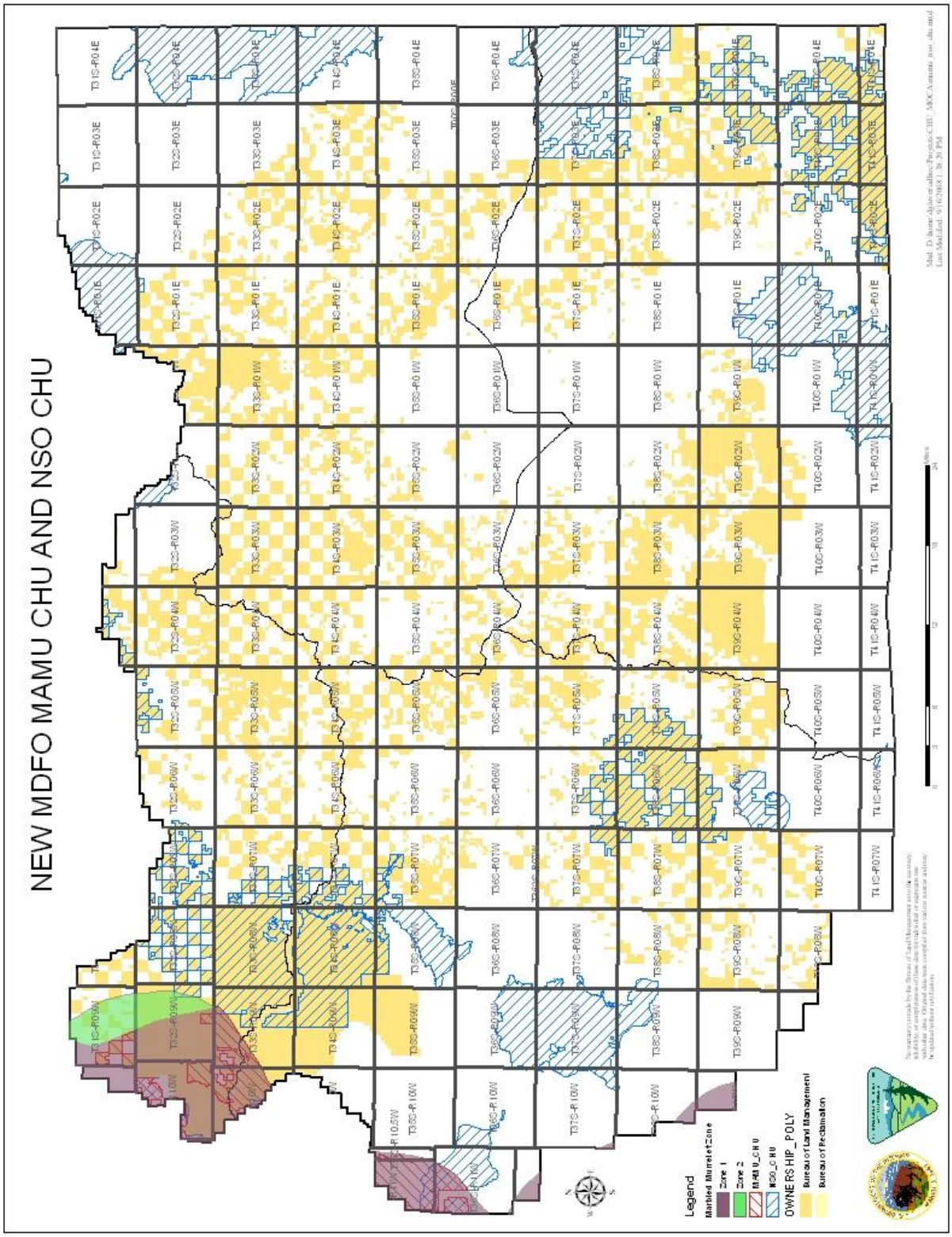


Figure 3. Proposed Marbled Murrelet Critical Habitat on the Medford District



4. Effects

4.1 Introduction

The effects of the proposed actions to spotted owls and marbled murrelets described in this BA are analyzed separately for each species. We describe potential disturbance effects to both species, and describe habitat changes across the Action Area by habitat removal or downgrade, or habitat treated and maintained for owls, as compared to the current environmental baseline. We analyze the effects of projects that occur within the provincial home range, core area, and nest sites for spotted owls by using the OEM for each affected owl site.

Direct and Indirect Effects

Direct effects are the immediate consequences of the proposed action. A regeneration harvest, for example, causes the immediate loss of habitat. Indirect effects occur over time following implementation of the proposed action. For example, certain thinning treatments are done for forest health and, over time, will accelerate forest growth and creation of late-successional forest conditions. In the short-term, such a treatment may cause an adverse or negligible direct effect. Over the long-term, a thinning treatment could beneficially affect late-successional dependent species due to accelerated development of late-successional forest characteristics. Noise and activity could be a direct effect on the species, however PDC reduce adverse effects by seasonally limiting activities or through spatial restrictions.

Interrelated and Interdependent Actions

Interrelated actions are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that might occur independently of the larger action, but which have no independent utility apart from the action under consideration. Interdependent actions depend on the Federal action and would make no sense without it.

Timber harvest projects often have activities directly or indirectly associated with their completion. For example, timber harvest necessitates site surveys for wildlife, archeology, fisheries, and botany; road construction or timber hauling on existing system roads; and post-harvest treatment to prepare sites for planting, fuels reduction, and restoration efforts. Timber harvest can reduce the size and continuity of existing late-successional stands, and interior forest habitat may be impacted. All timber harvest will have interrelated and interdependent effects.

Road construction has effects on spotted owls and their habitats. Clearing for the road right-of-way may remove NRF habitat, but PDC reduce the potential to disturb nesting pairs in close proximity. Acres logged as part of road building are included in the totals for the timber harvest.

Other interrelated and interdependent actions to timber harvest include brush disposal (lop and scatter, pile, pile and burn), site preparation, reforestation (planting and seeding), release (brush control), fertilization, and precommercial thinning (PCT). Brush disposal activities vary by timber sale due to fuels management objectives, requirements for retention of down woody material, and other resource management goals. Brush disposal abates the slash created by the timber harvest. Typical activities associated with this program include pile burning; broadcast

burning harvest units; and rearranging fuels by crushing, mulching, and lopping and scattering. These activities often occur in areas not considered habitat for any of the other listed or proposed species discussed in this document. When they occur in habitat during the critical breeding period, they could disturb listed or proposed species.

Pile and broadcast burning would normally occur within portions of the proposed harvest areas after harvest. Some acres may be planted post-harvest. Burning, planting, and wildlife tree creation operations that use power equipment or blasting may affect any owls that might be present in surveyed and unsurveyed NRF habitat, through noise disturbance. The PDC described in this document would be implemented for those activities.

Noise and activity can also be an interrelated interdependent effect that would not occur "but for" the harvest activity. All noise and activity impacts are analyzed as part of the harvest treatment activities when in the occupied habitat, as defined by the OEM.

Disturbance Effects

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. For clarification in this BA, we define "disturbance–no habitat" as those activities that do not affect habitat, but could have noise or activity impacts on nearby listed species. The disturbance associated with habitat treatments are evaluated as a part of that treatment activity and are not analyzed separately.

Wildlife are vulnerable during the reproductive period. Birds have expended their energy into finding mates and building nests, and females have invested considerable energy reserves into egg production. Spotted owls generally fledge in May or June (3 to 5 weeks after hatching). The young are fed by both parents until August or September (Forsman et al. 2002). The demand for food (for the young) is high while young are on the nest. Young are vulnerable during the reproductive period and when they are learning to survive on their own (prefledging in birds). They are less mobile, less experienced, and less able to defend themselves than when they are older and have developed flight ability and hunting experience. Forsman et al. (1984), Gutierrez et al. (1985a, 1985b), and Miller (1989) documented that juveniles had significantly higher mortality rates than adults. Miller (1989) and Gutierrez et al. (1985a, 1985b) found that few juveniles survived to reproduce. We think disturbance during the reproductive period would have adverse impacts on spotted owls and marbled murrelets. We have provided PDC to reduce or avoid those impacts.

4.2 Effects to Northern Spotted Owl

Effects of Disturbance to Northern Spotted Owls

All activities with the potential to disturb northern spotted owls will implement mandatory PDC. Mandatory PDC will ensure sites are protected during the critical breeding period or protocol surveys ensure the sites are not active, have non-nesting adults, or young have fledged. Spotted owls generally fledge in May or June (3 to 5 weeks after hatching). The young are fed by both

parents until August or September (Forsman et al. 2002). Seasonal protection of nesting owls during the critical breeding period is designed to allow juveniles to fledge undisturbed. Once fledged, we assume that owls, if bothered by the noise and activity, could fly away from the disturbance. PDC ensure potentially disturbing activities within the disturbance distance of a documented or generated owl site will avoid adverse effects.

There is also disturbance potential from activities that affect habitat. The disturbance is considered an interrelated and interdependent effect of the habitat impact and is not analyzed separately. PDC will reduce the potential disturbance effects to nesting birds and their young, although NFR habitat downgrade and removal are considered adverse activities, whether or not the activity occurs within the disturbance distance of an owl site.

PDC avoid the disturbance which could affect individual adult spotted owls or young such that their normal behavior, survival, or reproduction might be compromised. However, seasonal protection allows nesting adults and their young the opportunity to find other habitat once young have fledged from their nest site. BLM will implement mandatory PDC and, when possible, recommended PDC to avoid adverse effects from disturbance.

Effects on Northern Spotted Owl Non-habitat and Capable Habitat

The proposed actions (Table 3 and Table 6) include up to 200 acres of activities in the Cascades West Province and 2,000 acres in the Klamath Mountains Province on lands classified as non-habitat or capable habitat. These activities have the potential to disturb owls if they occur adjacent to occupied nest sites during the critical breeding period. Seasonal and distance PDC can be effective at eliminating or reducing disturbance during this sensitive period. The Medford BLM has incorporated all reasonable protections during this period of time to reduce or avoid disturbance effects to listed species.

We determine these activities are “no effect” because they occur on lands that are not habitat and mandatory PDC applied using the disturbance distances (Table C-1, Appendix C, PDC) for suitable habitat would avoid potential affects due to noise or activity.

Effects to Northern Spotted Owls based on the Owl Estimation Methodology

Medford BLM provided the OEM team with 423 sites from historic observations in the Action Area where one or more owls could be present. The team ran the OEM outside those documented sites to locate additional areas that had enough habitat to potentially support a spotted owl site, and generated a site at that location. Generated owl sites are those identified by the OEM as highly likely to be occupied by owls (Appendix D, Owl Estimation Methodology). The OEM generated 172 sites, for a total of 595 sites across the Action Area. Generated owl sites receive the same protection as documented sites.

Median Core Area radius was determined by the OEM process (Appendix D, Owl Estimation Methodology) as 0.5 miles for the Cascades and Klamath Mountain Provinces in Oregon. The Provincial Home Range radius is 1.3 miles for sites in the Klamath Mountains Province and 1.2 miles in the Cascades West and Cascades East Provinces. There are no known or generated owl sites in the Cascades East Province on Medford BLM.

The OEM process developed values for three scales of habitat based on published research of spotted owls. These values help the Service analyze the impacts of the proposed action. (see Appendix D, Owl Estimation Methodology, Table 4). The 595 owl sites located across the Action Area are distributed across ownerships (see Table 8). We evaluated nest patches, core areas, and provincial home ranges pre-project and post-project habitat percentages for the 122 owl sites in the Action Area that were intersected by projects. No proposed projects intersect the other 473 sites in the Action Area.

A spreadsheet has been prepared which summarizes owl site conditions for the 122 owl sites intersected by a proposed project at the nest patch, core area, and provincial home range scales pre- and post-project. Private and state lands were modeled by the OEM team to identify habitat that could contribute to an owl site.

Owl sites were analyzed by nest patch, core area, and provincial home range distances from the site center as follows:

Nest Patch - 300 meters

Core Area - 0.5 mile, approximately 500 acres, includes the nest patch

Provincial Home Range includes the core area and nest patch

- 1.2 mile diameter - approximately 2900 acres. (Cascades West and Cascades East Provinces)
- 1.3 mile diameter - approximately 3400 acres. (Klamath Mountains Province)

Effects of Projects to Northern Spotted Owl at the Nest Patch, Core and Home Range Scales on Federal Lands

Two sites have NRF maintenance activity in the nest patch, which the OEM process suggested is an LAA threshold activity, and no other NRF activity within that site's home range circle. These two sites (OEM numbers 48, 61) occur in the Boney Skull Timber Sale in the Glendale Resource Area, Klamath Mountains Province (Appendix H, OEM Summary). These sites occur in the Klamath Demographic Study Area. Both the sites and the area around these sites have been surveyed regularly to protocol and indicate very low likelihood of spotted owl nesting activity as mapped.

Site-specific analysis at these two sites shows nesting activity is unlikely, as mapped. NRF maintenance in their nest patches does not constitute an adverse affect and should not drop the site below the OEM threshold. We determine that NRF maintenance activities at the nest patch, as mapped, would constitute an NLAA activity because the habitat would retain the primary components important to owls following the activity: large trees with at least 60 percent canopy cover, down wood, and snags. PDC will avoid any noise disturbance to any owls near the sale that may be nesting during the critical breeding period. Medford NRF maintenance projects, which involve light thinning to improve forest health and reduce fire risks, are designed and implemented to have low to no impact to owl habitat.

OEM 48 was a site found after January 1, 1994 (and is not a 100-acre LSR core site). The surrounding area has been surveyed regularly and the site has had no documented resident activity since 1998. Confirmed residents nesting in an adjacent owl site are occasionally confirmed using the area for roosting and foraging. We do not consider NRF maintenance in the nest patch, as defined, as LAA because OEM 48 is not a functional owl nest patch.

OEM 61 was a site found after January 1, 1994 (and is not a 100-acre LSR core site) and has been surveyed regularly. Birds at the site in 2005 and 2006 attempted nesting in this 10-acre NRF site with roads directly above and below and failed both years. In 2007, the pair moved to a site that has more contiguous NRF habitat 0.25 miles away. We do not consider site OEM 61, as mapped, an active nest patch that would be adversely impacted by an NRF maintenance activity.

The BLM is not reducing NRF in any LSR/AMR, including 100-acre LSR cores, due to the proposed actions in this BA. The Medford BLM manages matrix lands for timber volume according to the NWFP and the O&C Act. Under NWFP protection standards, the Medford BLM maintains 100-acre LSR cores on matrix lands for those sites that meet pre-1994 conditions (see Definitions). These 100-acre LSRs were designed to aid connectivity of owls and other late-seral associated species in moving across matrix lands.

Effects of Activities that Maintain or Occur near Northern Spotted Owl Habitat

We plan some treatments that maintain the pretreatment habitat conditions, by definition, for spotted owls. The BLM classifies dispersal treatments that maintain dispersal conditions and NRF treatments that maintain the conditions of nesting, roosting and foraging for owls as "may affect, not likely to adversely affect" actions. The exception is when a project occurs within the 300 meter nest patch (See Appendix D. Owl Estimation Methodology). Noise and activity resulting from these light-touch projects will be planned to avoid known or generated owl sites spatially, or by seasonally avoiding critical breeding periods, as described in the PDC (Appendix C). The projects in this BA that affect existing spotted owl habitat are summarized in Table 14-16.

Table 14. Effects of NLAA-Only Projects to Spotted Owl Habitat by Project Type, Treatment Impact, and Province for Projects on BLM Land

Project Type	Dispersal					NRF (NO CHANGE)			
	Pre-project	Maintain	Remove	Total	% Affected	Pre-project	Maintain	Total	% Affected
Klamath Mountains Physiographic Province									
Timber Harvest		149	0	149			249	249	
Vegetation Management		202		202			0	0	
ROW		0	3	3			0	0	
Total Klamath	**99,186**	**351**	**3**	**354**	**0.36%**	**306,406**	**249**	**249**	**0.08%**

NOTE: GIS discrepancies between tables are due to rounding.

Medford BLM proposes some non-habitat activities adjacent to owl habitat, including the quarry project and road maintenance. Road maintenance is conducted as needed to move or remove the occasional hazard tree along roadways and could occur in any LUA, province, or CHU in insignificant numbers.

We determine that NRF and dispersal habitat maintenance and small amounts of dispersal removal from the projects above to "may affect, not likely to adversely affect" (NLAA) spotted owls. Maintenance activities and fuels reduction treatments in non-habitat would be expected to reduce the risk of wildfire and to improve the health of the landscape. Maintenance activities within dispersal or NRF habitat would not remove the components important to owls, and would make the residual habitat healthier and more ecologically-sustainable over time. Mandatory PDC will avoid potential adverse effects to nesting birds during the critical breeding period. There are no nest patch treatments in these projects.

Effects to Northern Spotted Owl Dispersal Habitat

Dispersal habitat is widely distributed and abundant throughout the Medford BLM Action Area. All-dispersal includes both NRF and dispersal since NRF also functions as dispersal. Tables 15 and 16 summarize dispersal effects. NRF downgrade, by definition, downgrades to dispersal habitat. Therefore, NRF downgrade increases the total amount of dispersal habitat and does not change the amount of all-dispersal habitat. Medford BLM determines that changes to dispersal habitat outside CHU would avoid adverse impacts because dispersal is abundant and widely distributed on Medford BLM lands.

Table 15. Effects to Dispersal by Physiographic Province from LAA Projects

	Pre-Project Dispersal	Dispersal Remove	Dispersal Maintained	% Dispersal Treated	Post Project Dispersal *	
Klamath Province						
					Post Project Dispersal	Post Project Dispersal (Includes NRF downgraded to dispersal)
Vegetation Management		294	2,329			
Timber Harvest		1,532	4,860			
Total Klamath Province	**99,186**	**1,826**	**7,189**	**9**	**97,360**	**102,260**
Cascades West						
Cascade West BLM	**30,002**				**29,902**	
Timber Harvest		100	1,346	5		
Cascade West BOR	201				**201**	
Timber Harvest			183	91		
Total Cascade West Province	**30,203**	**100**	**1,529**	**5**	**30,103**	**33,096**

Footnote: NRF also functions as dispersal. *Dispersal Maintained does not remove habitat and is not subtracted from Pre-Project Dispersal Total. NRF downgrade increases dispersal only acres. Post Project Totals include NRF downgraded to dispersal. (See Table 16 - NRF effects table)

We determine the removal of small percentages of dispersal habitat is NLAA because dispersal habitat is well-distributed across the Medford BLM. Over 59 percent of the Medford District lands support dispersing owls (Table 9). Removal of less than 2 percent of dispersal habitat in the amount and distribution in the Medford District has not been documented as an adverse effect.

Effects to Northern Spotted Owl Habitat on Bureau of Reclamation Lands

BOR lands inside project areas were classified by owl habitat and treatment impacts, but non-owl habitat (non-habitat plus capable lands) on BOR lands were not verified. Maintenance projects would be conducted on 91 percent of BOR dispersal habitat and 82 percent of NRF habitat (Tables 15 & 16). The high percentage of affected habitat is an artifact of the small amount of BOR lands within the action area. The one BOR project is designed to promote increased forest health condition across all of the limited BOR lands.

Maintenance projects do not change the amount of habitat. NRF stands that are treated to maintain conditions would be expected to improve NRF quality by encouraging taller and larger trees with more crown development than a pre-treatment stand. Treated sites would be more ecologically sustainable and more resilient to wildfire.

NRF is downgraded by 25 percent on BOR lands (Table 16). NRF downgrade is a short-term reduction of NRF habitat to a more open stand condition. Treatments change a NRF stand to dispersal because of reduced canopy closure and have the effect of increasing dispersal habitat acres. Post-treatment residual trees on BOR lands would be expected to respond rapidly to improved space, light, and resources and quickly develop the crown conditions necessary for NRF classification.

We determine the effects of the maintenance of dispersal and NRF habitat and the downgrade of 105 acres of NRF “may affect and would likely adversely affect” northern spotted owls due to the temporary decrease of NRF habitat.

Treatments on BOR lands (Tables 15 and 16) are designed to improve tree spacing; accelerate the height, girth, and structural complexity of remaining trees; reduce the risk of habitat loss from wildfire; and improve the ecological sustainability of the project areas. The downgrade of NRF habitat would be a short-term adverse effect that would rapidly be ameliorated as the treated stands respond to increased light and nutrients. Over time, the post-treatment stands would develop into better quality NRF habitat. Mandatory PDC will avoid disturbance effects to nesting owls.

Effects to Northern Spotted Owl NRF Habitat on BLM Lands

Treatments that remove or downgrade NRF are described in Section 1.1, Definitions. Table 16 summarizes NRF habitat downgrade and removal by project type and physiographic province. Habitat removal and downgrade is planned across two of three physiographic provinces. NRF habitat will be decreased by 2.6% in the Klamath and 4.7% in the Cascades West physiographic provinces.

Table 16: Effects to NRF by Physiographic Province from LAA Projects						
Project Type	NRF					
	Pre-Project	Removed	Downgraded	Maintained	% Treated	Post-Project
Cascade West						
Cascades West BLM	**73,773**				**4.55%**	**70,418**
Timber Harvest		467	2,863	1,756		
Vegetation Management			25			
Cascades West BOR	**519**				**82.47%**	
Timber Harvest			105	323		414
Cascades West Total	**74,292**	**467**	**2,993**	**2,079**	**4.66%**	**70,832**
Klamath Mountains						
Timber Harvest		2,925	4,732	418		
Vegetation Management		33	168	450		
Right-of-Way		4				
Quarry (Noise/Activity Only)						
Klamath Mountains Total	**306,406**	**2,962**	**4,900**	**868**	**2.57%**	**298,544**
Total	**380,698**	**3,429**	**7,893**	**2,947**	**2.97%**	**369,376**

Footnote: NRF also functions as dispersal *NRF Maintained does not remove habitat and is not subtracted from Pre Project NRF Total

The BLM portion of the proposed action anticipates the removal of 3,429 acres and the downgrade of up to 7,893 acres of spotted owl NRF habitat from the 380,698 total NRF acres currently within two affected Physiographic Provinces in the Medford District. The BLM portion of the proposed action anticipates 2,947 acres of NRF habitat would be treated and maintained (Table 16), but the amount of NRF habitat will not change as a result of maintenance treatments.

Most tree harvest and activities will occur in matrix or AMA (Table 3) and all NRF downgrade and removal will occur in Matrix or AMA.

Effects Determination

We find that 7,893 acres of NRF downgrade and 3,429 of NRF removal “may affect and is likely to adversely affect” (LAA) northern spotted owls because it removes 2.97 percent of the pre-project NRF habitat on the two affected provinces. The downgrade of NRF habitat would be a short-term adverse effect that would rapidly be ameliorated as the treated stands respond to increased light and nutrients. Over time, the post-treatment stands will develop into better quality NRF habitat if not harvested.

Effects to LSRS

A portion of one project (315 acres) occurs in AMR. The project is designed to reduce hazardous fuels and accelerate development of late seral conditions by thinning stands less than 80 years old. Dispersal habitat will be maintained on 264 acres and 51 acres of non habitat will be treated. PDC will be implemented to reduce disturbance on adjacent habitat.

Up to 200 miles of road maintenance activities could occur in LSRs, as proposed in Table 3. Road maintenance activities will be scattered across the LSRs in the District, will have insignificant impacts to a few trees along roads, and will not remove or downgrade NRF habitat. Road maintenance in the LSR will avoid adverse impacts to spotted owls by implementing PDC, will not remove existing or potential nest trees to listed species, and will avoid changing the amount or configuration of NRF habitat within the LSRs. No NRF downgrade or removal will occur in any 100-acre LSR.

Bureau of Reclamation Land (LSR): Timber and vegetation management treatments on BOR lands within the boundary of Medford BLM are administered through agreement between both agencies (BLM and BOR unpublished. 1982) following the standards of both agencies. The acres of the BOR sale are tracked separately from Medford BLM. There is no LSR affected from the BOR project.

Effects Determination in LSR: We find that 200 miles of NRF maintenance, occasional hazard tree removal and 264 acres of timber sale thinning in dispersal habitat will have no effect to NRF habitat within the AMR/LSR. No loss of NRF habitat in AMR/LSR will result and AMR/LSR will continue to function as they did prior to treatment. The thinned acres should result in increased fire resiliency and more rapid development of late seral conditions.

Effects to Northern Spotted Owl Critical Habitat on BLM & BOR Lands

No removal or downgrade of NRF habitat is proposed in spotted owl critical habitat (Tables 17 and 18). No dispersal habitat will be removed from spotted owl critical habitat. No activities proposed during the life of this programmatic BA will remove primary constituent elements of spotted owl critical habitat.

Table 17. Effects to Critical Habitat Unit from NLAA-Only Projects

	Pre-Project Dispersal	Dispersal Remove	Dispersal Maintained	% Dispersal Treated	Post Project Dispersal *
Rogue/Umpqua 14					
Timber Harvest	**13,278**		**142**	**1%**	**13,278 No Change**

Footnote: NRF also functions as dispersal *Dispersal Maintained does not remove habitat and is not subtracted from Pre-Project Dispersal Total

Table 18. Effects to Critical Habitat Unit from LAA Projects						
	Dispersal			NRF		
Project Type	Pre-Project	Maintained	% Treated	Pre-Project	Maintained	% Treated
Klamath Intra-Province 16						
Timber Harvest	6,269	223	3.6% No Change	17,326	6	<1% No Change
Rogue/Umpqua 14						
Timber Harvest	13,278	98	<1% No Change	59,515	23	<1% No Change
Southern Cascades 17						
BLM Timber Harvest	2,468	94	3.8% No Change	14,000	49	<1% No Change
BOR Timber Harvest	49	48	98% No Change	47	32	68% No Change

Footnote: NRF also functions as dispersal *NRF Maintained and Dispersal Maintained do not remove habitat and are not subtracted from Pre Project Totals.

We determine the activities summarized in Tables 17and18 and the maximum 300 miles of road maintenance that could occur in CHU (Table 6) are "may affect, not likely to adversely affect" (NLAA) spotted owl CHU because no NRF will be removed or downgraded, no dispersal will be removed, and no primary constituent elements of CHU will be reduced or removed. Maintenance projects do not change the amount of habitat. NRF stands that are treated to maintain conditions would be expected to improve NRF quality by encouraging taller and larger trees with more crown development than a pre-treatment stand. Treated sites would be more ecologically sustainable and more resilient to wildfire. BLM MO road maintenance will be dispersed, short duration, and will not remove or downgrade NRF habitat or remove dispersal habitat. We determine MO road maintenance "may affect and is not likely to adversely affect" (NLAA) CHU for spotted owls because no removal of primary constituent elements would occur.

Effects on Northern Spotted Owl Prey

The northern flying squirrel, red tree vole, dusky-footed woodrat, and bushy-tailed woodrat are important prey of the northern spotted owl. Timber harvest and fuels reduction projects may impact foraging by changing habitat conditions for prey. Sakai and Noon (1993) stated that dusky-footed woodrats, 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 on 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 eastern 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 to 45 years old) 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.

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 NRF habitat for arboreal prey species (flying squirrels and red tree voles), but may improve habitat for nonarboreal 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 nonforested 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 for 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 hawks, other owls, 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 understory 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 2 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 develop the pretreatment habitat within 25 to 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 NRF habitat for spotted owls reduces the amount of habitat available for nesting and roosting and impacts habitat available for flying squirrels, red tree voles, and woodrats. 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 applied by the Medford BLM reduce the impacts to the extent possible, while still facilitating tree harvest and other projects.

Effects to Northern Spotted Owl Habitat from Activities other than Timber Harvest

Road Maintenance

We anticipate up to 800 miles of road maintenance (Table 6) by the BLM Maintenance Organization (MO) will occur scattered across the Medford District BLM annually during the implementation period of this BA. Most road maintenance activities are short duration, low impact activities such as grading, brushing, and occasional down wood removal that are indistinguishable from ongoing road traffic activities. The MO coordinates with the BLM Resource Area staff to avoid impacts to nesting owls, CHUs or LSRs. However, since their scope of work includes year-round maintenance, some low-level activity is likely to occur during the critical spotted owl breeding period. No nest trees will be removed unless they are immediate public safety hazards. Emergency consultation with the Service will be implemented in all such cases. The effect of the noise and activity from road maintenance would be insignificant because one would be unable to meaningfully measure, detect, or evaluate it.

We determine that 800 miles of MO road maintenance is "may affect, not likely to adversely affect" (NLAA) spotted owls because no existing or potential nest trees will be removed, there will be no change to NRF habitat for owls, and because PDC will avoid disturbance during the critical nesting period.

Rights-of-Way

All proposed Rights-of-Way (ROW) occur in the Klamath Mountains Province. None occur in LSR or spotted owl CHU. ROW construction will follow PDC.

We determine that the Indian Hill China Garden, Josephine County Waterbrook, and Josephine County Brass Joe ROWs "may affect and are not likely to adversely affect" (NLAA) spotted owls because NRF habitat will not be reduced and mandatory PDC will avoid any adverse effects due to potential disturbance.

We determine that the Mount Baldy ROW "may affect and is likely to adversely affect" (LAA) spotted owls because NRF habitat will be reduced by four acres. Mandatory PDC will avoid any adverse effects from potential disturbance (Table 28).

Quarry

Loud explosives will be detonated at the Slotted Pen Quarry over short periods of time. Blasting will occur outside of the critical breeding period if within 1 mile of an owl site. Blasting will not occur unless any owl sites within the PDC distance of 1 mile are documented to be non-nesting or post-fledging. BLM will implement PDC to avoid adverse impacts and determines this activity is a "may affect not likely to adversely affect" (NLAA) spotted owls.

4.4 Effects to Marbled Murrelet

Two projects occur near, but outside of documented marbled murrelet habitat in the Glendale Resource Area. Anaktuvuk does not occur in marbled murrelet CHU nor proposed CHU. Road maintenance could occur in CHU and may affect but is not likely to adversely affect (NLAA) marbled murrelets or marbled murrelet current CHU (Table 19).

Table 19. Effects to Marbled Murrelets

Project	CHU	Province	Amount of Noise and Activity
Anaktuvuk Vegetation Management	Not in Marbled Murrelet CHU or Proposed CHU*	Klamath Mountains	251 acres
Road Maintenance	Various CHUs	Klamath Mountains	100 miles

NOTE: All acres in Table 19 avoid potential marbled murrelet habitat but would be adjacent to potential marbled murrelet habitat. Noise and activity would occur in stands that offer no current habitat for owls or murrelets, but are within disturbance distances (see PDC) of potential murrelet habitat.

The Anaktuvuk vegetation treatment project and the road maintenance work by the BLM's MO could occur within the 6.5 mile band beyond the documented range of marbled murrelets in the Klamath Mountains Province. Anaktuvuk would treat and maintain non-murrelet forest habitat in the matrix land use allocation near potentially suitable marbled murrelet habitat in this band. Table 19 summarizes the forested area that will be treated adjacent to potential marbled murrelet habitat. No murrelet habitat will be treated. No change to the amount of current murrelet habitat will occur as a result of either activity. No habitat impacts to current or proposed marbled murrelet critical habitat will occur. Mandatory PDC will apply to both projects to avoid the potential of adverse effects to any murrelets that might be in within the disturbance distance.

Up to 100 miles of road maintenance could occur in existing CHU for marbled murrelets, but no habitat change is anticipated. No marbled murrelet nest sites have been located on Medford BLM during previous protocol surveys in the area.

Effects of Potential Disturbance on Marbled Murrelet

Mandatory PDC will avoid or reduce impacts to nesting murrelets and their young. Vegetation treatment in nonmurrelet habitat on no more than 251 acres of noise and activity adjacent to potential marbled murrelet habitat and road maintenance on up to 100 miles of road is unlikely to adversely affect marbled murrelets.

PDC avoid disturbance impacts. If unmitigated, noises associated with the proposed actions could disturb nesting murrelets and negatively affect productivity. Little detailed information is available concerning the vulnerability of murrelets to disturbance effects. Research on a variety of other bird species suggests such effects are possible (Henson and Grant 1991; Rodgers and Smith 1995). Studies have shown disturbance can affect productivity. Nest abandonment can cause egg and hatchling mortality due to exposure and predation. Disturbance may cause longer

periods of incubation, premature fledgling, or nest evacuation; result in depressed feeding rates of adults and offspring that could cause reduced body mass or slower growth of nestlings; and cause avoidance of otherwise suitable habitat.

Murrelets may be sensitive to disturbance due to their secretive nature and their perceived vulnerability to predation. Due to the significant lack of disturbance-related information on this species, we assume any amount of potential disturbance would result in negative impacts. Medford BLM treats these project areas as occupied until protocol surveys indicate nonoccupancy.

Projects would be implemented after most birds have completed incubation. Impacts to nesting murrelets will be reduced if daily work occurs from two hours after sunrise until two hours before sunset. Research on murrelets has demonstrated that in the first days after eggs hatch, adult murrelets tend to concentrate their nest visits during the twilight hours; nestlings are left unattended for most of the daytime period. Adults increase daytime visits to the nest as the chicks develop (Ralph et al. 1995). A daily timing restriction will minimize the potential that adult murrelets will be disturbed when visiting the nest to feed offspring.

Summary

Most murrelet sighting locations and occupied sites have been found within approximately 16 to 32 miles of the coastline (16 miles inland south of the Rogue River drainage and 32 miles inland north of the Rogue River drainage). Surveys conducted from 1988 to 2002 have determined that the probability is extremely limited that projects beyond the known range, but within 6.5 miles (10 kilometers) of the known range would have any notable impact on the recovery of the species.

Direct, Indirect, Interrelated, and Interdependent Effects to Marbled Murrelet

The direct, indirect, interrelated, and interdependent effects described for owls also apply to marbled murrelets. Road right-of-way construction associated with the timber harvest, and vegetation management activities described in the proposed action have the most significant effects on spotted owls, marbled murrelets, and their habitats. Clearing for the road right-of-way removes suitable habitat and has the potential to disturb nesting pairs in close proximity.

Other interrelated and interdependent harvest actions include brush disposal (lop and scatter, pile, pile and burn), site preparation, release (brush control), fertilization, and precommercial thinning. If these activities occur adjacent to marbled murrelet habitat, they could have the potential for disturbance if a nesting marbled murrelet was nearby. Brush disposal activities may vary by timber sale due to fuels management objectives, requirements for retention of down woody material, and other resource management goals. Brush disposal abates the slash created by the timber sale. Typical activities associated with this program include pile burning and rearranging fuels by crushing, mulching, and lopping and scattering. These activities are conducted for the most part in areas not considered habitat for any of the species discussed in this document.

These projects "may affect, but are unlikely to adversely affect" (NLAA) marbled murrelet habitat because

- No marbled murrelet nests have been located on Medford BLM and are unlikely to occur. Many protocol surveys have yet to document murrelets on the Medford District.
- Potential murrelet habitat (western hemlock/tanoak) is limited on the Medford District.
- Medford BLM will use all possible mitigation measures to avoid adverse impacts to nesting marbled murrelets wherever they located. Activities would likely occur when murrelets (if there were nest sites) are not nesting.
- Suitable habitat was generously estimated around project areas.
- Many individual animals inherently tolerate or develop tolerance to disturbing activities that cause them no direct harm.

4.4 Cumulative Effects to Northern Spotted Owls and Marbled Murrelets

Cumulative effects under ESA are "those effects of future State or private activities, not involving Federal activities, that are reasonable certain to occur within the action area of the Federal action subject to consultation" (50 CFR 402.02). The effects of future Federal actions will be evaluated during future section 7 consultations and are not included in cumulative effects under ESA. Cumulative effects analysis of foreseeable state and private actions provide the Service and the Medford BLM an accurate environmental baseline to assess impacts of Federal actions.

Several known spotted owl activity centers within the Medford District are located partially on private or other non-Federal ownerships (state, county, etc). Under Oregon Forest Practice Rules (629-665-0210), owl nest sites (70-acre core areas) are protected for at least three years following the last year of occupation.

The land base in the action area has a checker board pattern of ownership of private land interspersed with BLM lands. A range of management practices occur on private lands from residential home site development to intensive industrial timber management. As of 2002 (Biomapper owl habitat data – Appendix A), there were approximately 198,000 acres of NRF on private land.

Private land harvest records for Jackson and Josephine Counties show harvest rates have never exceeded 1.08% per year since 1998. (ODF 2008, FIA 2008) Records do not provide information of habitat conditions. We anticipate some loss of owl habitat on private lands but can not predict the rate of loss, or the specific location of harvest.

In the Biological Opinion for the NWFP (USDA and USDI 1994b, Appendix G, 44-45), the Service concluded,

> "Non-federal landowner compliance with the take prohibition of the [Endangered Species] Act does not assure the maintenance of spotted owl dispersal habitat within Areas of Concern and checkerboard ownership nor provide for improvement of existing

> populations. Consequently, it is likely that a reduction in dispersal habitat would occur on non-federal lands in certain areas."

The contribution of marbled murrelet habitat on private lands is unknown. The large trees and large limbs important to murrelets are rare on private lands in our area. Current forest practice regulations for private lands do not address marbled murrelets. In the Biological Opinion for the NWFP (USDA and USDI 1994b, Appendix G, 46), the Service concluded,

> "...because a significant portion of this species' range is on non-federal lands, it may not be possible to provide for the recovery of this species without contribution from these areas. Therefore, timber harvest that is currently occurring on non-federal lands in all three states may be contributing to a future inability to recover the marbled murrelet."

The majority of state and private forests in Washington, Oregon, and Northern California is managed for timber production (Thomas et al. 1990; USDA and USDI 1994a). Historically, non-Federal landowners practiced even-aged management (clear-cutting) of timber over extensive acreages. The Medford BLM assumes these past management practices will continue and reduce the amount of NRF habitat for spotted owl and marbled murrelets on non-Federal lands over time. Harvest activities on state and private lands can be expected to impact spotted owls and marbled murrelets located within adjacent Federal lands by removing and fragmenting habitat and through disturbance activities adjacent to occupied sites during sensitive periods.

Federal lands will make significant contributions to the recovery of spotted owls and marbled murrelets through the implementation of the NWFP. In the case of the spotted owl, non-Federal lands are not expected to provide demographic support across and between physiographic provinces (Thomas et al. 1990; USDA 1990b; USDI FWS 1992a; USDA and USDI 1994a). Over 60 percent of the land within the boundary of the Medford District BLM is under private ownership.

5. Biological Assessment Conclusions

It is the conclusion of this biological assessment that proposed actions may affect listed species or their designated critical habitat as documented above.

NLAA: Disturbance

Adverse effects from disturbance from the activities above would be avoided through implementing the mandatory PDC and would "may affect and not likely adversely affect" (NLAA) spotted owls or marbled murrelets.

NLAA: Existing Northern Spotted Owl Critical Habitat

No projects that would adversely affect existing CHU for spotted owls will occur. No removal or adverse effects to primary constituent elements of critical habitat would occur from any of our proposed actions analyzed in this BA.

LAA: Projects that Remove or Downgrade Spotted Owl NRF

Formal consultation is requested on the actions that "may affect and likely to adversely affect" (LAA) listed species. All activities are in compliance with the NWFP and current spotted owl and marbled murrelet consultation parameters. Total reduction of spotted owl NRF habitat is less than 3 percent District-wide. The proposed actions would result in a less than 1.5 percent reduction in dispersal habitat or a 1 percent decrease in all-dispersal habitat District-wide. There are no changes to marbled murrelet suitable habitat.

Table 20. Determination of Effects of Projects by Province

Province	Project	Effects to Species	Effects to CHU
Cascades West	BOR	LAA	NLAA
NOTE: The BOR project is on non-BLM land and is analyzed separately for NRF and Dispersal. The project is analyzed in GIS as a Timber Harvest project, but is more accurately described as a Forest Health project. See Project Descriptions.			
Effects Determination of Timber Projects (Some projects occur in both provinces.)			
Cascades West	Camp Cur	LAA	NE
Cascades West	Conde Shell	LAA	NE
Cascades West	Deer Lake	LAA	NE
Cascades West	Flounce Around	LAA	NE
Cascades West	Lucky Lake	LAA	NE
Cascades West	Plateau Thin	LAA	NLAA
Klamath Mountains	Althouse Sucker	LAA	NE
Klamath Mountains	Bald Lick	LAA	NE

Table 20. Determination of Effects of Projects by Province

Province	Project		Effects to Species	Effects to CHU
Klamath Mountains	Big Jim		LAA	NE
Klamath Mountains	Birdseye		LAA	NE
Klamath Mountains	Birdseye Jones		LAA	NE
Klamath Mountains	Boney Skull (See Nest Patch Effects Evaluation)		NLAA	NLAA
Klamath Mountains	Caboose		LAA	NE
Klamath Mountains	Cheney Slate		LAA	NLAA
Klamath Mountains	Chew Choo		LAA	NE
Klamath Mountains	China		LAA	NE
Klamath Mountains	East Fork Illinois		LAA	NE
Klamath Mountains	Five Cows		LAA	NE
Klamath Mountains	Five Rogues Thin		LAA	NE
Klamath Mountains	Five Rogues Timber Sale		LAA	NE
Klamath Mountains	Fizzy Stew		LAA	NE
Klamath Mountains	Fortune Stew		LAA	NE
Klamath Mountains	Galls Foot		LAA	NE
Klamath Mountains	Granite Joe		LAA	NE
Klamath Mountains	Granite Horse		LAA	NE
Klamath Mountains	Mari Kelsey		LAA	NLAA
Klamath Mountains	North Trail		LAA	NE
Klamath Mountains	Pickett Charge		LAA	NE
Klamath Mountains	Pickett Snake		LAA	NLAA
Klamath Mountains	South Deer		LAA	NE
Klamath Mountains	Small Fortune		LAA	NLAA
Klamath Mountains	Swampwood		LAA	NE
Klamath Mountains	Tennessee Lime		LAA	NE
Klamath Mountains	West Fork Illinois		LAA	NE
Effects Determination of Vegetation Management Projects				
Cascades West	Camp Cur		LAA	NE
Klamath Mountains	Althouse Sucker		LAA	NE
Klamath Mountains	Anaktuvuk	Spotted owls	NLAA	NE
		Marbled murrelets	NLAA	NE
Klamath Mountains	Anderson West		LAA **	NE
Klamath Mountains	East Fork Illinois		LAA	NE
Klamath Mountains	Granite Joe		LAA **	NE

Table 20. Determination of Effects of Projects by Province				
Province	**Project**		**Effects to Species**	**Effects to CHU**
Klamath Mountains	Pickett Charge		LAA	NE
Klamath Mountains	Pickett Snake		LAA	NE
Klamath Mountains	South Deer Stew		LAA	NLAA
Klamath Mountains	Tennessee Lime		LAA**	NE
Effects Determination of Road Maintenance, ROW, and Quarry Projects				
Cascades West	Road Maintenance*	Spotted owls	NLAA	NLAA
Klamath Mountains	Road Maintenance*	Spotted owls	NLAA	NLAA
		Marbled murrelets	NLAA	NLAA
Klamath Mountains	Indian Hill China Garden ROW		NLAA	NE
Klamath Mountains	Josephine County Waterbrook ROW		NLAA	NE
Klamath Mountains	Josephine County Brass Joe ROW		NLAA	NE
Klamath Mountains	Mount Baldy ROW		LAA	NE
Klamath Mountains	Quarry (Activity: Use PDC)		NLAA	NE
*Could occur in isolated situations in all CHUs and LSRs. ** LAA due to Nest Patch treatment.				

Concurrence Request

Medford BLM requests the Service concur with our effects determination that the projects listed as NLAA in Table 20 are “may affect, not likely to adversely affect” for spotted owls or marbled murrelets for the reasons described in the Effects section. We also request the Service concur with our effects determination that the projects listed as NLAA in Table 20 for CHU are “may affect, not likely to adversely affect” for spotted owl CHU because the projects that are NLAA for spotted owls that also occur in spotted owl CHU, are NLAA for spotted owl CHU.

Formal Consultation Request

Medford BLM requests formal consultation for projects listed as LAA in the Table 20 because they are “may affect, likely to adversely affect” actions for spotted owls.

Literature Cited

Burger, A.E. 2002. "Conservation assessment of marbled murrelets in British Columbia, a review of biology, populations, habitat associations and conservation." Technical Report Series Number 387. Canadian Wildlife Service, Pacific and Yukon Region, British Columbia. 168pp.

Carey, A.B. 1991. "The biology of arboreal rodents in Douglas-fir forests." General Technical Report PNW-276, USDA Forest Service, Pacific Northwest Research Station, Portland, OR.

Carey, A.B., S.P. Horton, and B.L. Biswell. 1992. "Northern spotted owls: influence of prey base and landscape character." *Ecological Monographs* 62:223-250.

Carter, H.R. and R.A. Erickson. 1992. "Status and conservation of the marbled murrelet in California, 1892 - 1987." In Carter, H.R. and M.L. Morrison (eds.). *Status and Conservation of the Marbled Murrelet in North America. Proceedings Western Foundation of Vertebrate Zoology* 5(1):1-134.

Dillingham, C.P., R.C. Miller, and L.O. Webb. 1995. Marbled murrelet distribution in the Siskiyou National Forest of southwestern Oregon. *Northwest Naturalist* 76:33-39.

Dugger, K.M., F. Wagner, R.G. Anthony, and G.S. Olson. 2005. "The relationship between habitat characteristics and demographic performance of northern spotted owls in southern Oregon." *Condor* 107:863-878.

Evans Mack, D., W.P. Ritchie, S.K. Nelson, E. Kuo-Harrison, P. Harrison, and T.E. Hamer. 2003. "Methods for surveying Marbled Murrelets in forests: a revised protocol for land management and research." Pacific Seabird Group Technical Publication Number 2. [Online] http://www.pacificseabirdgroup.org.

Forsman, E.D., E.C. Meslow, and H.M. Wight. 1984. Distribution and biology of the spotted owl in Oregon. *Wildlife Monographs* 87:0084-0173.

Forsman, E.D., R.G. Anthony, J.A. Reid, P.J. Loschl, S.G. Sovern, M. Taylor, B.L. Biswell, A. Ellingson, E.C. Meslow, G.S. Miller, K.A. Swindle, J.A. Thrailkill, F.F. Wagner, and D.E. Seaman. 2002. "Natal and breeding dispersal of northern spotted owls." *Wildlife Monographs* 149:1-35.

Gomez, D., R.G. Anthony, and J.P. Hayes. 2005. "Influence of thinning of Douglas-fir forests on population parameters and diet of northern flying squirrels." *Journal of Wildlife Management* 69(4):1670–1682.

Hamer, T.E. and S.K. Nelson. 1995. "Nest success and the effects of predation on marbled murrelets." In Ralph, C.J., G.L. Hunt Jr., M.G. Raphael, and J.F. Piatt (technical editors) *Ecology and Conservation of the Marbled Murrelet* General Technical Report PSW-GTR-152. USDA Forest Service, Pacific Southwest Research Station, Albany, CA.

Hamer, T. and S.K. Nelson. 1998. Effects of disturbance on nesting marbled murrelets: summary of preliminary results (preliminary report). Prepared for the US Fish and Wildlife Service, Portland, OR.

Henson, P., and T.A. Grant. 1991. "The effects of human disturbances on trumpeter swan breeding behavior." *Wildlife Society Bulletin* 19:248-257.

Lemkuhl, J , K.D. Kistler and J.S. Begley. 2006. "Bushy-tailed woodrat abundance in dry forests of eastern Washington." *Journal of Mammalogy* 87(2):371-379.

Long, L.L. and C.J. Ralph. 1997. "Effect of human disturbance on nesting marbled murrelets, alcids, and other seabirds." Unpublished Report. USDA Forest Service, Pacific Southwest Research Station, Arcata, CA. 29 pp.

Marshall, D.B. 1988. Status of the marbled murrelet in North America: with special emphasis on populations in California, Oregon, and Washington. US Fish and Wildlife Service, *Biological Report* 88(30). 19 pp.

Nelson, S.K. and A.K. Wilson. 2002. "Marbled murrelet characteristics on state lands in western Oregon." Oregon Cooperative Fish and Wildlife Research Unit, Oregon State University, Department of Fisheries and Wildlife, Corvallis, OR. 151 pp.

Olson, G.S., E.M. Glenn, R.G. Anthony, E.D. Forsman, J.A. Reid, P.J. Loschl, and W.J. Ripple. 2004. "Modeling demographic performance of northern spotted owls relative to forest habitat in Oregon." *Journal of Wildlife Management* 68:1039-1053.

Ralph, C.J., G.L. Hunt, M.G. Raphael, and J.F. Piatt (technical editors). 1995. *Ecology and Conservation of the Marbled Murrelet* General Technical Report PSW-GTR-152. USDA Forest Service, Pacific Southwest Research Station, Albany, CA. 420 pp.

Rodgers, J.A. Jr. and H.T. Smith. 1995. "Set-back distances to protect nesting bird colonies from human disturbances in Florida." *Conservation Biology* 9:89-99.

Sakai, H.F. and B.R. Noon. 1993. "Dusky-footed woodrat abundance in different-aged forests in northwestern California." *Journal of Wildlife Management* 57:373-382.

Sowls, A.L., A.R. DeGange, J.W. Nelson, and G.S. Lester. 1980. *Catalog of California Seabird Colonies* FWS/OBS-80/37. USDI Fish and Wildlife Service, Office of Biological Services, Coastal Ecosystem Project, Washington D.C.

Thomas, J.W., E.D., Forsman, J.B. Lint, E.C. Meslow, B.R. Noon, and J. Verner. 1990. "A conservation strategy for the northern spotted owl: report of the Interagency Scientific Committee to address the conservation of the northern spotted owl." USDA Forest Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, and USDI National Park Service. Portland, OR. 427 pp.

USDA Forest Service. 1989. *Land and Resource Management Plan* Siskiyou National Forest. Region 6, Portland, OR.

USDA Forest Service. 1990. *Land and Resource Management Plan* Rogue River National Forest. Region 6, Portland, OR.

USDA Forest Service, USDC National Marine Fisheries Services, USDI Bureau of Land Management, USDI Fish and Wildlife Service, and U.S. Environmental Protection Agency. 1993. "Forest ecosystem management: an ecological, economic, and social assessment." Report of the Forest Ecosystem Management Assessment Team. U.S. Forest Service, U.S. Fish and Wildlife Service, National Marine Fisheries Service, National Park Service, Bureau of Land Management, and Environmental Protection Agency, Portland, OR.

USDA Forest Service, USDC National Marine Fisheries Services, USDI Bureau of Land Management, and USDI Fish and Wildlife Service.1999. "Streamlined Consultation Procedures for Section 7 of the Endangered Species Act (ESA) July 1999." BLM Information Bulletin Number OR-99-276.

USDA Forest Service, USDC National Marine Fisheries Services, USDI Bureau of Land Management, and USDI Fish and Wildlife Service. 2002. *Endangered Species Act Consultation Handbook* (abridged). July 2002.

USDA Forest Service and USDI Bureau of Land Management. 1994a. *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* US Government Printing Office, Portland, OR.

USDA Forest Service and USDI Bureau of Land Management. 1994b. *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* Includes *Standards and Guidelines for Management of Late-Successional and Old-Growth Dependent Species Within the Range of the Northern Spotted Owl* US Government Printing Office, Portland, OR.

USDA Forest Service and USDI Bureau of Land Management. 1995. *Southwest Oregon Late Successional Reserve Assessment* Siskiyou National Forest, Grants Pass, OR.

USDA Forest Service and USDI Bureau of Land Management. 1996. Rogue River/South Coast Biological Assessment; FY 97/98 Timber Sale Projects; FY 97/05 for all other projects. US Forest Service and Bureau of Land Management, Grants Pass, OR

USDA Forest Service and USDI Bureau of Land Management. 2001. *Rogue River/South Coast FY01/02/03 Timber Sale Projects Biological Assessment and Biological Opinion #1-7-01-F-032* Medford District Bureau of Land Management, Rogue River and Siskiyou National Forests, Portland Field Office of the US Fish and Wildlife Service.

USDA Forest Service and USDI Bureau of Land Management. 2003. *Rogue River/South Coast Biological Assessment FY 04-08 for Activities that May Affect Listed Species in the Rogue River/South Coast Province for Medford District Bureau of Land Management, Rogue River and Siskiyou National Forests, 11 July 2003*

USDA Forest Service and USDI Bureau of Land Management. 2006. FY 2006-2008 Programmatic Biological Assessment for the Reinitiation of Consultation on Activities that May Affect Listed Species in the Rogue River/South Coast Province Medford District Bureau of Land Management and Rogue River-Siskiyou National Forests, August 2, 2006.

USDA Forest Service, USDC National Oceanic and Atmospheric Administration, USDI Bureau of Land Management, USDI Fish and Wildlife Service, USDI National Park Service, and U.S. Environmental Protection Agency. 1994. *Forest Ecosystem Management: An Ecological, Economic, and Social Assessment.* Report of the Forest Ecosystem Management Assessment Team. July 1993. Portland, OR.

USDI Bureau of Land Management. 1994. *Medford District Proposed Resource Management Plan/Environmental Impact Statement* Medford, OR.

USDI Bureau of Land Management. 1995. *Record of Decision and Resource Management Plan* Medford, OR.

USDI Bureau of Land Management. 2002. *Western Oregon Districts Transportation Management Plan* Portland, OR.

USDI Bureau of Land Management. 2007. *Draft Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management Districts* Portland, OR

USDI Bureau of Land Management. 2008
Biological Assessment FY 2009-2013 Programmatic Assessment For Activities that May Affect the listed endangered plant species Gentner's Fritillary, Cook's Lomatium, McDonald's rockcress, and large-flowered wooly meadowfoam on the Medford District of the Bureau of Land Management Medford, OR

USDI Bureau of Land Management and USDI Bureau of Reclamation. 1982. Interagency Agreement. Unpublished. December 1982. 16 pp.

USDI Fish and Wildlife Service. 1990. Endangered and threatened wildlife and plants; determination of threatened status for the northern spotted owl; final rule. 55 Federal Register 123:26114-26194.

USDI Fish and Wildlife Service. 1992a. *Draft Final Recovery Plan for the Northern Spotted Owl* Portland, OR.

USDI Fish and Wildlife Service. 1992b. Endangered and threatened wildlife and plants: Determination of threatened status for the Washington, Oregon, and California population of the marbled murrelet; final rule. 57 Federal Register 191:45328-45337.

USDI Fish and Wildlife Service. 1992c. Endangered and threatened wildlife and plants: determination of critical habitat for the northern spotted owl; final rule. 57 Federal Register 10:1796-1838.

USDI Fish and Wildlife Service. 1994. Biological Opinion on Alternative 9 of the Final Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl. Portland, OR.

USDI Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; final designation of critical habitat for the marbled murrelet; final rule. 61 Federal Register 102:26256-26320.

USDI Fish and Wildlife Service. 1997. *Recovery plan for the threatened marbled murrelet (Brachyramphus marmoratus) in Washington, Oregon, and California* US Fish and Wildlife Service, Region 1, Portland, Oregon.

USDI Fish and Wildlife Service. 2003. Endangered and threatened wildlife and plants; 5-year review of the marbled murrelet and the northern spotted owl; notice of review. 68 Federal Register 76:19569-19571

USDI Fish and Wildlife Service. 2004. *Northern Spotted Owl Five-Year Review: Summary and Evaluation* US Fish and Wildlife Service, Portland, OR. 72 pp.

USDI Fish and Wildlife Service. 2006. Endangered and threatened wildlife and plants; designation of critical habitat for the marbled murrelet; proposed rule. 71 FR 176:53837-53886

USDI Fish and Wildlife Service. May, 2008 Final Recovery Plan for the Northern Spotted Owl (Strix occidentalis caurina) US Fish and Wildlife Service, Portland, Oregon xii + 142 pp.

Zabel, C.J., J.R. Dunk, H.B. Stauffer, L.M. Roberts, B.S. Mulder, and A. Wright. 2003. Northern spotted owl habitat models for research and management application in California (USA). *Ecological Applications* 13(4):1027-1040.

Appendix A. Environmental Baseline Process

SPOTTED OWL HABITAT BASELINE LAYER INSTRUCTIONS

Derived from 1996 Interagency Vegetation Mapping Project (IVMP), 2002 OSU Update, FOI, TPCC, Fire/Fuels Data, and Timber Sale Data.

1. Acquire Klamath, Western Cascade, and Eastern Cascade Province 25 square meter 1996 IVMP databases. Within these datasets are several grids compromised of either coniferous cover (con) or quadratic mean diameter (qmd). The Projection shows Clark 1866.
2. Use the files that contain STD in their naming convention, because they have been re-classed from individual values to ranges of values (i.e., Coniferous Cover of 3% was Value 4 in grid kla_con_cont is now Value 1 in kla_con_std and falls in category of 0-10%).
3. Reduce size of original dataset grids of conifer cover, quadratic mean, and 2002 OSU Update by clipping grids to District Boundary Layer Map Extents using Xmax's, Ymax's, Xmin's, and Ymin's of similar projection.
4. Mosaic the three clipped datasets from the conifer cover originals, kla_con_std, wco_con_std, and eco_con_std grids.
5. Reclassify then rename "eco_qmd_cat" to "eco_qmd_std." Reclassify it to represent similar broader categories found in the kla_qmd_std and wco_qmd_std.
6. Mosaic the three clipped datasets from the qmd grids, include the originals, kla_con_std and wco_con_std and the new reclassified eco_con_std grid.
7. Combine conifer cover and quadratic mean grid mosaics into new grid.
8. Using VAT from both grids derive a reclass table to crosswalk.

Table A-1. Conifer Cover

Value	Count	LAND_COV_T	VEG_COV_TY	STD_CON	PCT_COVER
1	4413040	vegetation	conifer	1	0-10
2	1413860	vegetation	conifer	2	11-20
3	1595954	vegetation	conifer	3	21-30
4	1792206	vegetation	conifer	4	31-40
5	1928058	vegetation	conifer	5	41-50
6	1935947	vegetation	conifer	6	51-60
7	1705561	vegetation	conifer	7	61-70
8	2377614	vegetation	conifer	8	71-80
9	2198657	vegetation	conifer	9	81-90
10	6022212	vegetation	conifer	10	91-100
21	71674	water	nonforest	0	0
22	472971	urban	nonforest	0	0
23	1584422	agriculture	nonforest	0	0
24	164880	barren	nonforest	0	0

Table A-1. Conifer Cover

Value	Count	LAND_COV_T	VEG_COV_TY	STD_CON	PCT_COVER
25	1428	snow	nonforest	0	0
26	440	noise	nonforest	0	0
27	264	other	nonforest	0	0
28	1613	topo-shadow	nonforest	0	0
29	440	wetlands	nonforest	0	0

Table A-2. Quadratic Mean Diameter

Value	Count	LAND_COV_T	VEG_COV_TY	STD_QMD	INCH_RANGE
1	2304293	vegetation	veg-cover	1	0-4.9
2	2605674	vegetation	veg-cover	2	5-9.9
3	3788387	vegetation	veg-cover	3	10-19.9
4	2416056	vegetation	veg-cover	4	20-29.9
5	2822255	vegetation	veg-cover	5	30-49.9
6	1318514	vegetation	veg-cover	6	50+
21	733162	water	nonforest	0	0
22	473679	urban	nonforest	0	0
23	1588665	agriculture	nonforest	9	0
24	165139	barren	nonforest	0	0
25	1537	snow	nonforest	0	0
26	442	noise	nonforest	0	0
27	276	other	nonforest	0	0
28	1682	topo-shadow	nonforest	0	0
29	440	wetland	nonforest	0	0
40	8722722	lt_70%veg	veg-cover	0	0
41	1499301	lt_30%con	veg-cover	0	0

9. Use attached crosswalk number 1 to reclassify new grid values into new combo grid. Use Owl Habitat values 1-6. Value 1 = NRF, Value 2 = Dispersal, Value 3 = Capable, Value 4 = Non-Capable, Value 5 = Undecided Dispersal (QMD 40 & 41/CON = 5 or 6), Value 6 = Undecided NRF (QMD 40 & 41/CON > 7), and Value 7 = Undecided Potential (QMD 40 & 41/CON < or = 4).

Table A-3. Crosswalk 1

Value	Count	MED_IVMP_C	MED_IVMP_Q	New Assigned Value
1	135161	9	1	3
2	192537	10	1	3
3	273302	9	2	3
4	520711	8	3	2
5	601261	9	3	2
6	1459759	10	5	1
7	1160426	10	4	1
8	1293875	10	3	2
9	444835	9	4	1
10	395929	9	5	1
11	126616	7	5	1
12	73535	5	5	2
13	655514	10	6	1
14	176663	5	2	3
15	301000	8	2	3
16	197641	5	1	3
17	755370	5	40	5
18	1091921	3	40	7
19	1000531	4	40	7
20	1077364	2	40	7
21	267224	7	40	6
22	292523	6	3	2
23	362515	7	3	2
24	199147	6	1	3
25	16058	3	1	3
26	2733803	1	40	7
27	224479	6	2	3
28	253593	7	2	3
29	98815	4	3	3
30	200426	6	0	4
31	44025	6	6	2
32	145453	6	4	2
33	190822	5	3	2

Table A-3. Crosswalk 1

Value	Count	MED_IVMP_C	MED_IVMP_Q	New Assigned Value
34	11664	1	0	4
35	88197	5	4	2
36	19053	2	0	4
37	40377	3	0	4
38	811	1	3	3
39	81528	4	0	4
40	148085	5	0	4
41	314033	8	4	1
42	47175	4	4	2
43	1086	1	1	3
44	1182	2	2	3
45	261886	8	5	1
46	105141	4	2	3
47	1098	2	4	3
48	781	2	5	3
49	89664	9	0	4
50	10261	3	2	3
51	116044	6	5	2
52	184511	7	1	3
53	498294	10	2	3
54	155090	4	1	3
55	184177	7	4	1
56	478868	6	40	5
57	195834	7	0	4
58	10760	3	3	3
59	184645	8	1	3
60	1461	28	28	4
61	555	1	2	3
62	531	1	4	3
63	140945	8	0	4
64	90584	8	6	1
65	5385	3	4	3
66	44831	4	5	3
67	132906	9	6	1

Table A-3. Crosswalk 1

Value	Count	MED_IVMP_C	MED_IVMP_Q	New Assigned Value
68	34379	7	6	1
69	1926	2	3	3
70	4768	3	5	3
71	2164	3	6	3
72	461	1	5	3
73	90293	10	0	4
74	209525	8	40	6
75	96385	9	40	6
76	131310	10	40	6
77	28874	5	6	2
78	97637	1	41	4
79	131187	2	41	4
80	239372	3	41	4
81	20586	4	6	3
82	135269	24	24	4
83	100716	21	21	4
84	1024651	23	23	4
85	3647	8	41	6
86	1466	10	41	6
87	329160	22	22	4
88	25371	4	41	4
89	11543	6	41	5
90	1752	2	1	3
91	204	2	6	3
92	139	1	6	3
93	20770	5	41	5
94	2242	9	41	6
95	4709	7	41	6
96	10	22	1	4
97	5876	24	0	4
98	439	9	24	4
99	63	1	22	4
100	63	2	22	4
101	100	4	22	4

Table A-3. Crosswalk 1

Value	Count	MED_IVMP_C	MED_IVMP_Q	New Assigned Value
102	3	21	40	4
103	77	2	21	4
104	777	7	24	4
105	186	24	1	4
106	736	2	24	4
107	556	1	24	4
108	81	6	21	4
109	421	10	24	4
110	1270	3	24	4
111	1532	4	24	4
112	1389	5	24	4
113	636	8	24	4
114	104	5	22	4
115	119	7	22	4
116	114	6	22	4
117	1127	6	24	4
118	579	10	21	4
119	4	24	40	4
120	156	21	0	4
121	204	9	22	4
122	72	3	22	4
123	94	9	21	4
124	90	5	21	4
125	831	2	23	4
126	817	3	23	4
127	1469	1	23	4
128	47	22	0	4
129	24	22	23	4
130	101	23	22	4
131	447	23	40	4
132	535	4	23	4
133	90	4	21	4
134	54	7	21	4
135	37	7	23	4

Table A-3. Crosswalk 1

Value	Count	MED_IVMP_C	MED_IVMP_Q	New Assigned Value
136	231	5	23	4
137	81	6	23	4
138	3234	25	0	4
139	9	22	40	4
140	37	25	1	4
141	8	23	41	4
142	1	23	4	4
143	6	23	3	4
144	2	23	2	4
145	102	3	21	4
146	4	23	1	4
147	1426	25	25	4
148	65	8	21	4
149	2	21	23	4
150	6	23	21	4
151	2	24	21	4
152	237	10	22	4
153	141	8	22	4
154	110	10	25	4
155	1	2	25	4
156	61	10	28	4
157	32	21	1	4
158	131	1	21	4
159	21	8	23	4
160	54	10	23	4
161	264	27	27	4
162	440	26	26	4
163	47	29	29	4
164	2	8	28	4
165	17	9	23	4
166	1	24	22	4
167	4	23	24	4
168	11	10	27	4
169	2	10	26	4

Table A-3. Crosswalk 1

Value	Count	MED_IVMP_C	MED_IVMP_Q	New Assigned Value
170	1	7	27	4
171	1	24	41	4
172	18	26	0	4
173	539	23	0	4

10. Combine new combo grid with OSU Update grid and reclassify habitat changes into new combination IVMP_OSU_Update grid. Use Crosswalk number 2.

Table A-4. Crosswalk 2

Value	Count	Crosswalk 1	OSU Update	New Assigned Values
1	4625010	1	0	1
2	3290126	2	0	2
3	2837705	3	0	3
4	2963224	4	0	4
5	5191763	7	0	7
6	1104100	5	0	5
7	630825	6	0	6
8	42056	5	1	3
9	18146	6	1	3
10	164844	7	1	3
11	89206	1	1	3
12	66310	3	1	3
13	94452	2	1	3
14	65677	4	1	4
15	196413	2	2	3
16	157486	3	2	3
17	242828	1	2	3
18	32391	4	2	4
19	67642	5	2	3
20	243890	7	2	3
21	27455	6	2	3

11. Begin process to reclassify Owl Habitat value 5, 6, and 7 to one of the values 1-4.
12. To complete the reclassification of 5, 6, and 7 to 1-4 put together an intersect of FOI and TPCC where FOI IR^ (Age Class) is greater than or equal to 0 and the TPCC Primary Mgmt.

(PC) does not contain "NF" or the Fragile Interfering Condition 2 (FIC2) does not contain "N".

13. Add attribute field called Owl Habitat to FOI_TPCC intersect and populate with the following formulas: If IR^ greater than or equal to 80 populate Owl Habitat with 1; otherwise, If IR^ greater than 30 but less than 80 populate Owl Habitat with 2; If IR^ is less than 30 populate the Owl Habitat with 3; and all other values are written to 4.
14. Change the FOI_TPCC vector shape file to a grid, using the Owl Habitat field as the VAT.
15. Combine the FOI_TPCC grid with the IVMP_OSU_Update. Reclassify to new grid FOI_TPCC_ IVMP_OSU_Update with attached crosswalk number 3.

Table A-5. Crosswalk 3
For Combination of FOI_TPCC and IVMP_OSU_UPDATE grids

FOI_TPCC Values	IVMP_OSU_UPDATE Values	FOI_TPCC_ IVMP_OSU_Update
0	1	1
0	2	2
0	3	3
0	4	4
0	5	4
0	6	4
1	1	1
1	2	2
1	3	3
1	4	4
1	5	2
1	6	1
2	1	1
2	2	2
2	3	3
2	4	4
2	5	2
2	6	2
3	1	1
3	2	2
3	3	3
3	4	4
3	5	3
3	6	3

Table A-5. Crosswalk 3
For Combination of FOI_TPCC and IVMP_OSU_UPDATE grids

FOI_TPCC Values	IVMP_OSU_UPDATE Values	FOI_TPCC_ IVMP_OSU_Update
4	1	1
4	2	2
4	3	3
4	4	4
4	5	4
4	6	4

16. Prepare Fire High Burn Severity Grid to account for habitat changes from 2003 to present. Code all Cells with a high burn severity with the value of 4, representing a total stand replacement.
17. Prepare Timber Sale Inventory (TSI) polys to account for habitat changes from 2003 to present.
18. Combine FOI_TPC_IVMP_OSU_UPDATE grid with Burn Severity gird. For all cell values that have a habitat code of 1 or 2 and a burn severity code of 4, the habitat code will be changed to 3, Capable. For habitat codes of 3 and 4, there are no changes. This will create the FOI_TPC_IVMP_OSU_BS grid.
19. Add attribute field to store owl habitat information for the TSI polys and populate it as follows: If treatments have changed the habitat rating to Dispersal Habitat, give the unit the value of 2; If treatments have changed the habitat rating to Capable Habitat, give the unit the value of 3; If the unit is or was NRF, the unit should be coded 1.
20. Convert TSI Polys to a grid using the habitat rating of 1-4 for the cell values.
21. Combine the FOI_TPC_IVMP_OSU_BS grid to the TSI grid. Reclassify cells that have both a TSI and FOI_TPC_IVMP_OSU_BS value with the TSI value.
22. Run a 5x5 Majority Filter
23. Convert the grid to vector polygon layer called Final_Owl_Baseline.
24. Eliminate any polygons that are less than 5 acres and cut the polygons by resource area boundary creating a new layer, Final_Owl_Baseline_5ac.
25. Intersect Final_Owl_Baseline_5ac with existing owl site points to determine if any points do not fall on NRF habitat.
26. Correct Final_Owl_Baseline_5ac for any habitat changes the biologists found that differ at the locations of their existing Northern Spotted Owl Nest sites that did not occur on NRF.
27. Correct the baseline layer to account for Serpentine Soils.
28. Correct baseline habitat using the habitat designations from the biologists for each project unit to create the updated layer, OWL_HAB_Final_Med_BLM.

Interagency Vegetation Mapping Project (IVMP) Metadata

Identification Information:
- Citation:
  - Citation Information:
    - Originator: BLM Oregon, Forest Service Region 6
    - Publication Date: Unknown
    - Title: kla_qmd_std
- Description:
  - Abstract: This theme shows quadratic mean diameter recoded to match the Vegetation Strike Team standards for the Klamath Oregon physiographic province of the Interagency Vegetation Mapping Project (IVMP).
  - Purpose: Effectiveness monitoring and resource management.
  - Supplemental Information: ARC/INFO GRID derived from Landsat TM satellite imagery (imagery circa 1996).
- Time Period of Content:
  - Time Period Information:
    - Range of Dates/Times:
      - Beginning Date: 1996
      - Ending Date: 1996
  - Currentness Reference: ground condition
- Status:
  - Progress: Complete
  - Maintenance and Update Frequency: As needed
- Spatial Domain:
  - Bounding Coordinates:
    - West Bounding Coordinate: -124.5
    - East Bounding Coordinate: -122.75
    - North Bounding Coordinate: 46.5
    - South Bounding Coordinate: 43
- Keywords:
  - Theme:
    - Theme Keyword Thesaurus: None
    - Theme Keyword: effectiveness monitoring
    - Theme Keyword: land cover
    - Theme Keyword: size
    - Theme Keyword: qmd_std_meta
    - Theme Keyword: Vegetation
    - Theme Keyword: Vegetation Strike Team
    - Theme Keyword: quadratic mean diameter
- Place:
    - Place Keyword Thesaurus: None
    - Place Keyword: FEMAT
    - Place Keyword: physiographic provinces
    - Place Keyword: spotted owl range
    - Place Keyword: Western Oregon

Place Keyword: Western Washington
Access Constraints: Discretionary, contains no sensitive information - generally considered releasable.
Use Constraints: None
Point of Contact:
Contact Information:
Contact Person Primary:
Contact Person: Jim Alegria
Contact Organization: BLM ORSO
Contact Address:
Address Type: mailing address
Address: P.O. Box 2965
City: Portland
State or Province: OR
Postal Code: 97208
Country: USA
Contact Voice Telephone: 503-808-6090
Native Data Set Environment: Arc/Info; AIX/UNIX

Data Quality Information:
Attribute Accuracy:
Attribute Accuracy Report: Statistical accuracy assessment to be performed upon completion of all physiographic provinces.
Logical Consistency Report: This layer is an ARC/INFO GRID imported from an ERDAS IMAGINE file. The source IMAGINE file was generated through a combination of unsupervised classifications in IMAGINE and regression analysis in SAS.
Completeness Report: This layer covers the Klamath Oregon physiographic province for the Interagecy Vegetation Mapping Project (IVMP). IVMP will map Western OR and WA.
Positional Accuracy:
Horizontal Positional Accuracy:
Horizontal Positional Accuracy Report: Unknown
Lineage:
Source Information:
Source Citation:
Citation Information:
Originator: Space Imaging EOSAT
Publication Date: 1996
Title: Landsat Thematic Mapper Satellite Imagery (Landsat 5)
Type of Source Media: CD-ROM, 8mm Exabyte
Source Time Period of Content:
Time Period Information:
Range of Dates/Times:
Beginning Date: 1996
Ending Date: 1996
Source Citation Abbreviation: Landsat TM
Source Contribution: Data source provide spectral information(25 meter pixels)
Process Step:

Process Description: The theme was created using a combination of image classification techniques based on unsupervised methods and regression analysis.
Process Date: 1998-2000

Spatial Data Organization Information:
Indirect Spatial Reference: Western OR and WA
Direct Spatial Reference Method: Raster

Spatial Reference Information:
Horizontal Coordinate System Definition:
Planar:
Grid Coordinate System:
Grid Coordinate System Name: Universal_Transverse_Mercator
Universal Transverse Mercator:
UTM Zone Number: 10
Planar Coordinate Information:
Planar Coordinate Encoding Method: Coordinate Pair
Coordinate Representation:
Abscissa Resolution: 0.001
Ordinate Resolution: 0.001
Geodetic Model:
Horizontal Datum Name: North American Datum of 1927
Ellipsoid Name: Clarke 1866
Semi-major Axis: 6378206.4
Denominator of Flattening Ratio: 294.98

Entity and Attribute Information:
Detailed Description:
Entity Type:
Entity Type Label: kla_qmd_std
Entity Type Definition: Quadratic mean diameter (recoded to match Vegetation Strike Team standards)
Entity Type Definition Source: OR BLM, USFS Region 6
Attribute:
Attribute Label: land_cov_type
Attribute Definition: The general land cover type
Attribute Definition Source: OR BLM, USFS Region 6
Attribute Domain Values:
Unrepresentable Domain: 12-character string:
background
water - rivers, lakes, ocean, etc.
urban
agriculture
barren - bare soil, rock, lava, sand, etc.
snow
noise - problems originating from image sensor
other - cloud, haze, smoke, shadow
topo shadow - topographic shadow
wetlands

prairie
lt_70%veg - less than 70% vegetation cover
lt_30%con - less than 30% conifer cover
unknown - qmd predicted > 75"
vegetation - all forest-related vegetation, clear-cuts

Attribute:
Attribute Label: veg_cov_type
Attribute Definition: Vegetation cover type
Attribute Definition Source: OR BLM, USFS Region 6
Attribute Domain Values:
Unrepresentable Domain: 12-character string:
background
non-forest
unknown - qmd predicted > 75"
veg-cover

Attribute:
Attribute Label: std_qmd
Attribute Definition: Standardized qmd code
Attribute Definition Source: OR BLM, USFS Region 6
Attribute Domain Values:
Unrepresentable Domain: Integer, 1 place:
0
1
2
3
4
5
6

Attribute:
Attribute Label: inch_range
Attribute Definition: Size range (inches)
Attribute Definition Source: OR BLM, USFS Region 6
Attribute Domain Values:
Unrepresentable Domain: 8-character string:
0
0-4.9
5-9.9
10-19.9
20-29.9
30-49.9
50+

Distribution Information:
Distributor:
Contact Information:
Contact Person Primary:
Contact Person: Lisa Blackburn

Contact Organization: Bureau of Land Management, OR/WA State Office
Contact Position: State Records Administrator
Contact Address:
Address Type: mailing address
Address: P.O. Box 2965
City: Portland
State or Province: OR
Postal Code: 97208
Country: USA
Contact Voice Telephone: (503)808-6276
Distribution Liability: No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.
Standard Order Process:
Digital Form:
Digital Transfer Information:
Format Name: ARCE
File Decompression Technique: No compression applied
Digital Transfer Option:
Offline Option:
Offline Media: 8 mm cartridge tape
Recording Capacity:
Recording Density: Low
Recording Format: TAR
Compatibility Information: Sun UNIX
Fees: $8 administrative fee; $18.60 per hour research time (human time spent to locate the files and make the tape); $0.13 per page copying costs (8.5x11 up to 8.5x14); $7.50 per paper plot; $16.00 per mylar plot; cost of media (diskettes, tapes, etc); cost of postage (based on actual postage, including tubes, padded envelopes, overnight/express mail, etc).
Ordering Instructions: Contact Distributor
Custom Order Process: Contact Distributor

Metadata Reference Information:
Metadata Date: 19990224
Metadata Future Review Date: 20000224
Metadata Contact:
Contact Information:
Contact Person Primary:
Contact Person: Stanley Frazier
Contact Organization: Bureau of Land Management, Oregon State Office
Contact Position: State Data Administrator
Contact Address:
Address Type: mailing address
Address: P.O. Box 2965
City: Portland
State or Province: OR

Postal Code: 97208
Country: USA
Contact Voice Telephone: (503)808-6009
Metadata Standard Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata Standard Version: 19940608

Appendix B. Reinitiation Projects

In some instance, a project included LAA and NLAA portions. The NLAA portions were broken out in NLAA BAs for fiscal years 07 and 08 where appropriate. LAA portions were carried into this BA.

Table B-1. Reinitiation History of Proposed Harvest, Vegetation Management, and Right-of-Way Projects included in this BA

Bold projects are new. All others are reinitiations of all or parts of projects analyzed under previous BAs.

Project	Treatment Type	BA FY 04-08	BA FY 06-08	07 NLAA	08 NLAA	Other BAs	Sold Sale BA
Ashland Resource Area							
Bald Lick	Timber Sale	X	X				
Birdseye	Timber Sale	X	X				
BOR	Timber Sale						
China (Keeler)	Timber Sale	X	X				
Conde Shell	Timber Sale					X	
Deer Lake	Timber Sale						
Galls Foot	Timber Sale			X			
Lucky Lake (Lake Creek)	Timber Sale	X	X				
Plateau Thin	Timber Sale	X	X				
Sampson Cove	Timber Sale	X	X				
Wagner Anderson	Timber Sale	X	X				
Butte Falls Resource Area							
Bowen Arrow	Timber Sale						
Camp Cur	Timber Sale	X	X				
Double Ginger	Timber Sale						
Evans-Sardine	Timber Sale	X	X	X			
Fielder Mountain	Timber Sale	X	X				
Flounce Around	Timber Sale	X	X				
Musty Evans	Timber Sale		X				
North Trail	Timber Sale		X				
Pleasant Fry	Timber Sale	X	X				
Slick Battle	Timber Sale	X	X				
Slick Sand	Timber Sale	X	X	X			
Twin Ranch	Timber Sale		X				
Glendale Resource Area							
Anaktuvuk	Vegetation Management		X	X	X		

Table B-1. Reinitiation History of Proposed Harvest, Vegetation Management, and Right-of-Way Projects included in this BA

Bold projects are new. All others are reinitiations of all or parts of projects analyzed under previous BAs.

Project	Treatment Type	BA FY 04-08	BA FY 06-08	07 NLAA	08 NLAA	Other BAs	Sold Sale BA
Big Jim	Timber Sale						
Boney Skull	Timber Sale	X	X	X	X		
Caboose	Timber Sale						
Chew Choo	Timber Sale	X	X				
Cottonsnake	Timber Sale					X	
Five Cows	Timber Sale	X	X				
Five Rogues Thin	Timber Sale			X			
Five Rogues TS	Timber Sale	X					
Fizzy Stew Matrix	Timber Sale			X	X		
Fortune Stew	Timber Sale			X			
Mari Kelsey	Timber Sale	X	X				
Slotted Pen Quarry	Other						
Small Fortune	Timber Sale						
Swampwood	Timber Sale						
Grants Pass Resource Area							
Althouse Sucker	Timber Sale	X	X	X	X		
Anderson West	Vegetation Management		X	X		X	
Birdseye Jones	Timber Sale	X	X	X			
Cheney Slate	Timber Sale	X	X				
East Fork Illinois	Timber Sale	X	X		X		
Granite Joe	Timber Sale	X	X				
Granite Horse	Timber Sale			X		X	X
Indian Hill ROW	Right-of-Way						
Josephine Co. ROW	Right-of-Way						
Josephine Co. ROW	Right-of-Way						
Mount Baldy ROW	Right-of-Way						
Pickett Charge	Timber Sale	X	X	X			
Pickett Snake	Timber Sale		X	X		X	
South Deer	Timber Sale	X	X	X		X	X
Tennessee Lime	Timber Sale		X				

Table B-1. Reinitiation History of Proposed Harvest, Vegetation Management, and Right-of-Way Projects included in this BA							
Bold projects are new. All others are reinitiations of all or parts of projects analyzed under previous BAs.							
Project	**Treatment Type**	**BA FY 04-08**	**BA FY 06-08**	**07 NLAA**	**08 NLAA**	**Other BAs**	**Sold Sale BA**
West Fork Illinois	Timber Sale	X	X				X

Appendix C. Project Design Criterion (PDC)

The goal of PDC is to reduce adverse effects to listed or proposed threatened or endangered species. PDC are jointly developed by BLM and the Service to proactively minimize the level of "take."

> "Section 7 requires minimization of the level of take…. Reasonable and prudent measures can include only actions that occur within the action area, involve only minor changes to the project, and reduce the level of take associated with project activities. Reasonable and prudent measures serve to minimize impacts on the specific individuals or habitats affected by the action" (ESA Handbook USDI 1999).

PDC may reduce the BLM's determination of effects from "likely to adversely affect" to a lesser determination, or might reduce the severity of a "likely to adversely affect" determination.

Medford BLM retains 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 could then include appropriate seasonal restriction and could also 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.

Firefighter safety must be taken into account at all times when using the PDC. If implementation of PDC might cause human safety risks, the BLM will respond to the human safety threat and will determine if that response is grounds for reconsultation.

There are two types of PDC:

Mandatory:

Must be incorporated in all projects to reduce adverse affects (LAA) or reduce the severity of impacts to listed species – required unless a specific exemption is mentioned in a "recommended" PDC. Mandatory PDC are incorporated in all appropriate planned actions. The effects determination reflects their implementation. Projects unable to incorporate mandatory PDC will be analyzed under separate consultation.

Recommended:

Discretionary; incorporated in projects where appropriate to further reduce adverse affects. If recommended PDC cannot be incorporated, the project will still be in compliance with this BA.

Any of the following PDC may be waived in a particular year if nesting or reproductive success surveys conducted according to the Service-endorsed survey guidelines reveal spotted owls are

non-nesting or no young are present that year. Waivers are only valid until March 1 of the following year. Sites/activity centers (including generated sites) are assumed occupied until protocol surveys indicate otherwise.

All Species

Wildland Fire - Mandatory PDC

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, 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.

Northern Spotted Owl

Mandatory PDC

A. Work activities that produce loud noises above ambient levels will not occur within specified distances (Appendix C-1) of any documented or generated owl site during the critical early nesting period, March 1 and June 30, or until two weeks after the fledging period. This seasonal restriction may be waived if protocol surveys have determined the activity center is not occupied, owls are non-nesting , or owls failed in their nesting attempt. The distances listed in Table B-1 may be shortened with Level 1 concurrence if significant topographical breaks or blast blankets (or other devices) would muffle sound between the work location and nest sites. The restricted area is calculated as a radius from a documented site or 200 additional meters from a generated owl site center.

The Resource Area biologist has the option to extend the restricted season until September 30 during the year of harvest, based on site-specific knowledge (such as a late or 2nd nesting attempt).

B. Delay any project activities located within the nest patch until September 30 unless the Resource Area biologist determines young are not present, or until two weeks after the fledging period.

C. Burning will not take place within 0.25 miles of spotted owl sites (documented or projected) from March 1 through June 30, or until two weeks after the fledging period, unless substantial smoke will not drift into the nest patch.

D. Protect known nest sites from high intensity fire whenever possible during wildfires. Update Resource Information Book as soon as new nests or sites are located.

E. 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.

F. PDC can be waived if site-specific biological evaluation by the resource area biologist indicates seasonal protection is unwarranted.

Table C-1. Mandatory Spotted Owl Restriction Distances

Activity	Zone of Restricted Operation
Heavy Equipment (including nonblasting quarry operations)	105 feet
Chain saws	195 feet
Impact pile driver, jackhammer, rock drill	195 feet
Small helicopter or plane	360 feet*
Type 1 or Type 2 helicopter	0.25 miles*
Blasting; 2 pounds of explosive or less	360 feet
Blasting; more than 2 pounds of explosives	1 mile
* If less than 1,500 feet above ground level.	

Above-ambient noises further than these Table C-1 distances from spotted owls are expected to have either negligible effects or no effect to spotted owls. The types of reactions spotted owls could have to noise the Service considers to have a negligible impact includes flapping of wings, turning the head towards the noise, hiding, assuming a defensive stance, etc. (USFWS 2003).

Recommended PDC

A. No NRF habitat removal will occur within 0.25 miles of any documented or generated owl site from March 1 through September 30, or until 2 weeks after the fledging period, unless

protocol surveys have determined owls are not present, are non-nesting , or nesting has failed.

B. Minimize repeated aircraft flights that are less than 1,500 feet Above Ground Level (AGL) to reduce disturbance during wildfires. Minimize the use of fire line explosives within 1 air mile of occupied stands from March 1 through June 30, or until 2 weeks after the fledging period, unless protocol surveys have determined owls are not present, are non-nesting , or nesting has failed.

C. Light Hand Tactics or Minimize Impact Suppression Tactics (MIST) should receive consideration for use within the protection zones for northern spotted owls.

Marbled Murrelet

PDC apply to two different inland "belts." PDC 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. These trees will be removed during the non-nesting season (September 16 through March 31). If these trees are an immediate threat to human safety, they will be cut and emergency consultation will be initiated, if appropriate.

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 unit and adjacent potential habitat that will be impacted by a project.

Brief Description of Marbled Murrelet Areas ("bands"):

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 southwest Oregon.

Area B - Area 6.5 miles (10 kilometers) 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) Areas A and B.

Mandatory PDC for Activities within Survey Area A or B

BLM will implement Mandatory PDC in or adjacent to occupied or unsurveyed suitable marbled murrelet habitat to ensure "may affect" activities that have the potential of disturbing marbled murrelets are reduced to "not likely to adversely affect" or "no effect."

A. The project must be surveyed to protocol if the project removes suitable habitat. The Pacific Seabird Group specifies a 2-year protocol to document presence or absence of murrelet

(Evans, et al. 2003). The Service will be contacted on a case-by-case basis to discuss other means of ensuring potential nest trees are not impacted if it is not feasible to complete the 2-year protocol. Medford BLM has the option of not surveying suitable habitat and classifying these stands as "Occupied." A "new" LSR must be established for any timber stand determined to be or assumed to be occupied by marbled murrelet (NWFP ROD, page C-10).

B. Work activities which produce noises above ambient levels will not occur within specified distances (see Table C-2) of any occupied stand or unsurveyed suitable habitat from April 1 through August 5. Work activities will be confined to the time period between 2 hours after sunrise to 2 hours before sunset from August 6 through September 15. See Fuels management PDC for direction regarding site preparation and prescribed fire.

C. Clean up trash and garbage daily at all construction and logging sites in occupied stands or unsurveyed suitable murrelet habitat. Keep food out of sight so it does not attract crows and ravens (predators on eggs or young murrelets).

D. No open air or unmuffled blasting activities will occur from April 1 through September 15 within 1.0 miles of occupied stands or unsurveyed suitable habitat. This distance may be shortened to those listed in Table C-2 if significant topographical breaks or blast blankets (or other devices) would muffle sound traveling from the blast or if less than 2 pounds of explosives are used.

E. Use only the following sources of wood for instream structures to minimize the impact to potential murrelet nest trees:

(I) Trees already on the ground in areas where large woody material is adequate;

(II) Trees lacking suitable nesting structure for murrelets or contributing to trees with suitable nesting structure, as determined by Resource Area wildlife biologist.

F. Do not burn within 0.25 miles of known occupied marbled murrelet sites or unsurveyed marbled murrelet habitat from April 1 through August 6 unless smoke will not drift into the occupied site or unsurveyed suitable habitat. Complete all broadcast and underburning operations (except for residual "smokes") in the time period between two hours after sunrise to two hours before sunset.

G. Restrict helicopter flights to a minimum of 500 feet above the canopy of occupied or unsurveyed suitable habitat from April 1 through August 6. Avoid repeated flights over occupied or unsurveyed suitable habitat (recommended AGL is 1,500 feet).

H. Protect known nest sites from high intensity fire whenever possible during wildfires. Update Resource Information Book as soon as new nests or sites are located.

I. Minimize noise disturbance resulting from projects in occupied stands or unsurveyed suitable habitat and within 0.25 mile of the edge of these stands from April1 through August 5.

J. Minimize the use of fire line explosives within 1 air mile of occupied or unsurveyed suitable habitat stands from April 1 through August 5.

K. Restrict quarry operation from April 1 through August 5 if an occupied stand or unsurveyed suitable habitat occurs within 0.25 miles of the quarry. Resource Area biologists have the discretion to modify the 0.25-mile zone depending on topography, site-specific conditions, and activities.

Table C-2. Mandatory Marbled Murrelet Restriction Distances

Activity	Zone of Restricted Operation
Blasting: more than 2 pounds of explosive	1 mile
Blasting: 2 pounds or less of explosive	120 yards
Impact pile driver, jackhammer, or rock drill	120 yards
Type 3 or 4 Helicopter or single-engine airplane	120 yards
Type 1 or 2 Helicopter	0.25 miles
Chainsaws (hazard trees, tree harvest, etc.)	120 yards
Heavy equipment	120 yards

Appendix D. Owl Estimation Methodology

Methodology for Estimating the Number of Northern Spotted Owls Affected by Proposed Federal Actions

Version 2.0

(Version 2.0 replaces the September 14, 2007 document)

Prepared by:
USDI Fish and Wildlife Service
USDI Bureau of Land Management
USDA Forest Service

September 15, 2008

Summary

Note to User: Information and guidance provided herein supersedes earlier versions of this document.

On February 16, 2007, the Ninth Circuit Court rendered a decision in the ONRC v. Allen case that invalidated the Incidental Take Statement (ITS) of a U.S. Fish and Wildlife Service (FWS) Biological Opinion that covered all FS and BLM timber harvest activities affecting the northern spotted owl in the Rogue Basin, Oregon for Fiscal Years 2002-2003. The Court concluded the ITS was arbitrary and capricious because: (1) the underlying Biological Opinion had been withdrawn; (2) the ITS failed to provide a numerical limit on take of the spotted owl without explaining why such a limit is impractical to obtain and employ; and (3) the ITS did not provide an adequate trigger for reinitiation of consultation.

In response to the 9th Circuit Court, spotted owl specialists from Region 1 of the FWS, the OR/WA State Office of the Bureau of Land Management (BLM), and Region 6 of the Forest Service (FS) developed a methodology for quantifying and monitoring incidental take of the northern spotted owl that addresses the 9th Circuit's decision. The methodology estimates the number of northern spotted owl home ranges that are likely to occur within the area affected by a proposed Federal action, based on the amount and distribution of suitable owl habitat and best available information on known owl locations and spacing patterns for that area. In particular, the methodology relies upon known spotted owl locations derived from surveys as the foundation for a "northern spotted owl occupancy" map. We believe the methodology provides a reasonable basis for the FWS to assess anticipated incidental take of the spotted owl caused by a proposed Federal action and includes procedures for monitoring take-related effects such that reinitiation of consultation can be triggered, as appropriate, prior to completion of the action. The methodology was reviewed by agency biologists responsible for the application of the methodology along with leading spotted owl researchers. Their comments were considered in finalizing this document.

BLM and FS Administrative Unit Staff and Level 1 Teams are encouraged to follow this methodology when assessing effects, and implementing and monitoring projects in situations where no or only partial spotted owl survey information is available for the analysis area. If current survey information is available, it represents the best available information and should be used to assess the effects of a proposed action on the spotted owl. Information derived from the methodology described herein should be included in the Biological Assessment and will assist the FWS in evaluating the potential for incidental take of spotted owls to be included in a Biological Opinion, as appropriate. Appendix 1 provides the scientific background in support of the methodology. A glossary of terms is also provided near the end of this document.

It should be noted that the northern spotted owl is one of the most studied species in the world. In developing this methodology, we have relied on the tremendous body of research available; however, for some of the specific questions we are trying to address, the information is limited. Therefore, we view the resulting methodology as an iterative process and anticipate updating the method(s) and its application as new information becomes available. The methods employed here are unique to the northern spotted owl and are likely not readily transferable to other listed species.

Methodology for Estimating the Number of Northern Spotted Owls Affected by Proposed Federal Actions1

The following procedures are intended to reasonably estimate the number of northern spotted owls (*Strix occidentalis caurina*) that are likely to occur within the area affected by a proposed Federal action (in consultation terms, the "action area") for the purpose of completing effect determinations in Biological Assessments (BAs) under informal consultation and jeopardy analyses and incidental take assessments in Biological Opinions (BiOps) under formal consultation. This information will be used to characterize, in part, the Environmental Baseline, Effects of the Action, and Cumulative Effects sections of a BiOp, and the amount of take, if any, exempted in an Incidental Take Statement (ITS).

This methodology provides a quantitative basis to express the anticipated incidental take of the spotted owl caused by a proposed federal action for purposes of take exemption and monitoring.

Spotted owl survey information plays an integral part in estimating the number of northern spotted owls affected by proposed Federal actions. In designing the estimation process, the BLM, FS, and the FWS relied on number and distribution data for spotted owl locations from demographic studies and other administrative owl survey data sets. These data, when combined with information on owl-landscape habitat configurations, facilitate the projection of likely spotted owl occurrence patterns across the landscape. The estimation process described below uses known spotted owl locations as the basis for the assessment and supplements any known locations with projected locations derived from the habitat analysis of spotted owl sites from similar areas within the owl's range. Using the projected owl locations solely, or in concert with known locations, facilitates estimating the number of northern spotted owls affected by proposed federal actions and obviates the need to conduct owl surveys specific to each of the proposed actions.

The biological basis for this methodology relies on information related to known spotted owl locations, habitat spatial relationships and distribution.

Project-specific spotted owl survey data, in some cases, may be not sufficient to estimate the number and distribution of spotted owls within a given area due to the negative effects that barred owl presence may have on the response of spotted owls during calling surveys, and other factors that may decrease spotted owl detectability such as weather and breeding status. For that reason, the northern spotted owl occupancy map (NSOOM) provides a more comprehensive estimate of the number of owls that are likely to occur in the area affected by a proposed Federal action because it includes both known spotted owl locations and projected locations. Please see Appendix 1 for additional information regarding the development of the NSOOM.

The NSOOM does not replace surveys. Surveys are encouraged to help inform project planning and preclude the need for relying on computer-generated points.

1 For example, land management activities involving timber harvest or fuels reduction, and those that may cause above-ambient noise levels that may affect the spotted owl.

A. Estimating the Number of Spotted Owl Home Ranges that may be Affected by Proposed Actions

Step 1: Define the analysis area.

(a) Map the estimated geographic location of proposed actions.

Delineate the boundaries of proposed actions in a GIS shapefile using the best available planning information. The shapefile should have an accompanying attribute table that could include the unit name, size (acres), type of activity, and type of impact(s) to the spotted owl (Table 1). For projects that potentially cover large areas (e.g., aerial applications, roadside salvage, etc.) consider creating multiple smaller units and delineate these in the GIS shapefile for the purposes of this analysis. It is recognized that both project location and the extent of affected acres are sometimes not fully defined at the time of consultation. Therefore, it is anticipated that the Administrative Units will, in some cases, rely on past consultation/planning as a guide to approximate the size and location of proposed actions for the purpose of completing consultation. It is expected that all specialists (i.e., fire, silviculture, timber, wildlife, etc.) will make contributions to mapping the proposed actions, thus, this effort should not rely entirely on one person "approximating" these areas.

Table 1. An example of information to be included in the attribute table of the GIS shapefile for proposed actions[2].

Actions/Unit	Acres Impacted	Activity Type	Impact	NSO site #
A	35	Variable density thinning	NRF habitat-maintained	0052
B	25	Understory Thinning	Dispersal habitat-maintained	3569
C	10	Regeneration harvest	NRF removed	0039
Etc.				

[2] For example, by using the IDENTIFY tool in ArcMAP, clicking on the proposed action location could display the unit name, acres impacted, treatment type and the type of impact to spotted owl habitat. For efficiency, projects can be set up for users in the GIS such that holding the computer's cursor over a given unit will display pertinent information from the attribute file.

(b) In the GIS shapefile, overlay a circle with a diameter of one spotted owl provincial home range on each proposed action/unit.

The resulting polygon(s) buffers the analysis area within which spotted owls may be affected (Figure 1 and Table 2). The GIS shapefile containing the action/unit and provincial home range circles should be included as part of the BA.

Figure 1. This figure shows an example of the extent of an analysis area using the composite of home-range diameter circles (Table 2) around proposed timber harvest units. Darker shaded (green) areas represent spotted owl habitat derived from the BioMapper product (Davis and Lint 2005 *in* Lint 2005 GTR-648).

Step 2: Identify spotted owl habitat within the analysis area.

(a) Federal Lands

Overlay the analysis area developed under Step 1 with your best available spotted owl habitat map layer. This layer is likely the Administrative Unit spotted owl habitat layer. Whatever habitat layer that is being used should be updated, as possible, to reflect current habitat conditions.

(b) Non-Federal Lands

Should the habitat condition on non-federal lands be analyzed for the Biological Assessment? Yes, albeit depending on the amount of non-federal ownership within affected northern spotted owl home ranges.

In the past, BAs/BiOps have assumed that no suitable spotted owl habitat occurs on non-federal lands for the consultation analysis. This "worst-case" scenario was used because it is difficult to know the current land-use planning status of owl habitat on non-federal lands within an action area. However, we acknowledge that there are situations where there is sufficient habitat on non-federal lands that if not considered would lead to the possibility of overestimating adverse effects (and take) on spotted owls caused by proposed federal actions.

To address the issue of assessing habitat conditions on non-federal lands that contribute to northern spotted owl home ranges on federal lands, the following guidance is provided.

All (federal and non-federal) acres of suitable habitat within the provincial home range radius of an affected owl activity center location on the NSOOM will be used to assess effects to individual owls. The BA will identify the owl activity centers affected by the proposed federal action and describe the amount of suitable habitat present on federal and non-federal lands before and after the proposed action for the three scales of analysis (i.e., nest patch, core and home range) specified in this methodology. The action agency will also specify the proportion of federal and non-federal acres for each of the analysis scales for each of the affected owl activity centers. For those activity centers with non-federal lands, the action agency will provide an estimate of the amount of suitable habitat on non-federal land using the best information available (e.g., BioMapper data used to develop NSOOM updated with most recent change data or other data as available). The BA will provide a tabular summary of the acres of suitable owl

habitat on federal and non-federal lands for the three analysis scales for pre and post proposed action scenarios.

In the process of preparing the BiOp for the proposed actions, the Service will consider the information provided in the BA on the amount of suitable habitat on both federal and non-federal lands when assessing whether the effects of the federal proposed action will rise to the level of take for any individual spotted owl.

Example Table. Extent of federal and non-federal land and NRF habitat within NSO home ranges in the action area. Additional columns can be added to the table to reflect analysis needs.

MSNO	Federal Land (acres & %)	Non-Federal Land (acres & %)	Federal Land NRF habitat (acres & %)	Non-Federal Land NRF habitat (acres & %)

As always, if formal consultation is required, the Cumulative Effects section of the BiOp will discuss the role of any suitable spotted owl habitat on non-federal land and any Endangered Species Act (ESA) compliance obligations on those lands within the action area.

As discussed in Appendix 1, habitat and known owl sites on non-federal lands will be used in the development of the NSOOM. This habitat layer is available via the biomapper product (Davis and Lint 2005) and is used due to its provincial scale coverage.

Is dispersal-only spotted owl habitat considered in the ITS methodology? No. The ITS methodology is focused on spotted owl nesting, roosting and foraging (NRF) habitat. Therefore, dispersal-only habitat is not used in the NSOOM nor is it used to examine effects under this methodology. Continue to examine effects to dispersal habitat as you have in the past.

Step 3: Select the position of spotted owl site centers within the analysis area.

As part of applying this methodology, Administrative Units will be asked to develop a GIS shape file of spotted owl sites on their unit. This shape file will include those sites where the Administrative Unit determines there is a reasonable likelihood that spotted owls occupy the sites. Site selection will depend on survey information, knowledge of barred owls, and/or owl habitat alterations since the last survey. This methodology relies on the Thomas et al. (1993: FEMAT IX-25) definition of a spotted owl site: “Any site where there has been a recent or historic observation of a resident single spotted owl or a pair of owls.” It will be the discretion of the administrative unit to define historical sites.

The spotted owl site layer (see above) the Administrative Units provide will serve as the foundation for the NSOOM for the action area. However, the NSOOM will also include computer-projected sites within likely occupied habitat (see below and Appendix 1).

Administrative Units may lack some confidence in the status of owl occupancy at some historic sites they include, and may therefore want to consider to defaulting to a computer-projected site instead in their effects analysis. In considering whether to use historic spotted owl sites in the development of the NSOOM, it should be noted that data collected in many of the demographic study areas show that on an annual basis as many as 60% of historic owl sites are occupied by spotted owls (unpublished annual reports by Anthony et al. and Forsman et al.). Additionally, on the Tyee demography study area in the Oregon Coast Ranges, 85 spotted owl sites were documented based on surveys prior to 1995. In 2005, those sites were resurveyed and spotted owls were detected within 400 m of where they were detected a decade ago at 60% of the sites (Lint unpublished data).

In some portions of the spotted owl's range, "effects of the action" analyses rely on the output of predictive owl occupancy models (e.g., California Klamath Province, Zabel et al. 2003) in the absence of surveys. We recommend continued use of these models.

What about the influence of barred owls and those spotted owl sites with relatively low habitat amounts? How is this information considered in selecting spotted owl sites and the development of the NSOOM? Both barred owls and relatively poor sites are taken into consideration in the process (see discussion below).

The ITS Team acknowledges the negative effects of barred owls on detection and occupancy rates of spotted owls (Courtney et al. 2004, 2008, Olson et al. 2006, and Crozier et al. 2007). Based on this information, the administrative units have been asked to consider the barred owl influence in their selection of occupied sites for this process. The ITS Team does not know to what extent spotted owl sites have been deleted from administrative unit spotted owl maps due to barred owls but believes very few sites were deleted. As a result, the ITS Team considers the methodology provides a liberal estimate of spotted owls for the purposes of estimating effects and take.

The ITS Team is also aware that some northern spotted owl sites, in particular, those sites located in the checkerboard pattern of BLM and non-federal lands have relatively low amounts of NRF habitat. The ITS methodology takes into account known spotted owl presence in these habitat conditions in that at least 90% of the sites are utilized to parameterize the NSOOM. This resulted, in some cases, in having as little as 17% NRF habitat (federal and non-federal, combined) at the home range scale (Table 5) being used to map likely occupied habitat. Therefore, spotted owls at the lower end of habitat conditions were utilized in this effort.

What level of spotted owl survey is needed for project planning? At a minimum, surveys should be conducted in accordance with the USFWS Northern Spotted Owl Survey Protocol (1992). Given the potential negative consequences of barred owl presence on spotted owl response rates, an update to the protocol is planned that will address the barred owl effect. Until this update is complete, continue to use the 1992 protocol.

Northern Spotted Owl Occupancy Map (NSOOM)

Computer-generated spotted owl sites

Both known spotted owl sites provided by the administrative unit and computer-generated spotted owl points are used as part of the process for quantifying take. The computer-generated points are used for areas with incomplete or no spotted owl survey information and are developed from spotted owl habitat relationships, nearest-neighbor distance, and density information from spotted owl demographic study areas, from the same province in which the BA/BiOp occurs (Appendix 1). The computer-generated points are placed randomly on the NSOOM within geographic areas satisfying the amount and spatial distribution of habitat along with the nearest-neighbor criteria associated with known owl sites. While the spatial distribution of the computer-points is random, the overall carrying capacity for the map area remains similar with each simulation.

Should computer-generated points be used to inform project planning? No. Computer points are based on a simulation that may not reflect actual spotted owl locations on the landscape. Again, the purpose of the computer-generated points is to estimate spotted owl numbers and distribution within unsurveyed habitat based on factors known to influence the carrying capacity of a given area for spotted owls for purposes of assessing the effects of a proposed Federal action on this species.

Should computer-generated sites be tracked through time? Computer points should be tracked for the term of the action(s) covered by the BA/BiOp and monitoring process. A different set of computer points may be generated for future actions covered by a BA/BiOp in the same map area if significant changes have occurred to the baseline conditions. This would result in the tracking of these points for the term of the actions covered by that BA/BiOp and subsequent monitoring activities.

Can elements of the ITS methodology be used to plan projects that avoid or minimize adverse effects to spotted owls? Yes. There are several elements of the ITS methodology that one can use to plan projects and minimize adverse effects to spotted owls. These elements include: 1) using your administrative unit's known spotted owl sites and suitable habitat layer and/or 2) using the NSOOM map which provides the general geographic area(s) where the amount and spatial distribution of likely occupied spotted owl habitat occurs out to the home range scale. One could also use their Unit's habitat layer and model nest patch and core area habitat, similar to the NSOOM process. This would result in a map of relatively higher quality habitat. For each of these elements, one would plan and design projects for the site specific conditions and outside of the mapped areas to avoid and/or minimize adverse effects to spotted owl habitat.

How are disturbance-related effects treated under this methodology? During the development of this methodology, Administrative Unit/Level 1 team meetings were held. Varied and appropriate ways of analyzing and protecting known spotted owl sites from disturbance

effects were discussed. The ITS Team supports the continued use of these approaches. For the computer generated sites, the ITS Team suggests a similar analytical approach for assessing effects of proposed actions. That is, the computer point and the surrounding activity-related distance should be assessed. Activities that occur during the critical breeding season and within the disturbance distance threshold for an activity may warrant likely to adversely effect determinations.

How can a project be planned to avoid adverse effects from disturbance? The following suggestions would help minimize adverse effects and may result in not likely to adversely affect determinations.

- Avoid siting projects near known spotted owl sites.
- Avoid siting projects within or immediately adjacent to NRF habitat.
- Avoid conducting activities within the critical breeding period for the spotted owl and within the disturbance distance threshold at known or computer generated owl sites.

For what length of time is a NSOOM valid? An occupancy map will be valid for the term of the action covered by the concurrence letter or BiOp, including any associated monitoring activities. Level 1 Teams will help determine if NSOOM updates are needed, based on stochastic events or new spotted owl survey data.

Can the NSOOM be used multiple times? As discussed above, the NSOOM is valid for monitoring the action(s) considered in the BiOp or Concurrence Letter for the term of the covered action. The NSOOM can also be used for effect analyses of other proposed actions, provided the baseline habitat hasn't changed significantly since the map was developed. Currently, we do not have the administrative and technological capacity to make annual changes to the NSOOM. However, for each new BA, a new NSOOM should be developed if baseline changes are significant and/or to provide a new set of computer-generated points for assessment purposes (see below). Deviations to this guidance can occur based on Level 1 discussions and decisions.

Who is responsible for the overall maintenance of information used to apply the ITS methodology? The interagency ITS Team envisions that most of the maintenance of information for the ITS methodology would be accomplished by Level 1 Teams. Here, Level 1 Teams would be responsible for edge-matching maps (see Glossary), making decisions on which known and computer sites to include or delete, tracking habitat conditions at sites, and making adjustments to local habitat definitions for purposes of completing consultation. Any revised maps and or other related products should be archived with the USFWS Level 1 representative. The ITS Team strongly encourages Level 1 teams to have at least one meeting a year to discuss all aspects of implementing the ITS methodology and to provide any of their concerns to the ITS Team.

Who is responsible for producing the NSOOM? It will be the responsibility of the interagency ITS Team to generate new versions of NSOOMs and update the ITS Methodology

document as new habitat or owl location information becomes available. New NSOOMs would be the result of having newer provincial habitat maps that come on-line through the NW Forest Plan monitoring program and/or a new consultation being initiated. In addition, as information becomes available, the ITS team will provide additional effects determination guidance, as appropriate. However, as pointed out in the text box above, depending of the level of new information (e.g., no significant changes in habitat baseline or number of spotted owl sites, new NSOOM may not need to be generated for each consultation. Level 1 Team will have discretion over this and advise the ITS team.

It is anticipated that future NSOOMs will be generated at a provincial rather than an Administrative Unit scale, as was done in 2007. Developing the NSOOM on a provincial scale should minimize the need to "edge-map" sites along administrative boundaries. However, this will require the Administrative Units to have their known site layer current on an annual basis. Also, the need to edge map computer points is not required because they are not treated like a known site, from a long-term point of view. These factors should help reduce the workload. When an Administrative Unit is ready to submit a BA, that is, they have a project planned and effects determined to at least their known sites, they will request a NSOOM from the ITS Team. In response, a NSOOM will be developed for the province, with a clipped version to the Administrative Unit. Once received, the unit will be able to assess effects of the proposed action based on the computer points, and finalize the BA. This process of clipping from the provincial map to Administrative Units will be repeated on an as needed basis, and should reduce work load for all involved.

How do I move a generated point on the NSOOM? When NSOOMs are developed, some of the computer-generated owl sites may not coincide with the suitable owl habitat layer used by an Administrative Unit. This is due largely to the NSOOM being developed on a remotely-sensed, pixel-based habitat map whereas most Administrative Unit habitat maps are raster-based, polygon maps and an artifact of GIS neighborhood calculations. If generated points do not coincide with spotted owl suitable habitat on an Administrative Unit's suitable habitat map, the following procedure can be used for moving a generated owl point into suitable habitat.

First, check to make sure your historic owl sites occur within your suitable habitat polygons. Second, don't consider the location of the proposed action when moving a generated owl point to avoid biasing the placement of that point. Next, move the generated point to the nearest patch (at least 15 to 20 acres in size) of suitable owl habitat taking into account the nearest-neighbor distance (Table 5) for the province. Keep this distance in mind and adhere to it as closely as you can. Once you have completed these steps, place the generated point at least 200 meters in from the stand boundary to reflect an "interior" location of spotted owl nest trees. Lastly, adjust the generated point, as needed on other factors such as proximity to streams, ridges, etc. When moving a generated point, consider the historic locations of owls in the vicinity to aid in deciding which stand to move the point to or where in a stand to place a point. The historic owl location data, in this case, would be owl sites that have not had owls for a long time such that Administrative Units elected not to use them on the NSOOM. These sites are useful in this context because they provide information about where an owl activity center was located at one time in the vicinity where you are considering moving a point.

Step 4: Delineate potentially affected spotted owl home ranges in the analysis area.

Implement this step using known and generated spotted owl sites on the NSOOM and encompass them using the appropriate provincial home range diameter (Table 2). Any home range subject to removal of suitable habitat or above ambient noise levels caused by the proposed action is an affected home range (Figure 2).

Table 2. Northern spotted owl median home range radius, area, and diameters and mean core area radius and area by physiographic province.

Province	**Median Home Range Radius and Area**	**Median Home Range Diameter**	**Mean Core Area Radius and Area**
Olympic Peninsula, WA	2.7 miles = 14,271 acres (Thomas et al. 1990) and Courtney et al. 2004); 40% = 5,708 acres.	5.6 miles	1.4 miles = 5,720 acres (Forsman et al. 2006); 50% = 2,860 acres.
Washington Cascades	1.8 miles = 6,657 acres (Thomas et al. 1990 and Courtney et al. 2004); 40% = 2,663 acres.	3.6 miles	0.7 miles = 1000 acres (Thomas et al. 1990 and Courtney et al. 2004); 50% = 500 acres.
Oregon Coast Ranges	1.5 miles = 4,523 acres (Thomas et al. 1990 and Courtney et al. 2004); 40% = 1900 acres.	3 miles	0.5 miles = 500 acres (Irwin et al. 2005, Glenn et al. 2004, Carey et al. 1992); 50% = 250 acres.
Oregon Cascades	1.2 miles = 2,955 acres (Thomas et al. 1990 and Courtney et al. 2004); 40% = 1,182 acres.	2.4 miles	0.5 miles = 500 acres (Swindle et al. 1999 and Irwin et al. 2000, 2005); 50% = 250 acres.
Klamath Province	1.3 miles = 3,340 acres; 40% = 1,336 acres (Thomas et al. 1990 and Courtney et al. 2004).	2.6 miles	0.5 miles = 500 acres (Wagner and Anthony 1998, Dugger et al. 2005, Zabel et al. 2003, Bingham and Noon 1997); 50% = 250 acres.

Based on our review of available literature, refined estimates of spotted owl core areas are now available and are different than historic (1990) FWS documents evaluating adverse effects. Potential changes include increasing the historic 0.7-mile core area radius to 1.4 miles for the Olympic Peninsula Province and reducing the historic 0.7-mile core area radius to 0.5 miles for the Cascades, Coast and Klamath Provinces in Oregon. The suitable habitat percentages provided in Table 2 are approximate for assessing incidental take; the rationale for these guidelines is presented in the "Rationale for Effects Determinations" section below. Use of revised core area sizes, for assessing take, should be discussed and agreed to by Level 1 teams.

Figure 2. Delineation of spotted owl home ranges (outer circles) and core areas (inner circles) around spotted owl site centers and project locations. Green denotes suitable habitat.

The area encompassing the affected home ranges represents the action area, which represents the area directly and indirectly affected by a proposed Federal action. Use this information to develop the Environmental Baseline section of the BA and, if appropriate, the BiOp.

Step 5: Identify the effects of the proposed action; estimate the number of spotted owl sites and computer points within the action area that may be adversely affected by the proposed action and document the results in the BA.

Step 1 generated a footprint of project locations, Step 2 generated a map of suitable owl habitat and Step 4 generated a footprint of likely occupied spotted owl habitat and spotted owl sites (historic and computer-generated) within the area affected by proposed actions/units. In this step, an estimate of the number of spotted owl sites within the action area that may be affected by the proposed Federal action is made. Based on the guidance below, separate the affected owl sites/home ranges into those that are Not Likely to be Adversely Affected (NLAA) and those that are Likely to be Adversely Affected (LAA) by the proposed action; provide the information in a table (Table 3) in the BA. The discussion below provides guidance on effects determinations.

Table 3. An example of tabular format for presenting information on site-specific effects to northern spotted owl sites, both known and those based on computer-generated points.

	Home Range (see Table 2)			**Core Area (see Table 2)**			**Nest Patch (70 acres - .175 mile radius)**			**Effects**
ID	Current NRF acres (%HR)	Harvest acres	Post NRF acres (%)	Current NRF acres (%core)	Harvest acres	Post NRF acres (%)	Current patch acres	Harvest acres	Post NRF acres (%)	NLAA or LAA?

How should the analysis of computer-generated owl points be used in a BA and a BiOp? The BA should include a discussion of the environmental baseline conditions for the spotted owl and the effects of the proposed action on the spotted owl. The baseline discussion should acknowledge: the number and distribution of known spotted owls in the action area; the amount, quality, and distribution of suitable spotted owl habitat in the action area; and a habitat map, among other items. The effects of the proposed action discussion in the BA should consider both known spotted owl sites and computer-generated points. The same approach should be used in the BiOp and the ITS.

Spotted owls need a certain amount of suitable habitat within their home range to provide the resources necessary to meet essential life functions [Thomas et al. 1990, Courtney et al. 2004, Seattle Audubon Society et al. v. Sutherland et al. Civ. No. C06-1608MJP (D.W. Wa August 1, 2007)]. As the amount of suitable habitat in an owl's home range decreases, so does site occupancy, reproduction and survival (Courtney et al. 2004). The question of how much habitat is enough is difficult to answer. In developing this methodology, we relied on the available science (see references below) and a Washington District Court ruling (cited above) to help establish guidance on assessing take of spotted owls related to habitat modification activities. We recognize that the habitat thresholds provided below are not a bright-line rule.

Nest Patch

Nest area arrangement and nest patch size have been shown to be an important attribute for site selection by spotted owls. More specifically, when using nesting habitat, models developed by Swindle et al. (1997, p.52) and Perkins et al. (2000) showed that the 200-300 meter radius (and sometimes greater), encompassing approximately up to 75 acres, around a nest is important to spotted owls and having as much of the 300-meter radius area in suitable habitat was critical to nest position on the landscape. Coincidentally, Miller et al. (1989) found that on average, the extent of forested area used by juvenile owls prior to dispersal averaged approximately 70 acres. Lastly, Meyer et al. (1998) found that old-growth patch size (i.e., larger patches) was strongly related to spotted owl site selection in Oregon. Based on the above, the ITS has concluded that it is likely that removal of NRF or dispersal-only habitat within a 300-meter radius of a nest patch would cause adverse effects and could, depending upon the extent of the removal, likely constitute take of spotted owls in the form of harm (see below). Based on the above information, the nest patch is defined herein as the 300-meter radius area around a known or likely nest site. Previous ITS documents have used a 200 meter radius area around sites; the change to 300 meters is based on the ITS team's further investigation into spotted owl habitat relationships using the documents cited in this nest patch section.

As this methodology has been implemented, questions have arisen regarding the effects of thinning NRF and dispersal-only habitat on the spotted owl. The ITS Team has reviewed the available information on this topic (Glenn et al. 2004, Meiman et al. 2003, Irwin et al. 2005, Pearson 2007 and Roseburg BLM Biological Assessment 2008). Based on that review, the ITS Team has concluded that any commercial thinning activities within a 300-meter radius of a known or likely nest site would likely cause adverse effects to, and may rise to the level of take of the northern spotted owl. The primary basis for this conclusion was the management recommendations provided by Glenn et al. (2004) and Meiman et al. (2003) for a no-harvest (which includes thinning)strategy in the immediate area of a spotted owl nest site and the complimentary information provided in the nest patch section herein.

Best available information indicates that two key elements of spotted owl habitat within a nest patch (defined as a 300-meter radius around an owl point on the NSOOM) are: (1) canopy cover of dominant, co-dominant, and intermediate trees (conifers and hardwoods); and (2) the amount of down wood (Thomas et al. 1990, Hershey 1995, and Courtney et al. 2004). Proposed management activities in forest stands likely to be used by spotted owls that are designed to retain the current condition of these elements within a nest patch and that are implemented

during the non-breeding period will reasonably warrant a not likely to adversely affect (NLAA) determination for the spotted owl. Examples of these activities include planting, road decommissioning, trail and road maintenance, culvert replacement, manual vegetation maintenance, special forest product removal, limited hazard tree removal, and possibly, some fuels reduction treatments to reduce fire risk. However, site and action-specific situations may warrant a different effect determination for these types of actions, and should be evaluated on a case-by-case basis by the local biologist. In cases involving salvage of dead-standing and down trees after blowdown and wildfire events, some tree removal may also qualify as a NLAA determination for the spotted owl depending upon the specific situation. Activities in non-habitat, could also qualify for NLAA determinations.

In making the effect determination, consideration should be given to whether the proposed action is likely to impact (1) owl prey habitat, (2) the quantity and quality of thermal and hiding cover, (3) nesting substrate availability, and (4) roost tree availability within the nest patch to an extent that it would disrupt the normal use of the nest patch for breeding, feeding and shelter by spotted owls. If so, a determination of LAA would be warranted.

Please note, and as indicated below for the Core and Home Range scales, light –thinning of NRF and dispersal-only habitat that maintains a similar stand function pre- and post-thinning would likely warrant a NLAA determination, however, if in the judgement of the local biologist, the amount of available habitat being treated covers a large portion of the area, it may warrant a LAA determination.

Core Area

The BLM/FS/FWS team that developed this methodology relied on numerous studies to ascertain spotted owl core area size by province. Some recent information (Table 2) suggests the need for adjusting (decreasing or increasing) core area size from the 0.7-mile radius that was historically used by the FWS to evaluate take of the spotted owl.

Habitat composition within a core area is also important to spotted owls and helps define the core area size mentioned above. Historically, the 0.7-mile core area value was based on the finding of Thomas et al. (1990) that areas with > 500 acres of suitable habitat are more likely to have spotted owls than areas with < 500 acres of habitat. These results indicate the value of older forest, but not necessarily how much old forest. Several recent studies have provided new information that further informs the definition of a spotted owl core area. For example, Bingham and Noon (1997) reported that a spotted owl core area is the area that provides the important habitat elements of nest sites, roost sites, and access to prey, benefiting spotted owl survival and reproduction. Rosenberg and McKelvey (1999) reported that spotted owls are “central place” animals with the core area (the area closest to the nest) being the focal area. Results from Bingham and Noon (1997) showed that spotted owls typically used 20-21 percent of their home range as core area habitat, which generally included 60-70 percent of the sites within their home range used during the breeding season.

Recently developed habitat-fitness and landscape models have demonstrated the importance of habitat amount within core areas. For example, Meyer et al. (1998) examined landscape indices associated within spotted owl sites versus random plots on BLM lands throughout Oregon. Across provinces, landscape indices highly correlated with the probability of spotted owl occupancy included the percent older forest (30 percent) within the 500 acres surrounding the site. Zabel et al. (2003) found for their northwest California study that the highest probability of owl occupancy occurred when the core area was composed of 69 percent nest/roosting habitat. Bart (1995) found that core areas should contain 30-50 percent mature and old growth forest. Franklin (pers. comm.) found that the proportion of good to medium to lesser quality habitat for owl cores in northwest California was approximately 60:30:10 percent. Lastly, Dugger et al. (2005) showed that when owl core areas in their southern Oregon study area had at least 50-60 percent older forest habitat, spotted owl fitness (i.e., survival and reproduction) was relatively higher than in core areas with lesser amounts.

In summary, habitat composition in owl core areas varies by region and study, ranging from a low of 27 percent to a high of 78 percent (mean 43%, 14 SD). Based on the above studies, 50 percent or higher cover of suitable habitat within a 0.5 mile radius should be considered as necessary to maintain spotted owl life history functions. We chose 50 percent because this lower value is where an effect of significant impairment of spotted owl life history functions is most likely to occur. We relied largely on the research conducted by Dugger et al. (2005), including unpublished habitat-fitness models, to ascertain this value. Light-to-moderate thinning types of actions that maintain the extent and function of NRF habitat within a core area are generally not likely to have adverse effects to spotted owls, although site-specific conditions will factor into this determination.

Home Range

The BLM/FS/FWS team that developed this methodology reviewed the available literature and agrees with Courtney et al. (2004) that spotted owl home range values reported in more recent studies are similar to home range values presented in Thomas et al. (1990).

The available science (Bart and Forsman 1992, Bart 1995, Forsman et al. 2006) suggests that as the amount of suitable habitat in an owl's home range decreases, so does site occupancy, reproduction, and survival. Bart and Forsman (1992) found that areas with less than 20 percent suitable habitat had few owls and less reproductive success than areas with more suitable habitat. In 1995, Bart re-analyzed his prior data, and concluded that spotted owl reproduction and survival decreased as suitable habitat decreased from 40 to 20 percent. While the threshold amounts of habitat needed to support spotted owls is uncertain, the studies cited above suggest that the removal of suitable habitat to below 40 percent of the median annual home range area is likely to cause significant impairment of spotted owl life history functions. Based on these studies, suitable habitat coverage of at least 40 percent or higher at the home range scale is likely necessary for maintaining spotted owl life history functions, although site-specific conditions may warrant deviations from this guideline. Similar to the core area, we suggest the lower value, in this case 40 percent, because this is where an effect of significant impairment of spotted owl life history functions, is most likely to occur. Light-to-moderate thinning types of activities that

maintain the extent and function of NRF habitat within a home range are generally not likely to have adverse effects to spotted owls.

In summary, NRF habitat removed to an extent that lowers the amount of suitable habitat cover within a home range to below 40 percent within a spotted owl home range area will likely have adverse effects to and may cause take of the spotted owl. However, the site and action-specific situations may warrant exceptions to this general guidance at any of the spatial scales discussed herein. The BA should include a clear and complete discussion of the justification for any exception. We recognize that in some portions of the spotted owl's range many known occupied owl sites are already below these thresholds. In these situations, a determination of take in the form of harm or harassment can occur multiple times at the same site to the same pair of spotted owls as long as the species is believed to still be present.

Rationale for Effect Determinations

The following guidance is intended to assist BLM and FS staff and managers in making project-related effect determinations as well as minimizing project effects to spotted owls. It should also be used as the basis for incidental take findings in FWS BiOps. Administrative Unit Staff and Level 1 Teams are encouraged to follow this guidance when assessing effects in their BAs, where no or only partial spotted owl survey information is available for the analysis area. If you have current survey information, use it when assessing the effects of a proposed action on the spotted owl.

Under this methodology, any removal of spotted owl habitat is presumed likely to have adverse effects to the spotted owl within identified spotted owl home ranges. However, the location of the habitat removal in relation to spotted owl sites must be evaluated for the FWS to determine if "incidental take" may occur. In some cases, site and action-specific situations may warrant a NLAA determination. As previously mentioned, a reasoned explanation should accompany any NLAA determination, particularly if habitat removal will occur

In general, the following list of scenarios (Table 4), which is not comprehensive, may occur in conjunction with a proposed project; the rationale supporting the habitat values are discussed below. The information provided in Table 4 is intended to help action agencies "forecast" the results of their actions so they can make feasible project adjustments to help reduce the likelihood of the projected take occurring.

Table 4. Potential habitat condition scenarios and their associated effect on the spotted owl. Site and action-specific situations may justify a different effect determination than presented below.

Habitat Condition Pre-Treatment	Habitat Condition Post-Treatment due to Habitat Removal or Downgrading	Effect	Take
Nest Patch: 300-meter radius contains any condition.	Nest Patch: 300-meter radius contains any condition that was subject to commercial thinning of NRF or Dispersal-only habitat.	LAA[1]	Yes

In the following scenarios, presume no actions will be occurring at the nest patch scale and that NRF habitat is removed or downgraded to dispersal habitat; the scenarios below exclude light-thinning that maintains habitat function.			
Core area contains > 50% NRF habitat and home range contains >40% NRF habitat	Core area contains >50% NRF habitat and home range contains >40% NRF habitat	LAA	No
	Core area contains >50% NRF habitat and home range contains <40% NRF habitat	LAA	Likely
	Core area contains <50% NRF habitat and home range contain >40% NRF habitat	LAA	Likely
	Core area contains <50% NRF habitat and home range contains <40% NRF habitat	LAA	Likely
Core area contains >50% NRF habitat and home range contains <40% NRF habitat	Core area contains >50% NRF habitat and home range contains <40% NRF habitat	LAA	Likely
	Core area contains <50% NRF habitat and home range contains <40% NRF habitat	LAA	Likely
Core area contains <50% NRF habitat and home range contains >40% NRF habitat	Core area contains <50% NRF habitat and home range contains >40% NRF habitat	LAA	Likely
	Core area contains <50% NRF habitat and home range contains <40% NRF habitat	LAA	Likely
Core area contains <50% NRF habitat and home range contains <40% NRF	Core area contains <50% NRF habitat and home range contains <40% NRF habitat	LAA	Likely

[1]See Nest Patch discussion on pages 13-14 above for the rationale supporting this determination.

In analyzing effects of actions to spotted owls, habitat amount and spatial distribution are important. For BiOps, an incidental take statement would be provided where the consultation biologist believes LAA determinations rise to the level of incidental take, with the habitat juxtaposition being a primary factor in this determination.

A reminder: the ITS methodology only quantifies potential occupancy/density of spotted owls for a given area. In reality, projects are being planned and implemented in unsurveyed suitable habitat. If a project is removing NRF habitat, there is a possibility that the project is removing an occupied nest tree, therefore, appropriate seasonal restrictions should be applied accordingly unless incidental take is authorized.

Step 6: Use the Information from Step 5 to Develop the Effects of the Action and ITS Portions of the Biological Opinion.

Habitat and disturbance-related take (i.e., harm and harass, respectively) should be quantified in terms of number of spotted owls. Sum the number of impacted home range circles within the action area where the effect determination is LAA and take is likely, and multiply by 2 (to account for up to 2 adult owls in each circle). The number of spotted owl young (average1.5/nest) likely to be affected/taken will have to be accounted for during the breeding season for inclusion in the BiOp/ITS. The total take would be calculated based on multiplying

the number of "take" circles with 2 adults and 1.5 young, then round up for a whole number of spotted owls. If the activity occurs outside the critical breeding season then there would be no take of young. Monitoring forms (see discussion below) should summarize the total number of owls taken.

How much take has occurred? For spotted owls, the effect of take of adults is more likely to be in the form of disruption of normal behavior patterns and would not to necessarily lead to death or bodily injury. This disruption could result in reduced fitness of the owls (e.g., movement, reduced reproduction or survival, or decreased ability for the young to survive fledging or dispersal) because of poorer habitat conditions. In these situations, a determination of take in the form of harm or harassment could occur multiple times at the same site to the same pair of spotted owls. For example, a nest patch considered to be occupied by one pair of spotted owls is maintained in year one, is disturbed due to noise caused by project A in year 2, and is subject to habitat removal by project B in year 3. In this example, one pair of owls may be considered taken by the proposed action in the form of harassment (year 2) and harm (year 3). In this scenario, take is recorded when the Level 1 Team has determined "implementation" to occur. For the purposes of this process, Level 1 Teams should reaffirm their implementation definition. This method of recording is used so as to not double count take of an owl pair under a single consulted-on action.

It is imperative that prior to signing of a BiOp, the FWS and the Level 1 Team and/or Administrative Unit discuss and agree upon the take units of measure and specifically the amount of allowable take to ensure the same understanding by both parties. Having this common understanding should help to avoid confusion later on during monitoring, and in tracking the amount of take that has occurred.

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For an assessment of effects to spotted owl dispersal habitat, continue to use a process that you and/or your Level 1 Team determine is appropriate. Preferably, this effects analysis is done at a landscape scale of at least a 5th field watershed and considers the conditions that are needed to help ensure adequate spotted owl survival during dispersal.

B. Reporting/Monitoring the Amount of Incidental Take

All projects scheduled for implementation as described in a BiOp will use a process similar to that described under Section A above to quantify (in advance of implementing the projects) and report the amount of incidental take on a project-by-project basis to ensure that the incidental take limit set forth in the ITS portion of the BiOp is not exceeded. At this stage, you will use the final design of treatment unit boundaries and any refinements of the activity to confirm the likely impacts to spotted owls and their habitat prior to project implementation. The following discussion is a summary of the steps that should be completed to confirm and report those impacts (see the steps outlined above in Section A for greater details).

Step 1: Map the geographic location of final action/units and overlay the spotted owl provincial home range diameter around each unit to define the analysis area.

Step 2: Overlay the Administrative Unit-updated spotted owl habitat layer on your analysis area.

Step 3: Reaffirm the position of known and predicted spotted owl site centers.

Step 4: Determine the number of spotted owl sites that are likely to be affected by the final actions/units by delineating nest patch areas, core areas and home ranges around each site center using the appropriate provincial values (Table 2).

Step 5: Quantify the amount of take in terms of spotted owls by applying the thresholds discussed above under Section A, Step 5.

Step 6: Compare the anticipated take for the project to any previously authorized take under the ITS of the BiOp. The action agency has the primary responsibility to track the cumulative level of take for implemented projects to ensure it does not exceed the amount of take exempted in the ITS. The FWS can also verify the cumulative level of take based on the monitoring reports received to date.

Step 7: Reinitiation of consultation will be necessary if the take level (habitat acres or numbers of owls) exempted in the ITS of the BiOp is reached and there are still projects covered under the BiOp to be implemented that are likely to cause take.

C. Monitoring Reports

It is the responsibility of the action agencies to submit monitoring reports to the FWS as stipulated (annually or otherwise) in the monitoring requirements section of an ITS. Both the number of affected acres and associated spotted owls shall be recorded on a standardized form; these data will subsequently be entered into the FWS Northern Spotted Owl Effects Tracking Database by the FWS. The Administrative Units are responsible for monitoring take exempted in BiOps and reinitiating consultation if the amount of exempted take is likely to be exceeded. Reinitiation must occur before the take limit is exceeded. Level 1 Teams have the primary responsibility for monitoring the amount of incidental take relative to the limit established in specific ITSs.

Appendix 1. This appendix provides the methodology for developing a northern spotted owl occupancy map (NSOOM) for areas lacking current survey information.

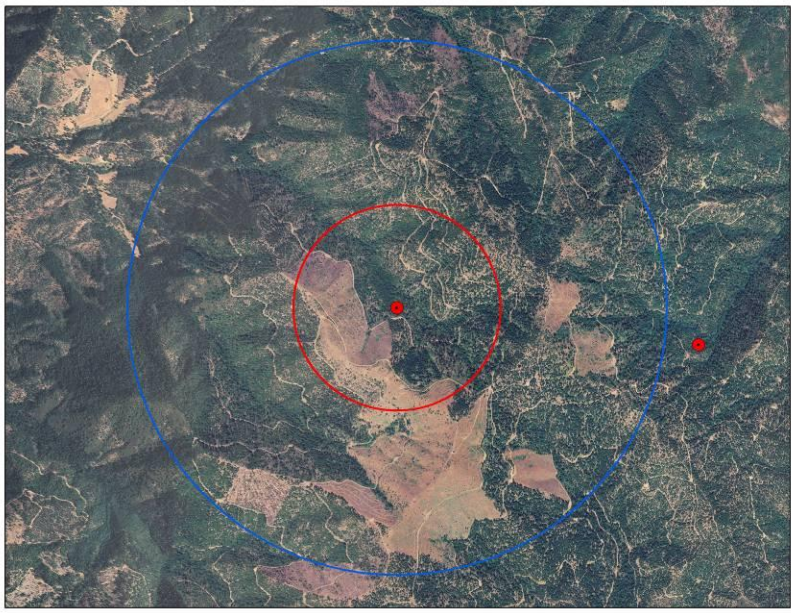
The information provided on the following pages describes the process and technical information used in the development of a NSOOM. Future and revised NSOOMs will continued to be developed by the ITS Team in collaboration with Level 1 Teams.

To supplement an Administrative Unit's use of historic owl locations, the authors of the "Methodology for Estimating the number of Northern Spotted Owls affected by Proposed Federal Actions" initiated a data call to collect current spotted owl occupancy location information for spotted owl demographic study areas on a provincial basis in order to conduct a habitat assessment around the sites using various spatial scales. In return, this information was used to guide placement of computer-generated spotted owl sites. In addition, the same data were used to calculate a density and nearest neighbor distance, both of which help determine "placement" of computer-projected owl sites. In situations where there was no demographic area to rely upon (e.g., Oregon Cascades – Roseburg BLM), a stratified sample of known spotted owl sites with recent occupancy information, based on administrative surveys, was used to conduct the habitat analysis.

The following spatial scales and GIS queries were used to conduct the habitat analysis and to develop placement of computer-projected spotted owl location points on a NSOOM. These spatial scales (Figure 3) are supported in the spotted owl literature for reflecting landscape-level characteristics of sites occupied by spotted owls (Thomas et al. 1990, Swindle et al. 1999, Perkins et al 2000, Ripple et al. 1991 and 1997, Courtney et al. 2004).

- Patch size acreage that nest trees are typically associated with
- Core area size and habitat amount
- Home range area size and habitat amount
- Habitat = smoothed habitat suitability values (Davis and Lint *in* Lint 2005, GTR-648)
- Nearest-neighbor distance and density

Figure 3. The spatial scales used in the development of a spotted owl occupancy map. The outer circle represents the median provincial home range, the inner circle approximates a core area, and the center point represents the nest tree within a nest patch. The dot outside, to the right of the home range circle, represents a second spotted owl site that could be a nearest neighbor distance away.



The following sections discuss the spatial analyses in greater detail. A document is being prepared that provides more specific step-by-step instructions on the GIS procedures.

A 300-meter radius area (encompassing approximately 75 acres) around the nest site is the spatial scale important to spotted owls; and having as much of this area contained in suitable habitat is key to nest position on the landscape. As stated earlier in this document, the 300 meter radius will be the value used to assess effects determinations and the development of future NSOOMs. Previous NSOOMs used a 200-m radius scale and quantified habitat acreage within this radius of demographic study owl sites. However, further investigation of the research also suggested a 300 meter radius, which is complimented by other spotted owl ecological information (see pages 13-14 above). A 90 percent rule was established for selecting the percent suitable habitat value within the nest patch to use for placing a computer-projected owl site on a map. The 90 percent rule basically uses the percent suitable habitat value associated with 90 percent of the owl sites in the dataset and establishes the lower habitat value based on the owl site that occurs at the 90 percent break. In this approach, most of the variability within the patch scale data was retained in the analysis. The patch size habitat values for the various provinces are shown in Table 5. Again, these values were derived from the 90 percent rule and 200-meter patch size for the earlier September 2007 document. The habitat base layer used for the spotted owl site habitat analysis was the Biomapper product, utilizing the smoothed habitat suitability index layer (Table 4) (Davis and Lint *in* Lint GTR-648).

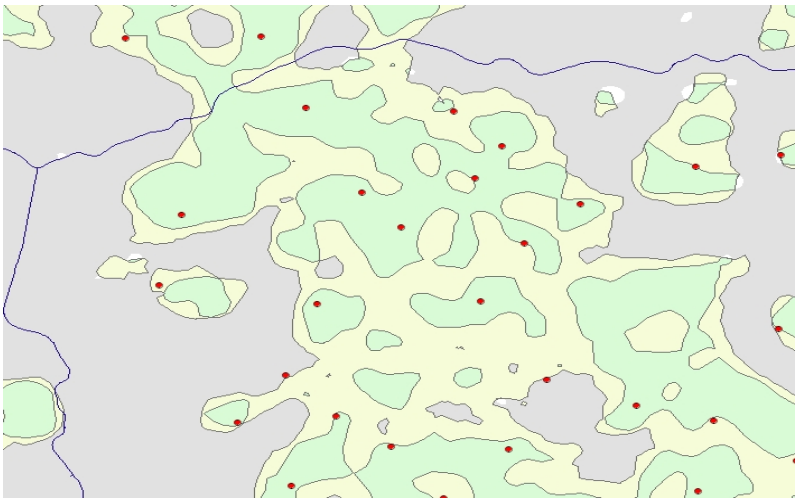
An example of the patch size analysis is depicted in **Figure 4** below. The darker green area represents spotted owl suitable habitat, the lighter, larger polygon areas represent the result of the 200-meter radius (patch size) circular neighborhood analysis, and the dots represent known spotted owl sites. The gray area represents non-spotted owl habitat.

Core Area Analysis

We relied on a 0.5-mile (800-m) radius (an area encompassing about 500 acres) spatial scale to approximate a spotted owl core area for the Cascades (East and West), Coast and Klamath Provinces in Oregon. The 500-acre value was derived from spotted owl telemetry studies and landscape occupancy models (Olson et al. 2005, Dugger et al. 2005, Zabel et al. 2003, Swindle et al. 1999, Meyer et al. 1998, Wagner and Anthony 1998, Glenn et al. 2005, and Carey et al. 1992). To date, Oregon has been the focus of the analysis. Core area values for Washington are available and will be used when the need arises to develop NSOOMs for provinces in Washington (Table 2).

To calculate habitat amount for the core area, we again utilized spotted owl sites from the demography study areas and the Biomapper provincial values (Table 5). Similar to the nest patch analysis, a lower habitat value representing the percent cover of suitable habitat within the core area was computed based on the 90 percent rule and was used in the GIS neighborhood analysis (Table 5). The overall habitat amount ranged from just under 100 acres to over 400 acres at the core scale. At this point in the analysis, nest patch and core area habitat values have been calculated. The results of both circular neighborhood analysis (nest patch and core area spatial scales) were then spatially intersected across the landscape.

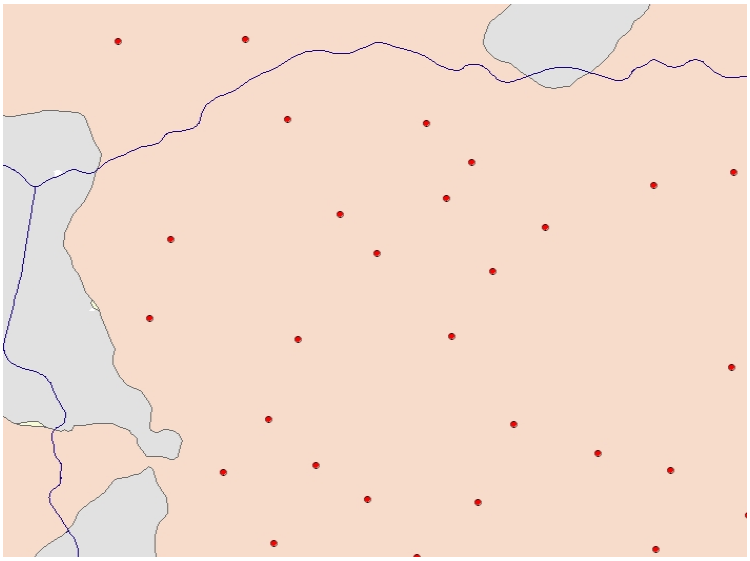
Figure 5 is an example landscape showing known spotted owl locations (dots), results of the 200-m nest patch scale analysis (the dark green-shaded polygons as depicted in Figure 4 above) and results of the core area radius analysis (the lighter green areas). The dark green-shaded polygons also represent the intersection of the two spatial analyses. The gray area represents portions of the landscape with too little spotted owl habitat to meet either 200-meter or 0.5-mile 90 percent criteria.



Home Range

The final spatial scale used to generate computer-projected spotted owl sites was the home range. Median provincial home range values (Table 2) were used to compute habitat amounts at spotted owl demography sites. The same habitat layer was used as for the nest patch and core area analyses, and the 90 percent home range scale values are presented in Table 5. Again, these habitat values were used to construct the neighborhood analysis at the home range scale, which involved the spatial intersection of home range, core area and nest patch analysis results on the landscape.

Figure 6 shows an example result of the home range-scale circular neighborhood analysis. Known spotted owl locations are shown as dots.



The results of the three analytical scales were then spatially intersected to identify portions of the landscape meeting the 90 percent threshold criteria at all three spatial scales (Figure 7, cross-hatched area). Any suitable habitat therein is considered likely occupied. Thus intersecting the spatial analyses results with a map of suitable habitat (in this example, the Biomapper HSI grids) results in a map of habitat likely occupied by spotted owls (Figure 8; dark green area).

Figure 7.

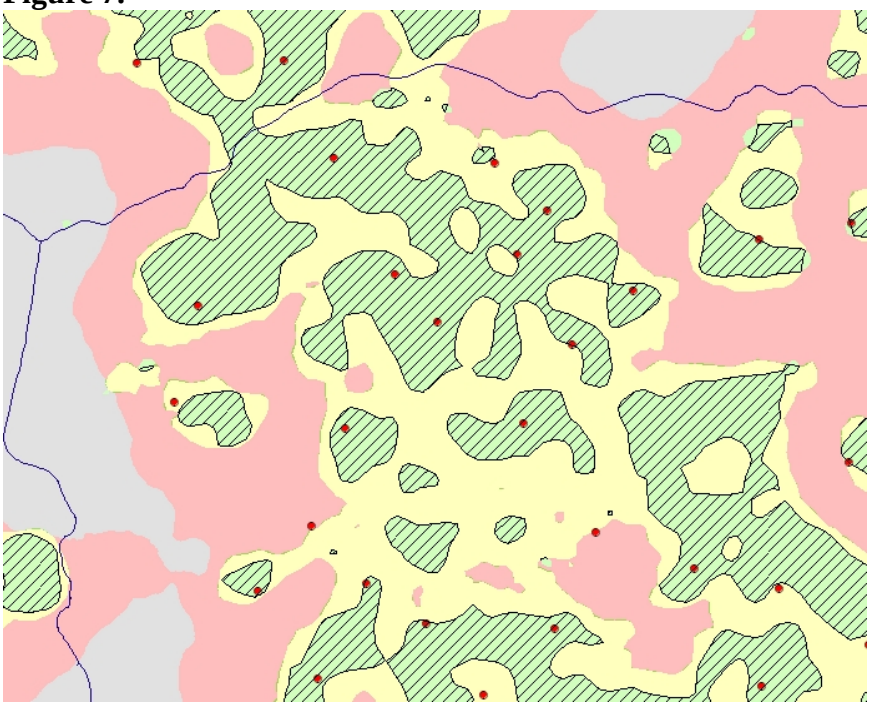
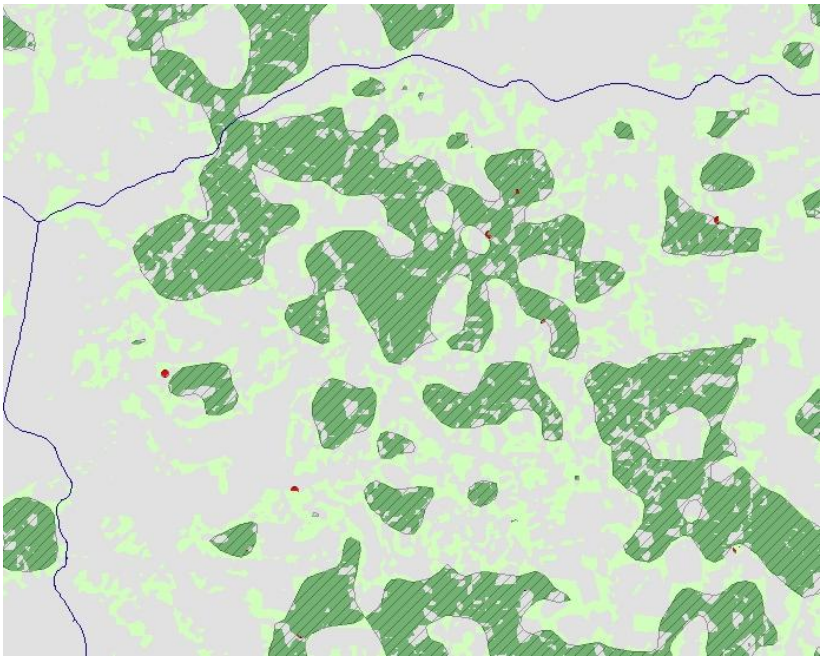


Figure 8.



Positioning of Computer-Projected Owl Sites

The above spatial analyses result in a map of habitat likely occupied by spotted owls. The next question then becomes, where, more specifically are spotted owls likely to occur within the habitat? We utilized nearest-neighbor distances (NND) between spotted owl sites derived from demography study areas to help position a computer-generated spotted owl site on the map. The NND was used to position generated sites among already known owl sites that were provided by the Administrative Units. A GIS function random point generator was calibrated with the NND (Table 5) and the density of owls on demographic study areas to help place generated sites on the map. These generated sites were also constrained to occur within likely occupied habitat.

Figure 9 shows an example of a NSOOM that has both historic sites (green dots) provided by an Administrative Unit along with computer-generated points (red dots) based on habitat spatial analyses, NND, and density values.

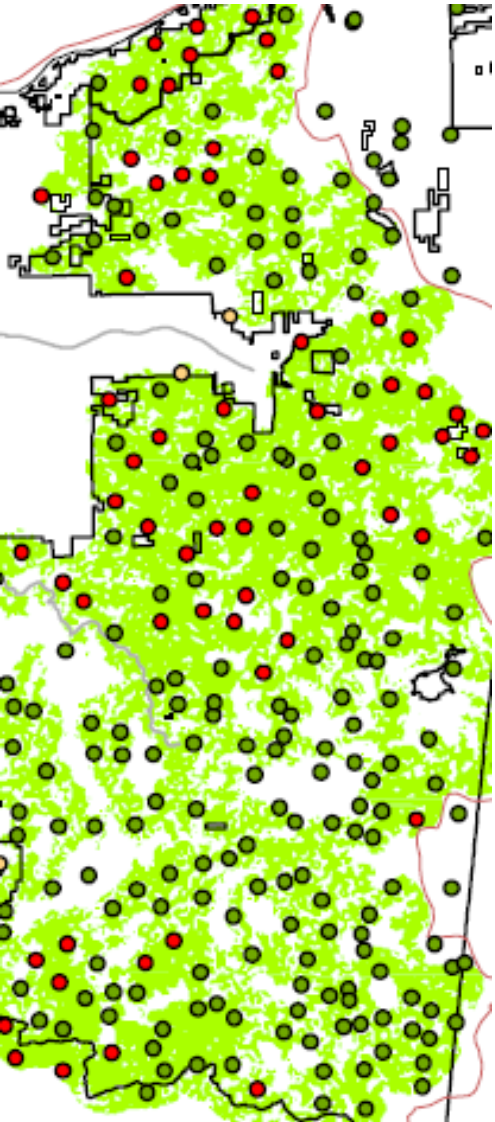


Table 5. Provincial habitat values based on the 90 percent rule (expressed in % of nest patch, core area, and home range covered by suitable habitat) used in a GIS neighborhood analysis for developing a map of likely occupied spotted owl habitat. The percentages represent the lowest value for 90% of the site analyzed. Note: These values are not used for assessing incidental take; those values are presented elsewhere in this document.

Admin Unit	Willamette NF	Mt. Hood NF	Roseburg BLM			Medford BLM		Eugene BLM	
Province	Cascades	Cascades West / East[2]	Coast	Cascades[2]	Klamath	Cascades	Klamath	Coast	Cascades
Habitat Suitability[1]	56	56/50	52	56	51	56	51	52	56
Patch (200m) habitat	40%	40%/44%	47%	45%	44%	33%	41%	42%	26%
Core (800m) habitat	35%	35%/42%	37%	35%	33%	23%	38%	31%	19%
Home Range habitat	35% (1.2 mi)	35%/36% (1.2 mi)	30% (1.5 mi)	33% (1.2 mi)	30% (1.3mi)	18% (1.2 mi)	31% (1.3 mi)	28% (1.5mi)	17% (1.2mi)
Nearest Neighbor	2080m	2080m/2374m	2084m	2333m	2078m	2333m	2596m	2478m	2611m
Density	H.J.A. study area	H.J.A. study area/GIS created	Tyee study area	GIS created	GIS created	Butte Falls study area	Evans Creek study area	Siuslaw NF	NCASI &GIS

Admin Unit	Siulsaw NF	Fremont-Winema NF	Coos Bay BLM (combined Klamath & Coast)	Rogue-Siskiyou NF	
Province	Coast	East Cascades	Coast/KLA	Cascades	Klamath
Habitat Suitability[1]	52	50	52/51	56	51
Patch (200m) habitat	40%	44%	52%	38%	41
Core (800m) habitat	31%	26%	47%	37%	38
Home Range	32% (1.5mi)	25% (1.2 mi)	30% (1.3&1.5 mi)	28%(1.2mi)	31(1.3mi)

habitat					
Nearest Neighbor	2478m	2446m	2084m	2446m	2596m
Density	Siuslaw NF	SO. Cascades demog. area	Tyee study area	SO. Cascades demog. area	SO. Cascades demog. area

[1] Habitat: The smoothed habitat suitability layer provided by Davis and Lint, GTR 648, Appendix G.

[2] Mt Hood East Cascades and Roseburg BLM Cascades habitat values, nearest-neighbor distances, and density were computed from a sample of occupied spotted owl sites for those Administrative Units during the same period as a habitat layer was available (i.e., the 1994 Biomapper map).

Validation of NSOOM Methodology

The ITS Team utilized a number of methods to help validate the process/methodology of quantifying an estimate of the number of spotted owls in a given area.

The first method used was to consider the actual survey information demonstrating spotted owl occupancy in a given area. As much as possible, spotted owl sites mapped by Administrative Units were used to serve as a foundation for the NSOOM.

The second method used was application of the "90 percent rule" developed by the ITS Team. For this methodology, 90 percent of known and recently occupied spotted owl sites were used to develop habitat relationships at three spatial scales (nest patch, core, and home range) for a given area. In using 90 percent of the sites, we captured a wide variation in the extant habitat conditions that the owls are residing in. What wasn't captured was the lower 10 percent of sites in very marginal habitat conditions. This resulted in only a few sites not being used in most of the areas for which the methodology was applied. The 90 percent methodology has some previous use in helping to define habitat conditions per Lint 2005, GTR 648.

The third way of evaluating the methodology was a direct comparison to a spotted owl density study area. Surveys on the density area were comprehensive with the intent of surveying most or all habitat conditions in an attempt to find all resident spotted owls. Using these known owl sites, we assessed the habitat conditions for the three spatial scales around the sites. After completing the habitat analysis, along with a nearest-neighbor analysis and knowing the range of densities on this area, we calibrated the GIS random generation function to place spotted owl sites across the area. For the few simulations completed, approximately the same number of computer-generated sites occurred as the number of known owl sites and in some simulations, more sites occurred. Having this similarity of concurrence or even more sites, helps affirm the validity of the methodology, in terms of estimating, conservatively, the number of spotted owl sites in a given area.

Lastly, the methodology was validated based on review by spotted owl field biologists, who would be familiar with the practicalities of the application of the methodology, and researchers' familiar with the latest information on spotted owl-habitat associations. We visited with the biologists and incorporated their comments into this product. In addition, we consulted with 2 leading spotted owl scientists; both believed that the methodology was appropriate for use in assessing effects of actions on spotted owls for purposes of estimating the amount of incidental take.

Glossary

attribute: information about a geographic feature in a geographic information system, usually stored in a table.

central-place animal: resource use by spotted owls where the spatial pattern of habitat limits use; use decreases with increasing distance from a nest tree.

core area: the area that provides important habitat elements for nest sites, roost sites, and access to prey, benefiting spotted owl survival and reproduction. Spotted owls typically use 20-21 percent of their home range as core area habitat, which generally includes 60-70 percent of the sites within their home range used during the breeding season.

demography: the quantitative analysis of population structure and trends; population dynamics.

density: the number of spotted owls or spotted owl sites per a unit of area.

dispersal: the movement, usually one way and on any time scale, of plants or animals from their point of origin to another location where they subsequently produce offspring.

dispersal habitat: forest stands with average tree diameters > 11 inches, conifer overstory trees with closed canopies (> 40 percent canopy closure), and open space beneath the canopy that allows owls to fly (Thomas et al. 1990).

edge: where plant communities meet or where successional stages or vegetative conditions with plant communities come together.

edge-matching: the process conducted by Level 1 teams or their representatives where historic owl sites or computer points along mutual border areas of administrative units or provinces are checked for: 1) location accuracy, 2) to eliminate duplicate sites or points, and 3) to affirm nearest-neighbor distances. This process is typically conducted at the time of NSOOM generation or as new information is reveal (i.e., addition of new sites).

fecundity: a measure of animal (in this case, spotted owl) productivity expressed as the number of female young per adult female.

geographic information system (GIS): a computer system capable of storing, manipulating, and displaying spatial (that is, mapped) data.

guideline: a policy statement that is not a mandatory requirement (as opposed to a standard, which is mandatory).

habitat: the resources and conditions present in an area that produce occupancy – including survival and reproduction – by a given organism.

habitat maintained: habitat that is altered but still maintains its function post-alteration.

habitat removal: the harvest of trees comprising suitable spotted owl habitat where the stand of trees no longer performs its prior function.

home range: the area annually traversed by spotted owls that provide important habitat elements.

landscape: a heterogeneous land area with interacting ecosystems that are repeated in similar form throughout the area.

nearest-neighbor: the overall average distance as measured among known spotted owl sites; utilized in determining spatial patterns of spotted owl sites.

neighborhood functions: geographic information systems analytical functions (such as mean, maximum, or a variety of values) that assign a value to each grid cell by taking its surrounding pixels into consideration.

northern spotted owl: one (*Strix occidentalis caruina*) of three subspecies of spotted owl that ranges from southern British Columbia, Canada, through western Washington and Oregon, and into northwestern California. Listed as a threatened species by the U.S. Fish and Wildlife Service.

northern spotted owl occupancy map (NSOOM): a spatially explicit map developed by utilizing known spotted owl locations and computer-generated locations that serve as spotted owl sites based on the density, nearest-neighbor distance and habitat spatial arrangement.

physiographic province: a geographic area having a similar set of biophysical characteristics and processes because of the effects of climate and geology that result in patterns of soils and broad-scale plant communities. Habitat patterns, wildlife distributions, and historical land use patterns may differ significantly from adjacent provinces.

polygon: a graphic feature that represents an area in a geographic information system.

range (of a species): the area or region over which an organism occurs.

stand (tree stand): an aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition so that it is distinguishable from the forest in adjoining areas.

stochastic: random, uncertain; involving a random variable.

suitable habitat: an area having the resources and conditions present to produce occupancy – including survival and reproduction – for the spotted owl.

take: Defined under section 3(19) of the Endangered Species Act as to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct”.

"Harm" is further defined in the regulations as an act that causes significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. "Harass" is further defined in the regulations as intentional or negligent 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.

wildfire: any wildland fire that is not a prescribed fire.

windthrow: synonymous with windfall, blow down.

Literature Cited

Anthony, R.G. et al. multiple years. Unpublished. Annual reports from northern spotted owl demography study areas. On file at the USFWS Oregon State Office, Portland, OR.

Wagner, F.F. and R.G. Anthony. 1998. Reanalysis of northern spotted owl habitat use on the Miller Mountain study area. A report for the Research Project: Identification and evaluation of northern spotted owl habitat in managed forests of southwest Oregon and the development of silvicultural systems for managing such habitat. Oregon Cooperative Wildlife Research Unit, Depar.Fisheries and Wildlife, Oregon State Univ. Corvallis, OR.

Bart, J. and E.D. Forsman. 1990. Surveys of Northern Spotted Owls on Public Lands. Ohio Cooperative Research Unit, Department of Zoology. Ohio State University, Columbus, OH. Also USDA For. Serv., Forestry Sciences Laboratory, Olympia, WA.

Bart, J. and E.D. Forsman. 1992. Dependence of Northern Spotted Owls, *Strix occidentalis caurina*, on Old-Growth Forests in the Western United States. Biological Conservation 62(2):95-100.

Bart, J. 1995. Amount of Suitable Habitat and Viability of Northern Spotted Owls. Conservation Biology 9(4):943-946.

Bingham, B. and B.R. Noon. 1997. Mitigation of Habitat Take: Application to Habitat Conservation Planning. Conservation Biology 11(1):127-139.

Bingham, B. and B.R. Noon. 1998. The Use of Core Areas in Comprehensive Mitigation Strategies. Conservation Biology 12(1):241-243.

Carey, A.B., S.P. Horton, and B.L. Biswell. 1992. Northern spotted owls: influence of prey base and landscape character. Ecological Monographs 62(2):223-250

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

Crozier, M.L., M.E. Seamans, R.J. Gutierrez, P.J. Loschl, R.B. Horn, S.G. Sovern, and E.D. Forsman. 2006. Does the presence of barred owls suppress the calling behavior of spotted owls? Condor 108:760-769.

Dugger, K. M., F. Wagner, R. G. Anthony, and G. S. Olson. 2005. The relationship between habitat characteristics and demographic performance of northern spotted owls in southern Oregon. The Condor. 107:863-878.

Forsman, E.D. et al. multiple years. Unpublished. Annual reports from northern spotted owl demography study areas. On file at the USFWS Oregon State Office.

Forsman, E.D., T.J. Kaminiski, J.C. Lewis, K.J. Maurice, and S.G. Sovern. 2005. Home range and habitat use of northern spotted owls on the Olympic Peninsula, Washington. J. Raptor Research 39(4):365-377.

Franklin, A.B., D.R. Anderson, R.J. Gutiérrez, and K.P. Burnham. 2000. Climate, habitat quality, and fitness in northern spotted owl populations in northwestern California. Ecological Monographs 70(4):539-590.

Glenn, E.M., M.C. Hansen, R.G. Anthony. 2004. Spotted Owl Home-Range and Habitat Use in Young Forests of Western Oregon. J. Wildl. Man. 68(1):33-50.

Irwin, L. L., D. F. Rock, and G. P. Miller. 2000. Stand structures used by northern

spotted owls in managed forests. Journal of Raptor Research. 34(3):175-186.

Irwin, L. L., D. Rock, and S. Rock. 2005. Adaptive management monitoring of spotted owls. Annual National Council for Air and Stream Improvement progress report. Unpubl.

Lint, J., technical coordinator. 2005. Northwest Forest Plan – the first 10 years (1994-2003): status and trends of northern spotted owl populations and habitat. PNW-GTR-648, USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon.

Meiman, S., R.G. Anthony, E. Glenn, T. Bayless, A. Ellingson, M.C. Hansen, and C. Smith. 2003. Effects of commercial thinning on home range and habitat-use patterns of a male northern spotted owl: a case study. Wildl. Soc. Bull. 31(4)1254-1262.

Meyer, J.S., L.L. Irwin, and M.S. Boyce. 1998. Influence of habitat abundance and fragmentation on northern spotted owls in western Oregon. Wildlife Monog. No. 139.

Miller, G.S. 1989. Dispersal of juvenile spotted owls in western Oregon. M.S. Thesis. Oregon State University, Corvallis, Oregon.

Miller, G.P., D.F. Rock, and L.L. Irwin. 1992. Spotted owl occupancy and habitat use in intermediate-aged forests western Oregon - 1991 progress report. U.S. Department of the Interior, Bureau of Land Management, Springfield, OR.

Olson, G.S., E. Glenn, R.G. Anthony, E.D. Forsman, J.A. Reid, P.J. Loschl, and W.J. Ripple. 2004. Modeling demographic performance of northern spotted owls relative to forest habitat in Oregon. J. Wildlife Management 68(4):1039-1053.

Olson, G.S., R.G. Anthony, E.D. Forsman, S. Ackers, P.J. Loschl, J.A. Reid, K. Dugger, E. Glenn, W.J. Ripple. 2005 Modeling site occupancy dynamics for northern spotted owls, with emphasis on the effects of barred owls. J. Wildl. Manage 69(3):918-932.

Pearson, B. 2007. Commercial thinning and spotted owls. Unpubl. Report.

Perkins, J.P. 2000. Land cover at northern spotted owl nest and non-nest sites, east-central coast ranges, Oregon. M.S. thesis. Department of Forest Resources, Oregon State University, Corvallis, OR.

Ripple, W. J., D. H. Johnson, K. T. Hershey, and E. C. Meslow. 1991. Old-growth and mature forests near spotted owl nests in western Oregon. Journal of Wildlife Management. 55(2):316-318.

Ripple, W.J., P.D. Lattin, K.T. Hershey, F.F. Wagner, and E.C. Meslow. 1997. Landscape composition and pattern around northern spotted owl nest sites in southwest Oregon. J. Wildlife Management 61(1):151-158.

Roseburg District BLM 2008. Biological Assessment for the proposed activities affecting the northern spotted owl.

Rosenberg, D.K. and K.S. McKelvey. 1999. Estimation of habitat selection for central-place foraging animals. J. Wildlife Management 63(3):1028-1038.

Seattle Audubon et al. v Doug Sutherland et al. 2007. Court opinion enjoining Weyerhaeuser Company from logging spotted owl habitat on private lands. U.S. District Court Western Washington District Court of Seattle.

Swindle, K.A., W.J. Ripple, E.C. Meslow, and D.J. Schafer. 1997. Old-forest distribution around spotted owl nests in the central Cascade Mountains, Oregon. M.s. Thesis, Oregon State University.

Thomas, J.W., E.D. Forsman, J.B. Lint, E.C. Meslow, B.R. Noon, and J. Verner. 1990. A conservation strategy for the northern spotted owl. A report by the Interagency Scientific

Committee to address the conservation of the northern spotted owl. USDA, Forest Service, and U. S. Department of the Interior, Fish and Wildlife Service, Bureau of Land Management, and National Park Service. Portland, OR.

Thomas, J.W., and M.G. Raphael (Eds.) 1993. Forest Ecosystem Management: An Ecological, Economic, and Social Assessment. Report of the Forest Ecosystem Management Assessment Team (FEMAT). July 1993. Portland, OR: USDA Forest Service and the USDI Bureau of Land Management.

U.S. Fish and Wildlife Service. 1990. Procedures leading to the assessment of incidental take of spotted owls. Rescinded guidelines 1990. USFWS, Portland, OR.

U.S. Fish and Wildlife Service. 2007. Draft Recovery Plan for the Northern Spotted Owl. Merged Options 1 and 2. Portland, Oregon. 170 pp.

Zabel, C.J., J.R. Dunk, H.B. Stauffer, L.M. Roberts, B.S. Mulder, and A. Wright. 2003. Northern spotted owl habitat models for research and management application in California. Ecological Applications 13(4):1027-1040.

Appendix E. Descriptions of Late-Successional Reserves located on the Medford District BLM

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

Fish Hook/Galice LSR 258

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.

This is the central LSR on the former 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. It also contains the Foster Creek drainage where older forest habitat connects to the Northwest Coast LSR. In addition, the areas not harvested in Silver Creek, Shasta Costa Creek, and Indigo Creek watersheds provide unfragmented habitat, although the 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 burned a major portion of this LSR. Of the 117,252 acres of spotted owl suitable habitat that existed prefire, 24,872 acres were lost in the fire (1,465 acres on BLM and 23,407 acres on National Forest). This LSR is capable of growing spotted owl habitat on 93 percent of the land. 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. Of the 53 activity centers, 2 (4 percent) had less than 30 percent of their home ranges as suitable owl habitat, 41 (77 percent) had more than 30 percent of their home ranges as suitable owl habitat, and 45 (88 percent) had more than 40 percent of their home ranges as suitable owl habitat. Post-Biscuit Fire, 19 activity centers suffered reductions in NRF habitat.

East IV/Williams-Deer LSR 249

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.

This LSR provides high elevation older forest connections between the mountains east of the Illinois Valley and the coastal part of the Siskiyous. Most of this high elevation connection occurs in the white fir and red fir plant series. Parts of this LSR also connect the Rogue River 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 Adaptive Management Area) and larger blocks of older forest habitat in the Siskiyou and Red Buttes Wildernesses to the south and

east (on Klamath and Rogue River National Forests, respectively). Older forest connections directly to the east and west are lacking.

It presently supports 42 activity centers for the northern spotted owl. Of the 42 activity centers, 14 (33 percent) have less than 30 percent of their home range in suitable owl habitat and 22 (52 percent) have more than 40 percent of their home range in suitable owl habitat. The LSR is capable of growing spotted owl habitat on 88 percent of the land. Of these capable lands, 49 percent are currently older forests.

West IV LSR 253

The West IV LSR contains National Forest and BLM lands. National Forest lands dominate the LSR but 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).

This LSR connects the 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 (Six Rivers National Forest), and the Kalmiopsis Wilderness. 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. Of the 7,240 acres of spotted owl suitable habitat that existed prefire, 5,094 acres were lost in the fire.

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 and one had more than 40 percent of its home range in suitable owl habitat. Two activity centers suffered reductions in NRF habitat from the Biscuit Fire.

Cascade-Siskiyou National Monument LSR 247 (formerly Soda Mountain LSR)

The Cascade-Siskiyou National Monument LSR 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.

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 Klamath Provinces in the southern portion of the I-5 Area of Concern. At least one spotted owl migration from west of the Applegate District to this LSR has been confirmed. However, forest connectivity for dispersal remains a concern.

It presently supports 18 activity centers for the northern spotted owl. Of the 18 activity centers, 16 (89 percent) have less than 30 percent of their home ranges in suitable owl habitat and 2 (11 percent) have 30 to 40 percent of their home ranges in suitable owl habitat.

Elk Creek LSR 224

The Elk Creek LSR contains a mixture of National Forest and BLM lands. Elevations range from 1,600 to 4,000 feet in the mixed conifer series. It is considered a key watershed (deferred watershed).

Two-thirds of the LSR is within a owl density study area (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 are not producing young. It presently supports 17 activity centers for the northern spotted owl.

The 2002 Timbered Rock Fire burned a portion of this LSR. Of the 10,402 acres of spotted owl suitable habitat that existed prefire, 1,198 acres were lost in the fire. This LSR is capable of growing spotted owl habitat on 51 percent of the lands.

South Umpqua River/Galesville LSR 223

The South Umpqua River/Galesville LSR is a combination of National Forest and BLM lands. There is a checkerboard ownership pattern within the LSR. 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 plays a critical function in east-west connectivity, linking the Coast Province with the Cascades Province. Important characteristics of this LSR include the South Umpqua River and the critical function of connectivity 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.

This LSR currently supports 46 northern spotted owl activity centers. Of the 46 activity centers, 11 (24 percent) contain more than 40 percent of their home range in suitable owl habitat and 35 (76 percent) do not have 40 percent of their home ranges in suitable owl habitat.

West Glendale Resource Area - Four Sections LSR (currently CHU for murrelet)

This LSR consists of portions of four sections in the northwest 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. Over 40 percent of the habitat within their home ranges is suitable. NRF habitat predominates in these four sections.

Appendix F. Meta Data for Biomapper Owl Habitat

Northern spotted owl habitat suitability map for the

Oregon Klamath physiographic province

Raster Dataset

Keywords

Theme: Habitat suitability
Place: Pacific Northwest, Range of the northern spotted owl, Oregon Klamath physiographic province

Description

Abstract

This grid is version 1.0 of northern spotted owl habitat suitability for the Oregon Klamath physiographic province. It was modeled using BioMapper (v3.1) software (Hirzel 2004). BioMapper is a recently developed software package that contains GIS and statistical tools designed to build habitat suitability models and maps using species-presence-only data. The model performs an ecological niche factor analysis that compares ecological conditions that correspond with species presence to conditions across the entire area being analyzed. The suitability statistic is based on the similarity of the biotic and abiotic characteristics of a habitat-capable map unit (pixel) to the characteristics of sites inhabited by territorial owls. Habitat suitability ranges from 0-100. A value close to zero signifies that an individual map unit has little in common with the conditions found where territorial owls are present, and those with values close to 100 have much in common with sites having territorial owl presence.

Purpose

This grid was created for the purpose of monitoring the status and trend of spotted owl habitat under the Northwest Forest Plan (Plan) to determine whether habitat was being maintained and restored as prescribed under the Plan. This is the first monitoring period and covers the time period of 1994-2003.

Status of the data

Complete

Data update frequency: As needed

Time period for which the data is relevant

Date and time: 1994

Publication Information

Who created the data: Raymond Davis and Joseph Lint

Date and time: (in press)
Publisher and place: PNW Research Station, Portland, OR
Series name: The Northwest Forest Plan, the first ten years (1994-2003)

Data storage and access information
File name: kla_stoc_hs
Type of data: raster digital data
Location of the data:
- http://www.reo.gov/monitoring

Data processing environment: Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 2; ESRI ArcCatalog 9.2.4.1420

Accessing the data
Data format: WinZip
Size of the data: 22.5 MB
Data transfer size: 17.0 MB
How to decompress the file: WinZip 8.1

Network location:
- www.reo.gov/monitoring

Access instructions: www.reo.gov/monitoring

Constraints on accessing and using the data
Access constraints: This layer is public property
Use constraints:
None

Details about this document
Contents last updated: 20081020 at time 14023100

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Standards used to create this document

Standard name: FGDC Content Standards for Digital Geospatial Metadata
Standard version: FGDC-STD-001-1998
Time convention used in this document: local time
Metadata profiles defining additional information

- ESRI Metadata Profile: http://www.esri.com/metadata/esriprof80.html

Horizontal coordinate system
Projected coordinate system name: NAD_1927_UTM_Zone_10N
Geographic coordinate system name: GCS_North_American_1927
Details
Grid Coordinate System Name: Universal Transverse Mercator
UTM Zone Number: 10
Transverse Mercator Projection
Scale Factor at Central Meridian: 0.999600
Longitude of Central Meridian: -123.000000
Latitude of Projection Origin: 0.000000
False Easting: 500000.000000
False Northing: 0.000000

Planar Coordinate Information
Planar Distance Units: meters
Coordinate Encoding Method: row and column
Coordinate Representation
Abscissa Resolution: 25.000000
Ordinate Resolution: 25.000000

Geodetic Model
Horizontal Datum Name: North American Datum of 1927
Ellipsoid Name: Clarke 1866
Semi-major Axis: 6378206.400000
Denominator of Flattening Ratio: 294.978698

Bounding coordinates
Horizontal
In decimal degrees
West: -124.652503
East: -122.309911
North: 43.506409
South: 41.925192
In projected or local coordinates

Left: 366387.500000
Right: 555787.500000
Top: 4816837.500000
Bottom: 4642512.500000

Lineage
FGDC lineage
Process step 1

Process step 2
Process description: Metadata imported.
Source used: C:\Biomapper\Grids\HS_GRIDS\ccas_stoc_hs1\metadata.xml

Process step 3
Process description: Metadata imported.
Source used: C:\Biomapper\Grids\HS_GRIDS\Stoc_hab_grids\hs_metadata.xml

Spatial data description
Raster dataset information
SDTS raster type: Grid Cell
Number of raster bands: 1
Raster properties
Origin location: Upper Left
Has pyramids: FALSE
Has colormap: FALSE
Data compression type: Default
Display type: matrix values
Cell information
Number of cells on x-axis: 7576
Number of cells on y-axis: 6973
Number of cells on z-axis: 1
Number of bits per cell: 8
Cell Size
X distance: 25.000000
Y distance: 25.000000
Details for kla_stoc_hs.vat
Type of object: Table
Number of records: 100
Description
Northern spotted owl habitat suitability map for California Cascades physiographic province

Attributes

Count

Rowid

VALUE

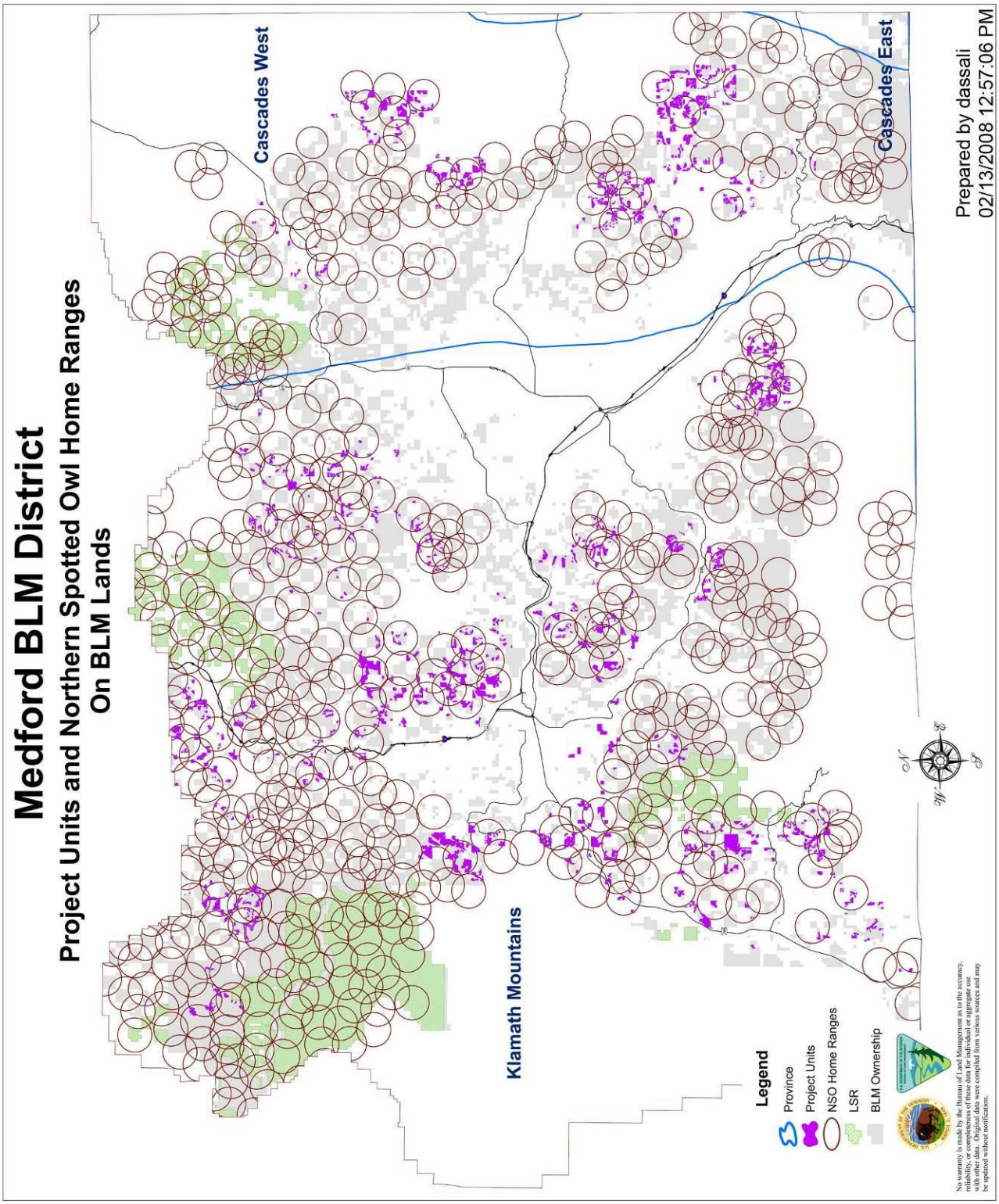
Value

COUNT

Overview

The only meaningful attribute is "Value", which contains continuous values ranging from 0 to 100. A value close to zero signifies that an individual map unit (pixel) has little in common with the conditions found where territorial owl pairs are present, and those with values close to 100 have much in common with sites having territorial owl presence. The higher the value, the more similar to conditions associated with territorial owl pair usage.

Overview citation

Davis, R. and J. Lint. (in press). Habitat status and trend. In Northwest forest plan--the first ten years (1994-2003): Status and trend of northern spotted owl populations and habitat. Gen. Tech. Rep. PNW-GTR-xxx. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. xx

Appendix G. Map of Proposed Projects and Northern Spotted Owl Home Ranges