United States Department of the Interior

BUREAU OF LAND MANAGEMENT
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TAKE PRIDE IN AMERICA

In Reply Refer to:
6842 (ORM020)

MAY 0 3 2010

Memorandum

To: Field Office Supervisor, Roseburg Office, US Fish and Wildlife Service

From: District Manager, Medford

TIMOTHY B. REUWSAAT

Subject: Submission of Medford BLM Medford Summer 2010 LAA BA

This Biological Assessment (BA) evaluates six (6) timber sales (DF Restore, Sampson Cove, Swinning, Twin Ranch, Deer North, and East West Junction) that "may affect and are likely to adversely affect" (LAA) northern spotted owls. No effects to current Critical Habitat is anticipated; nor are other federally listed wildlife species affected by these projects.

Attached are the *Medford Bureau of Land Management (BLM), Medford Summer 2010 LAA Biological Assessment;* Appendix A which lists project design criteria for northern spotted owls; Appendix B, the Owl Estimation Methodology; and Appendix C and D, the Proposed Action Maps.

We request formal consultation from the US Fish and Wildlife Service that evaluates these projects. We look forward to working with the US Fish and Wildlife Service to meet our joint obligations under the Endangered Species Act 7(a) 1 and 7(a) 2.

Attachments

ORM020:Jorgensen:2496:cs:4/30/2010:OP6094Transmittal AprilSummer2010 LAA BA

Biological Assessment

for

Timber Sales in the Medford BLM District that May Affect and are Likely to Adversely Affect (LAA) Northern Spotted Owls

(Cite as MEDFORD Summer 2010 LAA BA)

An Assessment of Effects to the Northern Spotted Owl

Medford District
Bureau of Land Management
May 2010

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Summer 2010 Biological Assessment for Activities in the Medford BLM District that May Affect and are Likely to Adversely Affect (LAA) Northern Spotted Owls (Cite as Medford Summer 2010 LAA BA)

1. Introduction

The Medford District Bureau of Land Management (BLM) is submitting this Biological Assessment (BA) to the US 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.

This Biological Assessment (BA) describes and evaluates the potential effects from six (6) timber sales in the Medford BLM district. The timber sales are located in three (3) resource areas. These are:

- Ashland Resource Area (DF Restore, Sampson Cove, Swinning),
- Butte Falls Resource Area (Twin Ranch), and
- Grants Pass Resource Area (Deer North and East West Junction).

BLM requests formal consultation for activities we have determined *may affect, likely to adversely affect (LAA)* the northern spotted owl.

The effects on plants are evaluated in the 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 (USDI 2008a). 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.

1.1 Consultation History

Lawsuits on ESA consultation for the northern spotted owl have resulted in withdrawn consultation documents and consequently in the need to reinitiate consultation. Three timber sale actions included in this Proposed Action were originally analyzed in previous BAs prepared by the Medford BLM (Table 1). This is the first consultation for the remaining three projects.

Table 1. Consultation History of Proposed Harvest Projects

Project	BA FY 04-08	BA FY 06-08	BA DA BA FH	Name of original project (if sale was previously consulted under another name)
Sampson Cove	X	X	X	
Swinning	X	X	X	Plateau thin
Twin Ranch		X	X	

Sampson Cove and Plateau Thin timber sales were originally consulted on programmatically in a combined Forest Service and Medford BLM BA covering forest management activities planned for 2004-2008 (USDA and USDI 2003). (Note: Swinning units were originally part of the Plateau Thin timber sale). The Service issued a Biological Opinion (BO) for these projects in 2003 (FWS Log #1-15-03-F-511). In response to the Ninth Circuit opinion in NEDC v. Allen/USFWS (NEDC I), No. 05-1279 (D. Or.), 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).

Twin Ranch timber sale was added to the Biological Assessment when Sampson Cove and Plateau Thin (Swinning) were reinitiated in the Medford BLM District's Biological Assessment for FY2006-2008 Projects (USDI 2006). The BLM received a BO (FWS Log# 1-15-06-F-162) and a separate Letter of Concurrence (LOC) (FWS Log#1-155-06-I-0165) from the FWS in August 2006. In response to the Ninth Circuit opinion in ONRC v. Allen, No. 05-35830 (9th Cir.), the Service withdrew several BOs and LOCs in March 2007, including FWS Log# 1-15-06-F-162 and FWS Log#1-155-06-I-0165 and requested reinitiation of ESA section 7 consultation.

The BLM reinitiated consultation on the Not Likely to Adversely Affect (NLAA) fuels treatments associated with these projects analyzed in the FWS Log#1-155-06-I-0165 LOC and received an LOC from the Service (Tails # 13420-2007-I-0231).

In October 2008, the BLM submitted a reinitiated programmatic BA for LAA projects, including the three sales, Sampson Cove, Plateau Thin (Swinning) and Twin Ranch in *District Analysis and Biological Assessment of Forest Habitat, DA BA FH* (USDI 2008b). A separate reinitiated BA for NLAA vegetation treatments originally analyzed in DA BA FH was submitted to the Service and the BLM received an LOC in 2009 (Tails #1342-2009-I-0093). On March 5, 2010, the Service sent BLM a memo requesting the District revise the 2008 DA BA FH due to changes in the proposed action. The sales covered in this Medford Summer 2010 BA will not be included in the revised DA BA FH.

Five (5) projects, Deer North, East West Junction, Sampson Cove, Swinning, and Twin Ranch, were presented to the Roseburg US Fish and Wildlife Service (USFWS) and BLM Level 1 team biologists at a meeting on June 30, 2009. The 6th project (DF Restore) was not reviewed at this time. The Level 1 team includes the Rogue River-Siskiyou National Forest Biologist, the Medford BLM District Biologist, and the Roseburg USFWS Biologist. A field visit to Twin Ranch timber sale with the RA 32 team during the strategy development included two (2) members of the Level 1 team. A draft of this BA was reviewed by the Level 1 team on April 15, 2010.

This BA is in conformance with, and incorporates by reference, the 1995 Medford District Resource Management Plan (USDI 1995) and the Northwest Forest Plan (USDA USDI 1994a).

1.2 Northern Spotted Owl Recovery Plan

On May 16, 2008, the USFWS released a final recovery plan for the northern spotted owl that identified criteria and actions (USDI USFWS 2008). On March 31, 2009, the USFWS advised the court that they intended to seek a remand of both the northern spotted owl recovery plan and critical habitat revision and they would file a motion concerning the terms of such remand after consultation and negotiation with the parties. At a Court status hearing on April 21, 2009, the Defendants requested permission, and the Court subsequently ordered the filing of the motion for remand by June 1, 2009. On July 16, 2009, the Assistant Secretary for Fish, Wildlife and Parks announced that the Federal government would conduct a thorough review of the Recovery Plan prior to its full implementation.

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. The BLM continues to work with the USFWS to incorporate Recovery Goals and Actions consistent with BLM laws and regulations. The 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 BLM is also a collaborator in many of the Recovery Actions that address barred owl issues, such as Recovery Action 32 (RA 32). The intent of RA 32 is to maintain substantially all of the older and more structurally complex multi-layered conifer forests on Federal lands in order not to further exacerbate the competitive interactions between spotted owls and barred owls. Within the administrative units of the Rogue River-Siskiyou National Forest and the Medford District BLM, an interagency, interdisciplinary team was created to develop a methodology for identifying Recovery Action 32 structurally complex forest for project level planning and NSO consultation needs in southwestern Oregon. The most current methodology (version 1.3, January, 2010) was used for this consultation to identify RA 32 stands.

1.3 Definitions

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

KSOACs (Known Spotted Owl Activity Centers)/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. The criteria for mapping these areas are identified on pages C-10 and C-11 of the Northwest Forest Plan Standards and Guidelines (USDA USDI 1994b).

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.

Matrix lands are Federal lands outside of reserves and special management areas that are available for timber harvest at varying levels (USDI 1995, 107). Matrix includes north and south

General Forest Management Areas (NGFMA and SGFMA). Green tree retention ranges from 6 to 25 trees per acre following regeneration harvest in Matrix lands (USDI 1995, 38-39).

1.3.2 Northern Spotted Owl Occupancy

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 BLM northern spotted owl database. A spotted owl site may include one or more alternate nest sites.

Generated ("G") Sites are estimated locations of spotted owl activity centers created by the use of a methodology developed by an interagency team to estimate the number of northern spotted owl home ranges that are likely to occur in unsurveyed habitat within the area affected by a proposed action. Generated sites are based on the amount and distribution of suitable owl habitat (on Federal and non-Federal land) and best available information on known owl locations and spacing patterns for that area. The methodology relies upon known spotted owl locations derived from surveys as the foundation for a "northern spotted owl occupancy" map (NSOOM) (USDI *et al*. 2008).

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. Provincial home range radii (provincial radius) vary based on the physiographic province in which they are located: Klamath Mountains Province = 1.3 miles (3,340 acres), and Western Cascades Province = 1.2 miles (2,950 acres) (USDI *et al.* 2008). The provincial home ranges of several owl pairs may overlap.

Core Area is a 0.5-mile radius circle (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 (USDI *et al.* 2008).

Nest Patch is the 300-meter radius (70 acres) around a known or likely nest site; it is included in the core area (USDI *et al.* 2008).

1.3.3 Owl Activity Periods

Table 2 displays the spotted owl breeding periods used to determine effects in this biological assessment.

Table 2. Northern Spotted Owl Breeding Periods

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

1.3.4 Northern Spotted Owl Habitat

BLM lands are assigned into four categories of forest land in this BA. These categories are distinct and not over-lapping.

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

Nesting, Roosting, and Foraging (NRF) Habitat for the northern spotted owl consists of habitat used by owls for nesting, roosting, *and* foraging. Generally, this habitat is multistoried, 80 years old or older (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. NRF in southwest Oregon varies greatly. It may consist of somewhat smaller tree sizes. 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. NRF habitat also functions as dispersal habitat.

Dispersal Habitat is a subcategory of "all dispersal" habitat for northern spotted owls. All-Dispersal is defined as dispersal plus NRF. 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.

Capable Habitat 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.

Non-habitat does not provide habitat for NSO and will not develop into NRF or dispersal in the future.

1.3.5 Spotted Owl Habitat Modification

Treat and Maintain NRF or Dispersal Habitat means an action or activity will occur within NRF or dispersal habitat but will not change the conditions that would classify the stand as NRF or dispersal post-treatment. The NRF stand will retain at least 60 percent canopy cover, large trees, multistoried canopy, standing and down dead wood, diverse understory adequate to support prey, and may have some mistletoe or other decay. Dispersal habitat will retain at least 40 percent canopy, flying space, and trees 11 inches diameter at breast height (dbh) or greater, on

average. The habitat classification of the stand following treatment will be the same as the pretreatment habitat classification.

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.

Remove Habitat means to alter known spotted owl NRF or dispersal habitat so the habitat no longer functions as nesting, roosting, foraging, or dispersal.

1.3.6 Spotted Owl Designated Critical Habitat

Critical habitat for the northern spotted owl was designated in 1992 in *Federal Register* 57, and includes the primary constituent elements that support nesting, roosting, foraging, and dispersal. Designated critical habitat also includes forest land that is currently unsuitable, but has the capability of becoming NRF habitat in the future (57 FR 10:1796-1837).

Final rule for revised designation of critical habitat for the northern spotted owl was published by the USFWS in the *Federal Register* and signed on August 12, 2008 (73 Federal Register 157:47326) 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).

The USFWS's Critical Habitat delineations are being challenged in court as this BA is being completed. The Secretary of Interior has sought to remand the 2008 designation of northern spotted owl CHU. The remand is now in litigation. At this time, the 2008 CHU designation remains in effect. None of the projects in this BA are within 2008 CHU.

Treat and Maintain Critical Habitat means no primary constituent elements are removed or reduced and primary constituent elements of critical habitat are retained.

Primary Constituent Elements of Critical Habitat are 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:

- space for individual and population growth, and for normal behavior,
- food, water, air, light, minerals, or other nutritional or physiological requirements,
- cover or shelter,
- sites for breeding, reproduction, rearing of offspring, and
- habitats that are protected from disturbance or are representative of the historic geographic and ecological distributions of a species [50 CFR 424.12(b)].

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

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. The elements are:

- sites for breeding, reproduction, and rearing offspring (nesting) cover or shelter (roosting),
- food or other nutritional or physiological requirements (foraging), and
- sites for habitats that are representative of the historical geographical and ecological distributions of the northern spotted owl.

Primary constituent elements also include dispersal habitat that can provide protection and minimal foraging opportunities for dispersing owls. Dispersal habitat may include younger and less diverse forest stands, including even-aged and pole size stands.

2. Description of the Proposed Action

The BA describes and evaluates the potential effects from six (6) timber sales in the Medford BLM District on the northern spotted owl (*Strix occidentalis caurina*). All projects will occur on matrix lands in spotted owl habitat. None of the projects occur within 2008 Designated Critical Habitat.

This BA uses the Section Seven watershed scale (hydrologically defined units) for the Environmental Baseline. The ownership within these Section Seven watersheds occur in a checkerboard pattern of mixed private and Federal ownership, and not all of these lands are capable of providing spotted owl habitat.

The projects are scattered across the Medford BLM District and are included in five (5) Section Seven watersheds (Table 3) and two (2) spotted owl physiographic provinces: Klamath Mountains (Deer North, East West Junction, Swinning) and Western Cascades (DF Restore, Sampson Cove, Twin Ranch). One project (Sampson Cove) has units within lands formerly designated CHU OR-38.

We expect the projects to be implemented soon after the BO is received and National Environmental Policy Act (NEPA) compliance is completed; projects are expected to be implemented in FY 2010, 2011 or 2012. BLM defines implementation of timber sales as the date a project is sold. However, harvest activities could take up to five (5) years to complete. Once a sale is sold, purchasers usually have three (3) 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 units will receive post harvest fuels treatments to reduce potential increases in fuel hazard due to the buildup of harvest generated slash and residual small high density trees, as needed. These fuels treatments will include biomass removal or selective slashing/hand pile burning, and underburning within the first two (2) years of harvest. Follow-up maintenance underburns may occur 4-10 years post harvest within the Wildland Urban Interface (WUI) to maintain a Fire Regime Condition Class (FRCC) of one (1) or two (2).

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.

2.1 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). For this consultation, the Action Area includes all proposed harvest units as well as all areas subject to increased ambient noise levels caused by activities associated with the proposed action.

2.2 Description of the Treatment Types

2.2.1 TIMBER HARVEST

Commercial Thinning (CT) is typically prescribed for even-aged stands with a single canopy layer. In these stands, growth rates are beginning to decline due to competition. These treatments would thin stands by spacing the residual trees based on the crown radius of the healthiest dominant and co-dominant trees to achieve an average relative density of 35 percent with some variation for site differences (range between 25 and 45 percent relative density).

Density Management (DM) is typically prescribed for uneven-aged stands for the primary purpose of widening the spacing of residual trees to promote growth and structural development of the remaining stand. These treatments would thin stands by spacing the residual trees based on the crown radius of the healthiest dominant and co-dominant trees to achieve an average relative density of 35 percent with some variation for site differences (range between 25 and 45 percent relative density).

Understory reduction treatments (UR) would primarily thin from below (the smallest diameter trees) to achieve a target canopy closure of 60 percent in NRF stands and 40 percent in dispersal stands. The prescription for these areas would retain the most vigorous large trees in patches while thinning lower and middle tree layers to accelerate individual tree growth and retain the healthiest trees in each size class and layer.

Modified group selection (MGS) is the removal of trees (usually Douglas-fir) that are competing with vigorous pines and non-tanoak hardwoods with greater than 30 percent live crown ratio. Typically these openings would be between one-fourth (¼) acre to one-half (½) acre in size, with the occasional group up to one (1) acre in size if the pines and non-tanoak hardwoods are in need of more release.

Group selection (GS) is used in small patches (< 3 acres), which lack conifer regeneration because of intense conifer, hardwood or brush competition or in areas where the overstory trees are showing signs of declining health (stagnating growth patterns, dead, dying, or diseased). A "regeneration opening" would be created by cutting and removing large hardwoods and/or conifers, potentially burning hardwoods on site when yarding is not feasible. These openings

would be planted with conifer seedlings and young stand management treatments would occur as needed.

Regeneration harvest (RH) treatments are proposed to be done under RMP NGFMA guidelines (1995 Medford RMP), leaving 6-8 large conifers per acre greater than 20" dbh. Spatial distribution of these trees would vary from individual trees to groups.

Structural Retention for Stand Regeneration (SR) treatments are proposed to be done under RMP SGFMA guidelines (1995 Medford RMP), leaving 16-25 large green conifers (>20" dbh) per acre across the natural range of diameters present in the stand. Trees >6" dbh would be removed between the trees selected for retention. Two large hardwoods per acre would be retained. Douglas-fir/Tanoak series stands containing an established and competitive tanoak component would retain 9 to16 large trees per acre.

Shelterwood (SH) treatments would retain 12 to 25 green trees per acre greater than 20 inches dbh to provide protection for newly planted and natural seedlings in areas with growing-season frosts. The spatial distribution of trees would be more uniformly distributed. After harvest, canopy closure would be 20 to 30 percent.

2.2.2 FUELS REDUCTION

Biomass removal includes removing the logging slash (tree tops and limbs) from the unit to a landing where resulting piles of slash are chipped and hauled away. Biomass is any dead or living vegetation in a fuels unit that is ≤8" in diameter for conifers and ≤12" for hardwoods. Decadent woody material, such as large snags and pre-existing down wood is not biomass and will be retained within the stands.

Selective Slashing means reducing understory vegetation density by cutting and spacing of conifers <8" dbh and hardwoods <12" dbh. Retained vegetation would be spaced 14-45' apart. Untreated vegetation groups ranging in size from 0.1 to 2 acres would be retained in each treatment unit.

Hand piling and burning is typically used when underburning is not possible due to heavy fuel loads. Sticks 1" to 6" diameter and longer than two (2) feet would be piled by hand.

Understory Burning (underburning) is used where the objective is to maintain ≥80 percent of the overstory. Typically, burning occurs between fall and spring outside of Project Design Criteria (PDC).

2.3 Description of the Projects

The proposed actions for all timber sale projects are summarized in Table 3.

2.3.1 Purpose and Design of the projects

The underlying purpose of these projects is to provide a sustainable supply of timber and forest products while managing for a healthy forest ecosystem. All projects are within matrix lands, which are identified in the NWFP as lands available for timber harvest. Harvest would be

accomplished using a combination of cable and tractor systems. All treatment units will meet NWFP and Medford RMP snag and coarse woody material (CWD) guidelines.

These projects have been designed to avoid older and more structurally complex, multi-layered conifer forests (RA 32). The BLM reviewed the proposed timber sale units in the field for potential RA 32 habitat using the January 2010 draft Medford BLM/ Rogue River-Siskiyou National Forest methodology. No identified RA 32 stands were included in the proposed actions in this BA.

Road maintenance will occur with existing roads being graded, brushed, culverts repaired, water bars placed or repaired. Some hazard tree removal may be needed.

2.3.2 Proposed Action Summary

All project acres presented in this BA are from GIS planning-level shape files (overlay maps) and associated attribute files. There may be minor deviations in the description of projects. Consultation will be reinitiated if the scope of the project expands to include effects greater than those consulted on under this BA or if the projects cannot be revised to comply with this consultation.

Table 3. Proposed Action Summary

Project	RA	EA #	Total Timber Sale Acres (In BA)	CHU*	Treatment type	Road building (miles)	RA 32**	
							Habitat dropped from harvest (Acres)	RA 32 treated (Acres)
ILLINOIS SECTION 7 WATEARSHED								
Deer North	Grants Pass	Planning	229	No	CT, DM, UR,MGS, GS, RH	0.3	3	0
East West Junction	Grants Pass	Planning	382	No	CT, DM, UR,MGS, GS, RH	1.1	22	0
LITTLE BUTTE SECTION 7 WATERSHED								
DF Restore	Ashland	Planning	370	No	RH, MGS, GS	0	0	0
BEAR SECTION 7 WATERHSED								
Sampson Cove	Ashland	Planning	747	1992 CHU OR-38 241 acres	UR, MGS, GS, UR	0.08	105	0
KLAMATH SECTION 7 WATERSHED								
Swinning	Ashland	Planning	550	No	CT, UR, MGS	0	240	0
ROGUE UPPER SECTION 7 WATERSHED								
Twin Ranch	Butte Falls	OR-M050-2010-0002	629	No	CT, RH, SR, DM, SH	0.1	342	0

* Critical Habitat Unit
**RA 32 acres identified from field evaluations

2.4 Project Design Criteria

Project Design Criteria (PDC) are conservation measures developed to reduce disturbance impacts to listed species (see Appendix A). Disturbance of listed wildlife species occurs when noise, smoke, vibration, or visual stimuli cause impairment of normal behavior. Mandatory PDC are measures applied to project activities designed to avoid the potential adverse disturbance effects to nesting birds and their young. Mandatory PDC will be incorporated into all activities as integral to the Proposed Action. 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.

3. Environmental Baseline

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.

A detailed account of the taxonomy, ecology, and reproductive characteristics of the spotted owl can be found in the Final Recovery Plan (USDI FWS 2008), the SEI 2004 northern spotted owl status review (Courtney *et al.* 2004); the Interagency Scientific Committee Report (Thomas *et al.* 1990); Forest Service Ecosystem Management Report (USDA *et al.* 1993), final rule designating the spotted owl as a threatened species (1990), and several key monographs (e.g., Anthony *et al.* 2004 and Forsman *et al.* 2004).

3.1 Status of Northern Spotted Owl Habitat in the Action Area

This Environmental Baseline for owls on the Medford BLM administered lands for the Action Area is current as of February 2010. The Baseline was developed using existing information, Interagency Vegetation Mapping Project (IVMP) imagery from 1996 (as corrected through 2003), and several additional steps of refinements. This was also the source for information for non-BLM Federal lands. 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 project shapefiles when necessary. Some slight modifications were incorporated in this BA as a result of field verifications during the planning process and corrections in the database unit boundaries.

Three (3) of the proposed projects are within the Klamath Province in southwestern Oregon where fire is recognized as a key natural disturbance (Atzet and Wheeler 1982). Fire has played an important role in influencing successional processes and creating diverse forest conditions. The remaining three sales are within the Western Cascades Province. Within the Western Cascades Province, historical fire frequencies that are low or moderate in the northern part of the province are higher in the south (Moeur *et al.* 2005).

Spotted owl habitat patterns in these drier portions of its range are not continuous, but occurred naturally in a mosaic pattern (USDI FWS 2008). The mosaic pattern described was a direct result of natural fire regimes. Agee (1993, 2003) and Hessburg and Agee (2003) characterized the historical wildfire regime as low- to mixed-severity with fire return intervals of less than 10 to 50 or more years, depending on local conditions.

Table 4 summarizes Federal and private ownership, as well as spotted owl habitat for the affected Section Seven watersheds.

Table 4. Environmental Baseline for the Action Area (Section 7 Watersheds)

Illinois Section 7 Watershed	Acres
Total acres all ownership	633,158
Total acres Non-Medford BLM ownership	566,521
Total acres Medford BLM	66,637
Non-habitat	7,513
Capable	22,306
Dispersal	9807
NRF	26565
Total NRF on Non-Medford BLM ownership	168,711
Other Federal NRF	142,690
Non-Federal NRF	26,021

Little Butte Section 7 Watershed	Acres
Total acres all ownership	238,594
Total acres Non-Medford BLM ownership	184,303
Total acres Medford BLM	54,291
Non-habitat	14,116
Capable	17,968
Dispersal	5,985
NRF	16,222
Total NRF on Non-Medford BLM ownership	26,173
Other Federal NRF	23,115
Non-Federal NRF	3,058
Bear Section 7 Watershed	**Acres**
Total acres all ownership	231,095
Total acres Non-Medford BLM ownership	204,852
Total acres Medford BLM	26,243
Non-habitat	9,086
Capable	4,222
Dispersal	1,994
NRF	10,942
Total NRF on Non-Medford BLM ownership	22,918
Other Federal NRF	10,788
Non-Federal NRF	12,130
Klamath Section 7 Watershed*	**Acres**
Total acres all ownership	396,386
Total acres Non-Medford BLM ownership	329,880
Total acres Medford BLM	66,506
Non-habitat	32,337
Capable	12,289
Dispersal	3,514
NRF	18,366
Total NRF on Non-Medford BLM ownership	68,189
Other Federal NRF	28,192
Non-Federal NRF	39,734
Information not available for California part of Klamath Watershed	

Rogue Upper Section 7 Watershed	Acres
Total acres all ownership	793,935
Total acres Non-Medford BLM ownership	685,565
Total acres Medford BLM	108,370
Non-habitat	10,339
Capable	33,656
Dispersal	22,878
NRF	41,497
Total NRF on Non-Medford BLM ownership	196,746
Other Federal NRF	172,524
Non-Federal NRF	24,222

*The Klamath Section seven watershed only includes lands in Oregon

3.2 Status of Northern Spotted Owl Sites in the Action Area

Spotted owl sites used in this BA are based on historic information, protocol surveys, incidental observations, or computer generated sites as discussed in the Methodology for Estimating the Number of Northern Spotted Owls Affected by Proposed Federal Actions (USDI *et al.* 2008).

The number of spotted owl sites (documented and generated) are summarized in Table 5 by Section Seven watershed and associated with the Action area.

Table 5. Spotted Owl Sites (by Section 7 Watershed and Project Area)

	Number of owl sites (centers) within Watershed boundary *	Number of owl home ranges Associated with the Action Area
Illinois	**50**	
Deer North		**7**
East West Junction		**3**
Little Butte	**33**	
DF Restore		**1**
Klamath	**26**	
Swinning		**4**
Bear	**28**	
Sampson Cove		**7**
Rogue Upper	**90**	
Twin Ranch		**5**

* This number represents primarily BLM sites and adjacent Forest Service sites. There are likely more owl sites on FS lands not included in this number.

Limited surveys have been conducted at some of these sites in the past decade, and history for every site within the project area is lacking. Since the existing survey coverage and effort are insufficient to produce reliable estimates of population size at the district level, demographic data are used to evaluate trends in spotted owl populations (USDI USFWS 2008).

Three (3) timber sales are located in the Klamath Mountains Province and three (3) are located in the Western Cascades Province. According the 2004 Status and Trends in Demography of Northern Spotted Owls report, populations in the Klamath Demography study area (which represents the Klamath Mountain Province) and Southern Oregon Cascades study area (which represents the Western Cascades Province) were stable at the time when the meta-analysis was conducted (Anthony *et al.* 2006).

The data from all of the demographic study areas located across the range of the spotted owl were analyzed again in 2009. This document is in press, but initial reports indicate populations of northern spotted owls are declining across the range and in all study areas (Anthony *et al.*, in press). Specific information for the Klamath and Southern Oregon Cascades Demography Study areas will be available when the report is released.

3.3 Barred Owls

The 2008 Final Recovery Plan for the Northern Spotted Owl identifies competition from the barred owl as an important threat to the spotted owl (USDI FWS 2008). Barred owls (*Strix varia*) are native to eastern North America, but have moved west into spotted owl habitat. Since barred owls are less selective about the habitat they use and the prey they feed on, they may be out-competing northern spotted owls for habitat and food. The effects of the barred owl on spotted owl survival and reproduction is unknown. Barred owls are detected opportunistically. There is a trend of increasing numbers of barred owls within the Medford District. Barred owls have been observed in or near the Action Area within the last five years.

4. Effects of the Proposed Action

The projects analyzed in this BA “may affect and are likely to adversely affect” (LAA) spotted owls due to removal and downgrading of NRF habitat. There is No Effect (NE) to 2008 critical habitat because none of the projects occur within any 2008 designated CHUs.

The proposed action may impact the northern spotted owl in a variety of ways and at differing levels depending on exactly where and when the activity occurs. All effects from the proposed action have been evaluated in this assessment, including effects from activities which are interdependent or interrelated.

In the long-term, thinning treatments will improve ecological health of the stands by reducing stand densities to help restore the health and vigor of the remaining trees by reducing competition. Removal of the smaller diameter trees within a stand allow larger healthier trees to

grow, reducing the chance of tree loss in overstocked stands due to suppression mortality, and reducing the intensity and risk of wildfire by removing excess fuels.

4.1 Effects to Habitat

We describe potential effects of habitat change as compared to the current environmental baseline. The effects to NRF and dispersal habitat are summarized in Tables 6 and 7.

4.1.1 Effects to NRF

Table 6. Effects to NRF by Section 7 Watershed from proposed projects (BLM ownership)

Project	NRF				
	Pre-Project acres	NRF Removed	NRF Downgraded	Post-Project acres	% changed
Illinois Sec. 7					
Deer North		0	60		
East West Junction		114	123		
Illinois Total	26,995	114	183	26,698	-1.1
Little Butte Sec. 7					
DF Restore		77	210		
Little Butte Total	16,222	77	210	15,935	-1.8
Klamath Sec. 7					
Swinning		91	227		
Klamath Total	18,366	91	227	18,048	-1.7
Bear Sec. 7					
Sampson Cove		34	42		
Bear Total	10,942	34	42	10,866	-0.7
Rogue Upper Sec. 7					
Twin Ranch		0	202		
Rogue Upper Total	41,497	0	202	41,295	-0.5
NRF	**Total Pre-Project**			**Total Post-Project**	**Total change**
Action Area Total	114,022	316	864	112,842	-1.0

Approximately 1.0 percent of NRF habitat would be removed from the Action Area Section 7 Watersheds.

The BLM has determined the removal of NRF habitat associated with these projects is likely to adversely affect (LAA) northern spotted owls because:

- The removal of NRF habitat through regeneration harvest would remove key habitat elements, including large-diameter trees with nesting cavities or platforms, multiple canopy layers, adequate cover, and hunting perches.
- Regeneration harvests would reduce the overall canopy below 40 percent and the existing multi-canopy, uneven age tree structure would not remain post treatment. These treatment acres would not be expected to provide suitable NRF habitat for many years post-treatment.
- The removal of these key habitat features would reduce the nesting, roosting, foraging, and dispersal opportunities for owls within the project area, and lead to increased predation risk.
- Loss of habitat will reduce opportunities for future reproduction and survival of young.
- Removal of NRF would reduce the amount of existing NRF in the Section Seven Watershed.

The BLM has determined the downgrading of NRF habitat associated with these projects is likely to adversely affect (LAA) northern spotted owls because:

- Thinning that downgrades suitable NRF habitat to dispersal habitat would remove key habitat elements (large-diameter trees with nesting cavities or platforms, multiple canopy layers, adequate cover, and hunting perches), but to a smaller degree because more of the original stand remains intact.
- The removal of these key habitat features would reduce the nesting, roosting, foraging, and dispersal opportunities for owls within the project area, and lead to increased predation risk.
- Downgrading of NRF to dispersal would reduce the amount of existing NRF in the Section Seven Watershed.

The loss of NRF would range from 0.5 percent to 1.8 percent (Table 6) within the five (5) Action Area Section Seven watersheds. This small habitat loss would not preclude owls from nesting within these watersheds in the future. Thinning that downgrades suitable NRF habitat to dispersal habitat would remove key habitat elements but to a smaller degree because more of the original stand remains intact. Thinned stands are expected to return to NRF habitat much more rapidly in comparison to stands treated with a regeneration harvest prescription because more of the key habitat features are retained after a typical thinning operation (Zabel *et al*. 1992, Davis *et al.* 2007

This small loss would not preclude owls from nesting within these watersheds in the future because the proposed treatments are relatively small and are dispersed throughout five (5) Section Seven watersheds. The proposed actions were designed to avoid NRF habitat removal in nest patches and core areas of known active or generated owl sites within the Action Areas where spotted owls may be present. Between 98 and 99 percent of the existing NRF habitat within each Section Seven watershed would still be available post harvest and would continue to provide nesting habitat for spotted owls.

Approximately 715 acres of RA 32 stands were identified in the planning process. Retaining these stands would reduce the amount of NRF removed and downgraded within the associated Section Seven watersheds from the project acres.

Stands identified for thinning will have smaller, less vigorous trees harvested. Thinning will reduce the number of trees to levels that the site has water and nutrients to sustain. Thinning increases average stem diameter, crown width, tree growth rate and enhances overall tree vigor (Hann 2003). Thinning and prescribed fire can reduce surface fuels, reduce crown density and managing surface fuels to increase the likelihood that the stand can better withstand a wildfire (Agee and Skinner 2005).

4.1.2 Effects to Dispersal

Table 7. Effects to Dispersal by Section 7 Watershed (BLM Ownership)

Project	Dispersal					
	Pre-Project	**Dispersal Removed**	**Dispersal Added ****	**Dispersal Maintained**	**Post-Project**	**% changed**
Illinois Sec. 7						
Deer North		38	60	132		
East West Junction		40	123	43		
Illinois Tota	9807	78	183	175	9,912	+1.1
Little Butte						
DF Restore		14	210	70		
Little Butte Tota	5,985	14	210	70	6,181	+3.3
Klamath						
Swinning		0	227	233		
Klamath Tota	3,514	0	227	233	3,741	+6.5
Bear						
Sampson Cove		25	42	168		
Bear Tota	1,994	25	42	168	2,011	+0.9
Rogue Upper						
Twin Ranch		174	202	253		
Rogue Upper Tota	22,878	174	202	253	22,906	+0.1
Action Area Total	44,178	291	864	899	44751	+1.3

* NRF downgrade increases dispersal-only acres.

The BLM has determined the removal of dispersal habitat associated with these projects may affect, but is not likely to adversely affect northern spotted owls. The action may affect spotted owl dispersal by removing 291 acres of dispersal habitat. These treatment acres would not be expected to provide suitable dispersal habitat for many years post-treatment.

Since dispersal habitat is widely distributed and abundant throughout the Action Area, the Medford BLM determines that changes to dispersal habitat outside CHU is not likely to adversely affect dispersal for the following reasons:

- There is no net loss of dispersal in any Section Seven watershed. There would be a net gain of between 0.1 and 6.1 percent of dispersal in the Section Seven watersheds.
- The proposed treatments will be dispersed throughout the Section Seven watersheds to minimize the potential for adversely affecting spotted owl dispersal.
- The treatments would make the residual habitat more ecologically-sustainable over time.

The BLM has determined that the maintenance of dispersal habitat associated with these projects may affect, but is not likely to adversely affect northern spotted owls because:

- Canopy cover in treated stands will be maintained at 40 percent.
- Decadent woody material, such as large snags and down wood will retained.
- The proposed treatments will be dispersed throughout the Section Seven watersheds to minimize the potential for adversely affecting spotted owl dispersal.
- Maintenance activities within dispersal would not remove the components important to owls, and would make the residual habitat healthier and more ecologically-sustainable over time.

4.2. Effects to CHU

No timber harvest is proposed in 2008 CHU. Because no action will occur within lands currently designated as CHU, the proposed action will have "*No Effect*" on 2008 CHU.

The USFWS's Critical Habitat delineations are being challenged in court as this BA is being completed. Although none of the projects in this BA are within 2008 CHU, information on the 1992 former CHU (ex-CHU) is incorporated for information in response to the pending court review.

Lands in the ex-CHU were designated to maintain and improve existing essential nesting, roosting, foraging, and dispersal habitats located within the area that links the Western Cascades and the Klamath Mountains provinces. Fifty-two percent of the ex-CHU is located within the Cascade-Siskiyou National Monument (CSNM). The CSNM has developed a management plan separate from the NWFP. Management in the Monument will be designed to enhance and restore ecological values, including owl habitat. Total acreage mapped for the ex-CHU equals 60,642 acres (which incorporates 19,272 private and 42 State acres). All of the 41,578 Federal acres within the ex-CHU are managed by the BLM.

Table 8: Ex-CHU OR 38 Baseline Owl Habitat

	Acres
Existing NRF (BLM)	14,120
Existing Dispersal (BLM)	23,699

Two hundred forty one acres on BLM matrix lands will be treated and maintained through selective thinning projects in the ex-CHU lands. Thirty five acres dispersal and 206 acres NRF

will be treated. The Proposed Action will not remove or downgrade NRF or remove dispersal habitat in the ex-CHU lands and will not adversely affect the primary constituent elements used to define the ex-CHU habitat. There will be no change in the baseline due to timber sale actions addressed in this BA.

Projects within NRF are designed to ensure that none of the criteria used to define primary constituent elements of critical habitat in lands formerly classified as CHU will change (high, multi-storied canopy with large overstory trees, accumulations of wood on the ground, snags, and flying space). Components important to spotted owls such as nest trees, multilayered canopy and dead and down wood that support prey species habitat will remain within the Action Area post-harvest, retaining the ability of the habitat to provide nesting, roosting, foraging and dispersal of owls. The Action Area includes all proposed harvest units as well as all areas subject to increased ambient noise levels caused by activities associated with the proposed action.

Effects to spotted owls as a result of the implementation of the project will be insignificant for the following reasons:

- There will be no change to the amount of NRF in the ex-CHU in the Action Area.
- The primary constituent elements of critical habitat that make up NRF will be maintained, and improved over the long term. Treated stands will be more ecologically sustainable and fire resilient.
- Canopy cover within treated stands will be retained at or above 60 percent in NRF.
- Decadent woody material in the treatment area, such as large snags and down wood will remain post-treatment.
- Any multi-canopy, uneven aged tree structure that was present prior to treatment will remain post-treatment.
- No nest trees will be removed.
- PDC will avoid adverse disturbance.

Although in the short term, there may be some change in habitat, post-project habitat will retain the values that qualified it as NRF prior to the action. Treatments will improve ecological health of the stands by stimulating forage plants important to spotted owl prey, reducing the chance of tree loss in overstocked stands due to suppression mortality, and reducing the intensity and risk of wildfire by removing excess fuels.

Projects within dispersal habitat in ex-CHU lands are designed to ensure that the treatment will not adversely affect the dispersal primary constituent elements in these areas because dispersal habitat will retain at least 40 percent canopy cover and large trees, snags, large down wood. Structural diversity important to northern spotted owls will be retained. Light to moderate thinning will reduce the average canopy cover of the stand to no less than 40 percent. Selective harvest may affect dispersal habitat by removing some horizontal and vertical structure.

Effects to spotted owls as a result of the implementation of the project will be insignificant for the following reasons:

- Post-project habitat will retain the values that qualified it as dispersal prior to the action.

- Canopy cover within treated stands will be retained at or above 40 percent.
- Decadent woody material in the treatment area, such as large snags and down wood will be maintained during treatment.
- Any multi-canopy, uneven aged tree structure that was present prior to treatment will remain post-treatment.
- Treated stands will be more ecologically sustainable and fire resilient.
- Thinned stands will develop structural diversity more rapidly than a dense unthinned stand because residual trees will grow faster in more ecologically-sustainable conditions.
- Dense stands will be opened by thinning, improving conditions for dispersing spotted owls.
- Thinning dispersal habitat could reduce the rate of spread and intensity of wildland fires.
- PDC will avoid adverse disturbance impacts.

In the long-term, treatments will improve ecological health of the stands by stimulating forage plants important to spotted owl prey, reducing the chance of tree loss in overstocked stands due to suppression mortality, and reducing the intensity and risk of wildfire by removing excess fuels.

4.3 Effects to Spotted Owls

4.3.1 Effects to NRF in Nest Patch, Core Area and Home Range

Owl sites were analyzed at the nest patch, core area, and provincial home range scales as described in the Definition Section (1.3.2). We evaluated pre-project and post-project NRF habitat percentages at these scales for the nine (9) owl sites (both documented and generated) in the Action Area with changes to Federal NRF habitat as a result of the proposed action (Table 9).

The 18 remaining sites were not included in the table because the proposed action will not reduce NRF habitat or change the baseline. No actions are planned within the nest patch of the remaining 18 sites.

“Treat and maintain” treatment would occur within the 0.5 mile Core Area for 6 sites. 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 (USDI Fish and Wildlife Service, USDI Bureau of Land Management and USDA Forest Service 2008).

Nine (9) sites are discussed in more detail because additional site specific data analysis demonstrates the proposed treatments are not expected to result in potential harm, even though the OEM thresholds would not be met post treatment.

Table 9. Effects to Spotted Owl Sites at the Nest Patch, Core Area, and Home Range

	Nest Patch (300m)		Core Area (0.5 miles)		Home Range (1.3/1.2 miles)		
	Current NRF acres (% NP)	Post NRF acres (% NP)	Current NRF acres (% Core)	Post NRF acres (% Core)	Current NRF acres (% HR)	Post NRF acres (% HR)	Sales Affecting Sites
Site # 0967O (BLM)							
All NRF	45 (64.3)	45 (64.3)	209 (41.8)	209 (41.8)	512 (17.4)	510 (17.3)	Sampson Cove (Cascades West)
Federal NRF Only	45 (64.3)	45 (64.3)	207 (41.4)	207 (41.4)	485 (16.4)	483 (16.4)	
Site # 10HCRDO (USFS)							
All NRF	53 (75.7)	53 (75.7)	303 (60.6)	303 (60.6)	1305 (44.2)	1252 (42.4)	Twin Ranch (Cascades West)
Federal NRF Only	53 (75.7)	53 (75.7)	303 (60.6)	303 (60.6)	1297 (44)	1244 (42.1)	
Site # 119G (BLM)							
All NRF	59 (84.3)	59 (84.3)	180 (36)	180 (36)	1017 (30.4)	1014 (30.4)	Deer North (Klamath)
Federal NRF Only	59 (84.3)	59 (84.3)	118 (23.6)	118 (23.6)	298 (8.9)	295 (8.8)	
Site # 133G (BLM)							
All NRF	67 (95.7)	18 (25.7)	251 (50.2)	171 (34.2)	866 (25.9)	783 (23.4)	East West Junction (Klamath)
Federal NRF Only	58 (82.9)	9 (12.9)	139 (27.8)	58 (11.6)	376 (11.3)	293 (8.8)	
Site # 158G (BLM)							
All NRF	47 (67.1)	47 (67.1)	163 (32.6)	163 (32.6)	665 (22.5)	663 (22.5)	Swinning (Cascades West)
Federal NRF Only	47 (67.1)	47 (67.1)	156 (31.2)	156 (31.2)	629 (21.3)	627 (21.3)	
Site # 180G (BLM)*							
All NRF	49 (70)	49 (70)	116 (23.2)	116 (23.2)	369 (12.5)	368 (12.5)	Swinning (Cascades West)
Federal NRF Only	49 (70)	49 (70)	116 (23.2)	116 (23.2)	366 (12.4)	365 (12.4)	

Table 9. Effects to Spotted Owl Sites at the Nest Patch, Core Area, and Home Range							
	Nest Patch (300m)		Core Area (0.5 miles)		Home Range (1.3/1.2 miles)		
	Current NRF acres (% NP)	Post NRF acres (% NP)	Current NRF acres (% Core)	Post NRF acres (% Core)	Current NRF acres (% HR)	Post NRF acres (% HR)	Sales Affecting Sites
Site # 2059O (BLM)							
All NRF	38 (54.3)	38 (54.3)	113 (22.6)	109 (21.8)	681 (23.1)	533 (18.1)	Twin Ranch (Cascades West)
Federal NRF Only	38 (54.3)	38 (54.3)	113 (22.6)	109 (21.8)	681 (23.1)	533 (18.1)	
Site # 3260O (BLM)							
All NRF	23 (32.9)	23 (32.9)	91 (18.2)	91 (18.2)	1187 (40.2)	1132 (38.4)	Twin Ranch (Cascades West)
Federal NRF Only	23 (32.9)	23 (32.9)	91 (18.2)	91 (18.2)	1187 (40.2)	1132 (38.4)	
Site # 4608O (BLM)							
All NRF	52 (74.3)	52 (74.3)	261 (52.2)	261 (52.2)	1133 (33.9)	1129 (33.8)	Deer North (Klamath)
Federal NRF Only	50 (71.4)	50 (71.4)	219 (43.8)	219 (43.8)	406 (12.2)	402 (12.0)	

*This site shows one acre proposed in the home range. This is a mapping inaccuracy. No harvest will occur in the home range.

4.3.2 Site Descriptions for Effects to Individual Owl Sites

The following is a detailed analysis of each home range which would be affected by habitat removal or habitat downgrade and the treatments and processes that will be incorporated by the BLM to avoid harm to spotted owls.

Site # 133G (East West Junction)

This site was generated through the OEM process in unsurveyed suitable habitat where no known owls occur. Pre-treatment NRF acres on Federal lands are already below the OEM thresholds identified in the Owl Estimation Methodology considered necessary to maintain spotted owl life history functions (Appendix B). Thirty-nine acres of NRF removal and ten acres of NRF downgrading would occur in the nest patch of site #133G. As stated in the Owl Estimation Methodology (Appendix B), generated points are based on a computer simulation that may not reflect actual spotted owl locations on the landscape." Therefore, protocol surveys to determine occupancy will be completed in the next two to five years, depending on the harvest schedule, to determine occupancy. Surveys will use the draft "*2010 Protocol for Surveying*

Proposed Management Activities that May Impact Northern Spotted Owls, version 1.0" to cover all suitable nesting habitat within the home range of this site. If spotted owls are found within the provincial radius of this site, the BLM will modify the project to avoid potential harm. Units within the home range, but outside of the nest patch will be dropped from the sale or modified to "treat and maintain." Units within the nest patch will be dropped from the sale or modified in accordance to the OEM guidelines.

Site # 119G (Deer North)

This site was generated through the OEM process in unsurveyed suitable habitat where no known owls occur. According to the GIS habitat layers, three (3) acres of NRF downgrading would occur within the home range of site #119G. However, recent field inspections have classified the portion of the unit that falls within the home range of site #119G as dispersal habitat. Therefore, the proposed treatment would maintain dispersal habitat and these three (3) acres would actually be NLAA. Harm is not expected to occur at this site since the proposed treatments would not reduce the amount of available NRF within the home range of this site.

Site # 4608O (Deer North)

Four (4) acres of NRF downgrade would occur within the home range of this documented site. The proposed treatments are located at the outer border of the home range and private tax lots, agricultural land, and private timber land are located between the historic nest sites and the proposed unit (See Appendix D, maps 1 and 2). This non-federal land includes approximately 180 acres agricultural fields and Deer Creek that do not provide habitat for spotted owls. It's the field biologist's opinion that it's unlikely the owls would use the habitat in the proposed unit because the owls would need to expend more energy and risk predation by crossing the large open field. Contiguous foraging habitat exists within the core area and within the home range to the northwest and southeast of the nest sites. The available habitat would provide easier foraging opportunities for the owl pair and it would not be necessary for the pair to use the habitat in the proposed unit. Therefore, due to the habitat arrangement at the home range scale, it's unlikely these four (4) acres located at the outer border are necessary to meet essential life functions of this potential owl site, so potential harm is not expected to occur.

Site # 2059O (Twin Ranch)

This site has been monitored every year by BLM since 1989. The site had an active pair that remained in or near the 100-acre KSOAC from 1994 through 2004. The last year the site had an active nesting pair was 2004. In 2005, a single female was found during seven (7) survey visits (4 daytime and 3 nighttime). Non-nesting status was confirmed at this site. No spotted owl responses were heard during surveys in 2006-2009 when the surveys of the historic site and surrounding suitable habitat were completed. The area was surveyed four (4) times in 2006 (2 daytime and 2 nighttime), three (3) times in 2007 (1 daytime and 2 nighttime), five (5) times in 2008 (1 daytime and 4 nighttime), and three (3) times in 2009 (2 daytime and 1 nighttime). In 2007, the female, which had been previously color-banded, was discovered nesting in another site approximately three (3) miles northeast of the historic site.

The private lands surrounding the 100-acre KSOAC were harvested in the early 2000s. The home range has 23.5 percent suitable habitat. This site is currently considered to be unoccupied by spotted owls because they have not been located with four (4) years of protocol surveys, the

female has been located at a new site, and the low amount of suitable habitat within the home range.

Under the current Twin Ranch timber sale, no timber harvest would occur within the 100-acre KSOAC or within the nest patch. Protocol surveys to determine occupancy will be completed using the draft "*2010 Protocol for Surveying Proposed Management Activities that May Impact Northern Spotted Owls*, version 1.0." If spotted owls are found, units within the provincial radius of the site would either be dropped from the sale or modified to "treat and maintain."

Site # 3260O (Twin Ranch)
This site has been monitored intermittently by BLM since 1992. The site had an active pair in 1992 and a single male in 1993. The site was considered to be non-nesting in 1992. Because the pair was present in 1992 and a resident male was present in 1993, the site was given a 100-acre KSOAC under the NWFP in 1994. The KSOAC and surrounding suitable habitat was surveyed from 1994-1999 (2 to 3 visits per year). No spotted owl has been detected in the historic nest stand or surrounding habitat in the section. The site was considered vacant and not checked from 2000 to 2004. In 2006, surveys were resumed. The area was surveyed in 2005 (1 nighttime), 2006 (2 daytime and 1 nighttime), 2007 (1 daytime and 2 nighttime), 2008 (3 nighttime) and 2009 (1 daytime and 2 nighttime). No owls were detected. The private lands on three sides of the activity center were clearcut in the early 1990's. This site is currently considered to be unoccupied by spotted owls because no resident spotted owls have been detected since 1993.

Under the current Twin Ranch timber sale, no timber harvest would occur within the 100-acre KSOAC or within the nest patch. Protocol surveys will be completed using the draft "*2010 Protocol for Surveying Proposed Management Activities that May Impact Northern Spotted Owls*, version 1.0" to determine if spotted owls re-occupy the site prior to the timber sale implementation. If spotted owls are found, units within the provincial radius of the site would either be dropped from the sale or modified to "treat and maintain."

Site # 10HCRCO (Twin Ranch)
One historic site is shown in the NE corner of T35S, R4E, Section 7, on Rogue River-Siskiyou National Forest lands. Recent surveys from the OSU Southern Oregon Cascades demographic study area documented a spotted owl in another location within the section in 2002. A single spotted owl was found on US Forest Service lands in T35S, R4E, Section 7 east of the historic site. The nest patch for this new location is outside the Twin Ranch timber sale units.

Protocol surveys to determine occupancy will be completed using the draft "*2010 Protocol for Surveying Proposed Management Activities that May Impact Northern Spotted Owls*, version 1.0." If spotted owls are found, units within the provincial radius of the site would either be dropped from the sale or modified to "treat and maintain."

Site # 0967O (Sampson Cove)
The last documented successful reproduction at the site was in 2000. The site was surveyed in 2003 (1 daytime and 7 nighttime) with a single owl detected on one occasion. A pair was last located at the site in 2005 (3 daytime visits). This site was last monitored in 2006 (1 daytime and 3 nighttime surveys). A single owl was located that year.

Under the Sampson Cove timber sale, no timber harvest would occur within the 100-acre KSOAC or within the nest patch. Two (2) acres of a harvest unit (NRF downgrade) are shown on the map as overlapping with the home range. This unit will be dropped from the sale and the unit will be marked on the ground by lay-out crews following the home range boundary. Harvest within the provincial radius will be limited to those prescriptions that "treat and maintain" northern spotted owl habitat.

Site # 158G (Swinning)
This site was generated through the OEM process in unsurveyed suitable habitat where no known owls occur. Pre-treatment NRF acres in the home range on Federal lands are low (21.3 percent). 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. Approximately two (2) acres of NRF downgrade was mapped under the Swinning timber sale within the home range of site #158G (Table 9). As stated in the Owl Estimation Methodology (Appendix B), "generated points are based on a computer simulation that may not reflect actual spotted owl locations on the landscape."

Because the proposed treatment is within the home range of the generated site, and the available NRF is already below thresholds, the treatment within the home range will be altered to "treat and maintain" NRF rather than downgrading NRF as planned in the original proposal. This unit will retain NRF habitat elements (at least 60 percent canopy, large trees, multistoried canopy and standing and down wood) post-treatment.

Site # 180G (Swinning)
This site was generated through the OEM process in unsurveyed suitable habitat where no known owls occur. Less than one acre NRF downgrade was mapped in the home range. This is a mapping inaccuracy. No habitat removal or downgrade will occur within the home range.

4.4 Effects to Spotted Owl Prey

Timber harvest and associated 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).

Regeneration harvest will remove habitat for arboreal prey species (flying squirrels, woodrats, and red tree voles), but may improve habitat for non-arboreal species (western red backed voles and deer mice). 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. 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. 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.

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.

Edges created from harvest can be areas of good prey availability and potentially increased vulnerability (i.e., better hunting for owls) (Zabel 1995). 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.

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. Several studies (Wagner and Anthony 1998, Dugger *et al*. 2005, Zabel *et al*. 2003, Bingham and Noon 1997) indicate the core area size for the Klamath and South Cascades provinces is 0.5 miles (or 500 acres) within the nest site. Therefore, effects to prey species are most critical at the nest patch and core areas. Effects to spotted owl sites at the nest patch and core areas are analyzed in Section 4.3 above and the indirect effects to prey species can be derived from this data. For all projects, treatment implementation would be spread out temporally and spatially within the project area, which would provide areas for spotted owl foraging during project implementation and reduce the impact of these short term effects at the project level.

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. Treatment areas are small enough and dispersed enough that many resident prey species could move to adjacent patches until the stand recovers.

4.5 Effects of Disturbance to Northern Spotted Owls

Mandatory PDC will be incorporated into all proposed action activities. Applying the Mandatory PDC should avoid harm to nesting owls and their young that might occur from noise or activity, but may not reduce the adverse effects of habitat removal. Nesting owls are confined to an area close to the nest, but once the young fledge, they can move away from noise and activities that might cause them harm. Since all projects will follow mandatory PDCs, that restrict activities to outside of the breeding season and beyond recommended disturbance distance thresholds (Appendix A), no harm to nesting owls, or their young, is expected from project related noise or activities.

4.6 Interrelated and Interdependent Effects

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 have no independent utility apart from the action under consideration. Interdependent actions depend on the Federal action and would make no sense without it.

All proposed timber harvest projects in this BA will have interrelated and interdependent effects. Timber harvest projects often have activities directly or indirectly associated with their completion, such as road construction or timber hauling on existing system roads. Acres logged as part of road building are included in the totals for the timber harvest. Post harvest brush disposal is another interrelated and interdependent action to timber harvest. Brush disposal activities vary by timber sale due to fuels management objectives, requirements for retention of down woody material, and other resource management goals. Typical activities associated with this program include biomass removal, pile burning; underburning; and rearranging fuels by crushing, mulching, and lopping and scattering. Another interrelated and interdependent effect from timber harvest is the possible reduction in the size and continuity of existing late-successional stands, and interior forest habitat.

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.

4.7 Cumulative Effects

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.

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.

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 majority of state and private forests in Washington, Oregon, and Northern California are managed for timber production. Non-Federal lands are not expected to provide demographic support for spotted owls across and between physiographic provinces (Thomas *et al*. 1990; USDA and USDI 1994a). Historically, non-Federal landowners practiced even-aged management (clear-cutting) of timber over extensive acreages. Private industrial forest lands are managed for timber production and will typically be harvested between 40 and 60 years of age, in accordance with State Forest Practices Act standards. In 2008, during the development of the DA BA FH, data was requested from Oregon Department of Forestry and the Pacific Northwest Inventory and Analysis team to help determine harvest rates in the past decade on private lands within the Medford district. These records indicated private harvest rates in Jackson and Josephine Counties have never exceeded 1.08 percent of the total private lands per year since 1998. These records did not provide information of pre-treatment habitat conditions. We anticipate some loss of owl habitat on private lands, but cannot predict the rate of loss, or the specific location of harvest.

The Medford BLM assumes these past management practices will continue and reduce the amount of NRF habitat for spotted owl on non-Federal lands over time. Harvest activities on state and private lands can be expected to impact spotted owls located within adjacent Federal lands by removing and fragmenting habitat and through disturbance activities adjacent to occupied sites during sensitive periods. 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.

5. Biological Assessment Conclusions

It is the conclusion of this biological assessment that proposed actions may affect the spotted owl species as documented above. Formal consultation is requested for projects listed in Table 10 because they are “may affect, likely to adversely affect” actions for spotted owls. All activities are in compliance with the NWFP, Medford RMP, and current spotted owl consultation parameters.

Medford BLM seeks formal consultation on these six (6) projects for spotted owls that may affect and are likely to adversely affect northern spotted owls due to 1,180 acres of NRF removal and downgrade and 291 acres of dispersal removal. Medford seeks concurrence that the maintenance portions of these projects are not likely to adversely affect spotted owls. Medford BLM has planned these projects to avoid harm to individual owl sites resulting from habitat removal at the nest, core, or home range level.

The proposed action would also result in an increase of dispersal habitat within the Section Seven watersheds in the Action Area.

Table 10. Effects Determination by Project		
Project	**Project plan design to reduce impacts to spotted owls**	**Effects to Spotted Owls**
DF Restore	All actions occur outside provincial radius/core area. No habitat removal within any known or generated spotted owl site.	LAA
Deer North	No actions would occur within the nest patch or core area. Four (4) acres of NRF downgrade would occur at the outer boundary within the home range of one (1) known site. Due to the available habitat closer to the nest patch, it's unlikely the pair uses these four (4) acres (see map in Appendix D). Harvest within the home range of one (1) generated site would be "treat and maintain."	LAA
East West Junction	Surveys will be done in one spotted owl generated site to reaffirm no occupancy where habit removal is proposed. If owls are found, harvest units within the provincial radius would be dropped or changed to a "treat and maintain".	LAA
Sampson Cove	All actions occur outside the nest patch and KSOAC. No NRF would be downgraded or removed and no dispersal habitat would be removed within the home range. Harvest within the home range would be "treat and maintain".	LAA
Swinning	No actions would occur within the nest patch and core area. No NRF would be downgraded or removed and no dispersal habitat would be removed within the home range. Harvest within the home range would be "treat and maintain".	LAA
Twin Ranch	All actions would occur outside the nest patch and KSOAC. Removal and downgrade of habitat would occur within historic home range of three (3) spotted owl sites. These sites have been monitored to different levels and surveys in the past three (3) years have not detected a pair or resident single spotted owl. Protocol surveys will be conducted	LAA

Table 10. Effects Determination by Project		
Project	**Project plan design to reduce impacts to spotted owls**	**Effects to Spotted Owls**
	to check for occupancy within the home range. If owls are found, the proposed units would be altered to a "treat and maintain" prescription or units would be dropped from the sale.	

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Appendix A: Project Design Criteria (PDC)

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

Physical impacts to habitat and disturbances to spotted owls will be reduced or avoided with PDC. Listed are project design criteria designed for the programmatic impacts discussed in the *Effects of the Action* section.

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 will then, at the least, include an appropriate seasonal restriction; and could include clumping of retention trees around the nest trees, establishment of buffers, dropping the unit(s)/portions, or dropping the entire project.

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

PDC for disturbance are intended to reduce disturbance to nesting spotted owls. For this consultation, potential disturbance could occur near either documented owl sites or projected owl sites. To estimate likely occupied habitat outside of known home ranges, nearest-neighbor distances and known spotted owl density estimates were utilized to “place” potential spotted owl occupied sites in suitable habitat

Any of the following Mandatory PDC may be waived in a particular year if nesting or reproductive success surveys conducted according to the USFWS endorsed survey guidelines reveal that spotted owls are non-nesting or that no young are present that year. Waivers are only valid until March 1 of the following year. Previously known sites/ activity centers are assumed occupied until protocol surveys indicate otherwise.

Mandatory Project Design Criteria

A. Activities (such as tree felling, yarding, road construction, hauling on roads not generally used by the public, prescribed fire, muffled blasting) that produce loud noises above ambient levels will not occur within specified distances (Appendix A-1) of any documented or projected owl site between March 1 and June 30 (or until two weeks after the fledging period) – unless

protocol surveys have determined the activity center is non-nesting or failed in their nesting attempt. The distances may be shortened if significant topographical breaks or blast blankets (or other devices) muffle sound traveling between the work location and nest sites.

B. The action agency 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 recycle nesting attempt) if project would cause a nesting spotted owl to flush. (See disturbance distance).

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

D. To minimize the number of potential spotted owl nest trees used for used for instream structures, only the following sources will be used:

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

(II) Trees that lack structural conditions (snags, cavities) suitable for spotted owls.

Appendix A-1. Mandatory Restriction Distances to Avoid Disturbance to Spotted Owl Sites

Activity	**Buffer Distance Around Owl Site**
Heavy Equipment (including non-blasting 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 mile*
Blasting; 2 lbs of explosive or less	360 feet
Blasting; more than 2 lbs of explosives	1 mile

***** If below 1,500 feet above ground level

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

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 two (2) weeks after the fledging period, unless protocol surveys have determined owls are not present, are non-nesting, or nesting has failed.

B. Minimize the use of fire line explosives within one (1) air mile of occupied stands from March 1 through June 30, or until two (2) weeks after the fledging period, unless protocol surveys have determined owls are not present, are non-nesting , or nesting has failed.

Appendix B: 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

Suggested Citation: USDI Fish and Wildlife Service, USDI Bureau of Land Management and USDA Forest Service. 2008. Methodology for estimating the number of northern spotted owls affected by proposed federal actions. Version 2.0. Oregon Fish and Wildlife Office, Fish and Wildlife Service, Portland, OR.

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 Actions[1]

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.

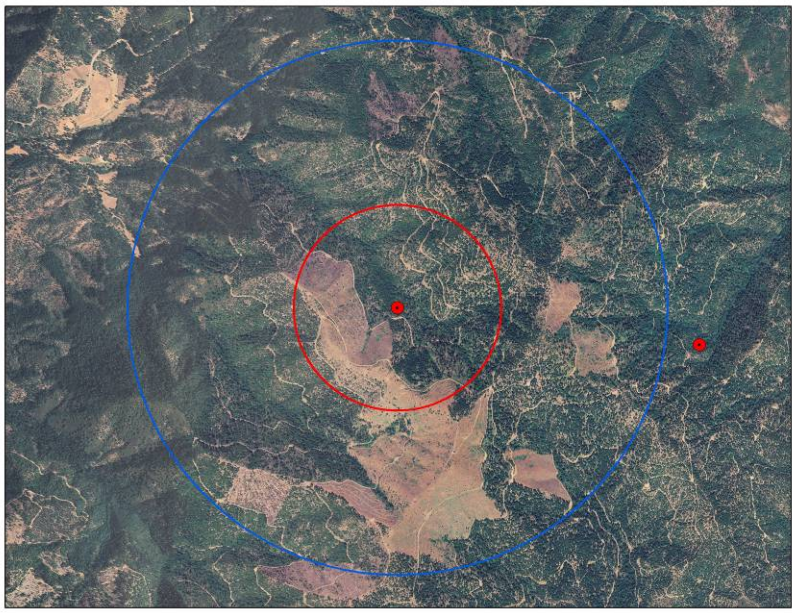
The information provided on the following pages describes the process and technical information used in the development of a NSOOM. Future and revised NSOOMs will continued to be developed by the ITS Team in collaboration with Level 1 Teams.

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).

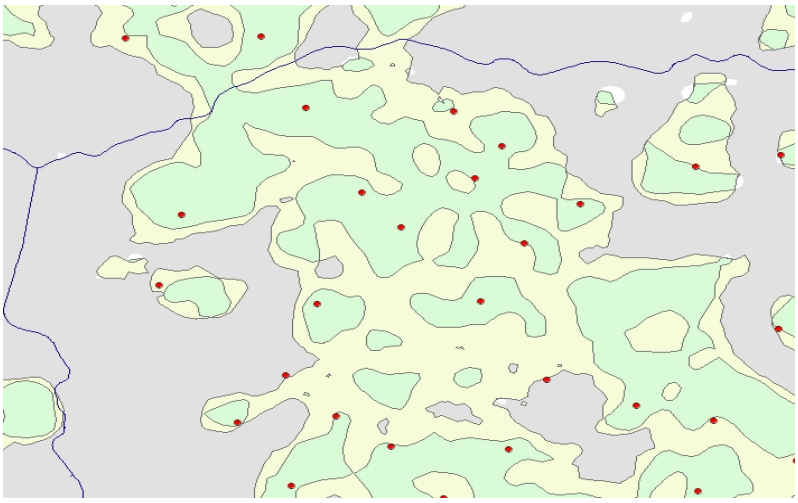
An example of the patch size analysis is depicted in **Figure 4** below. The darker green area represents spotted owl suitable habitat, the lighter, larger polygon areas represent the result of the 200-meter radius (patch size) circular neighborhood analysis, and the dots represent known spotted owl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

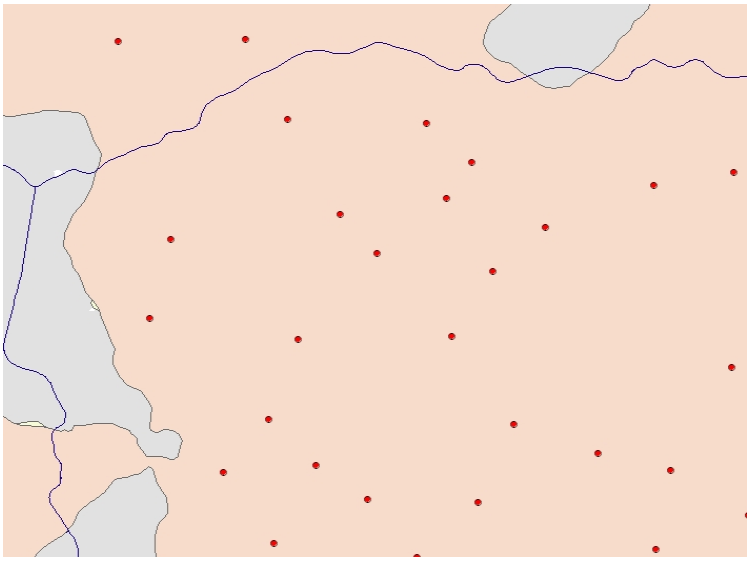
Figure 5 is an example landscape showing known spotted owl locations (dots), results of the 200-m nest patch scale analysis (the dark green-shaded polygons as depicted in Figure 4 above) and results of the core area radius analysis (the lighter green areas). The dark green-shaded polygons also represent 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.

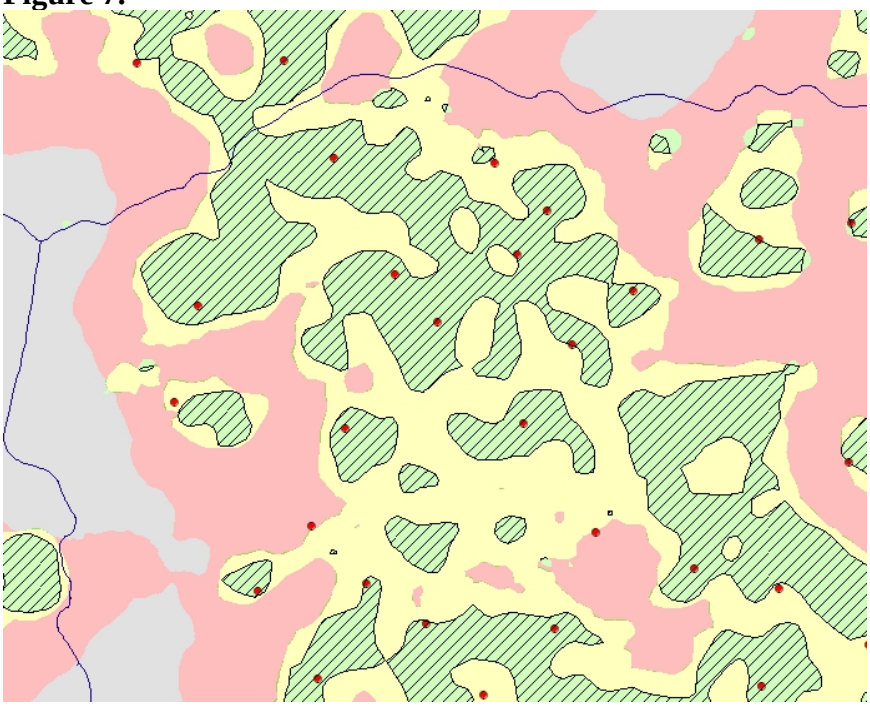


Figure 8.

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.

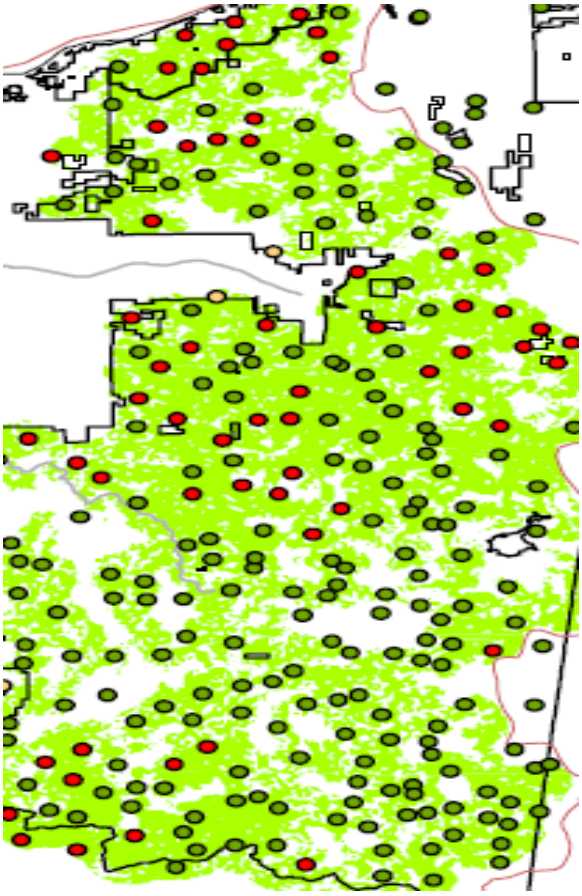


Table 5. Provincial habitat values based on the 90 percent rule (expressed in % of nest patch, core area, and home range covered by suitable habitat) used in a GIS neighborhood analysis for developing a map of likely occupied spotted owl habitat. The percentages represent the lowest value for 90% of 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.

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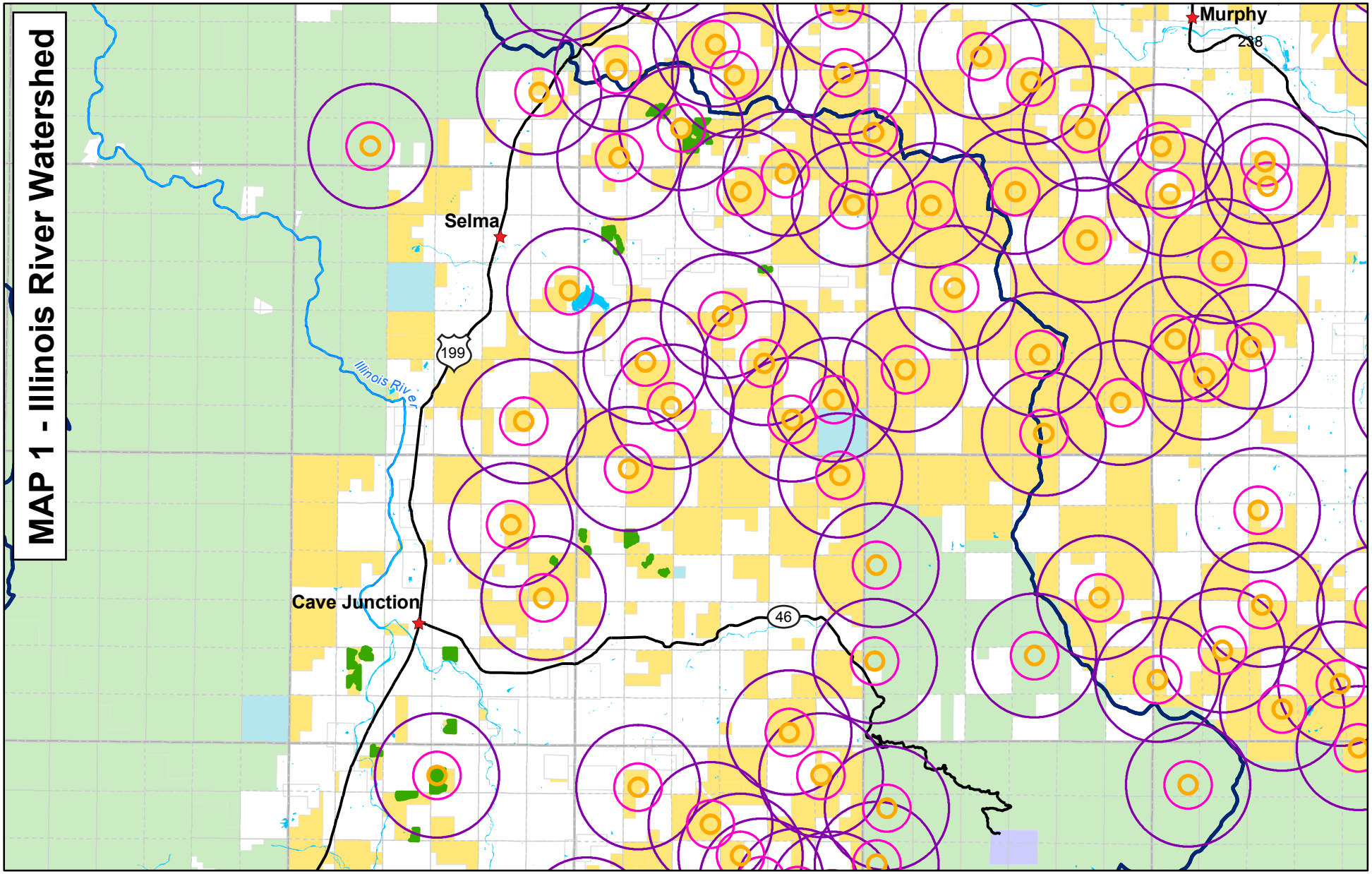
Appendix C: Proposed Action Maps

Map 1—Illinois River Watershed

Map 2—Bear Creek, Klamath River and Little Butte Creek Watersheds

Map 3—Upper Rogue Watershed



Medford Summer 2010 LAA BA

Illinois Watershed

Nest Patch, Core, Home Ranges & Project Units

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.

Legend

- Nest Patch
- Core
- Home Range
- Project Units
- Section 7 Watershed
- Bureau of Land Management
- U.S. Forest Service
- National Park Service
- State
- Private

Miles

0 2.5 5

N

Prepared By: dassali
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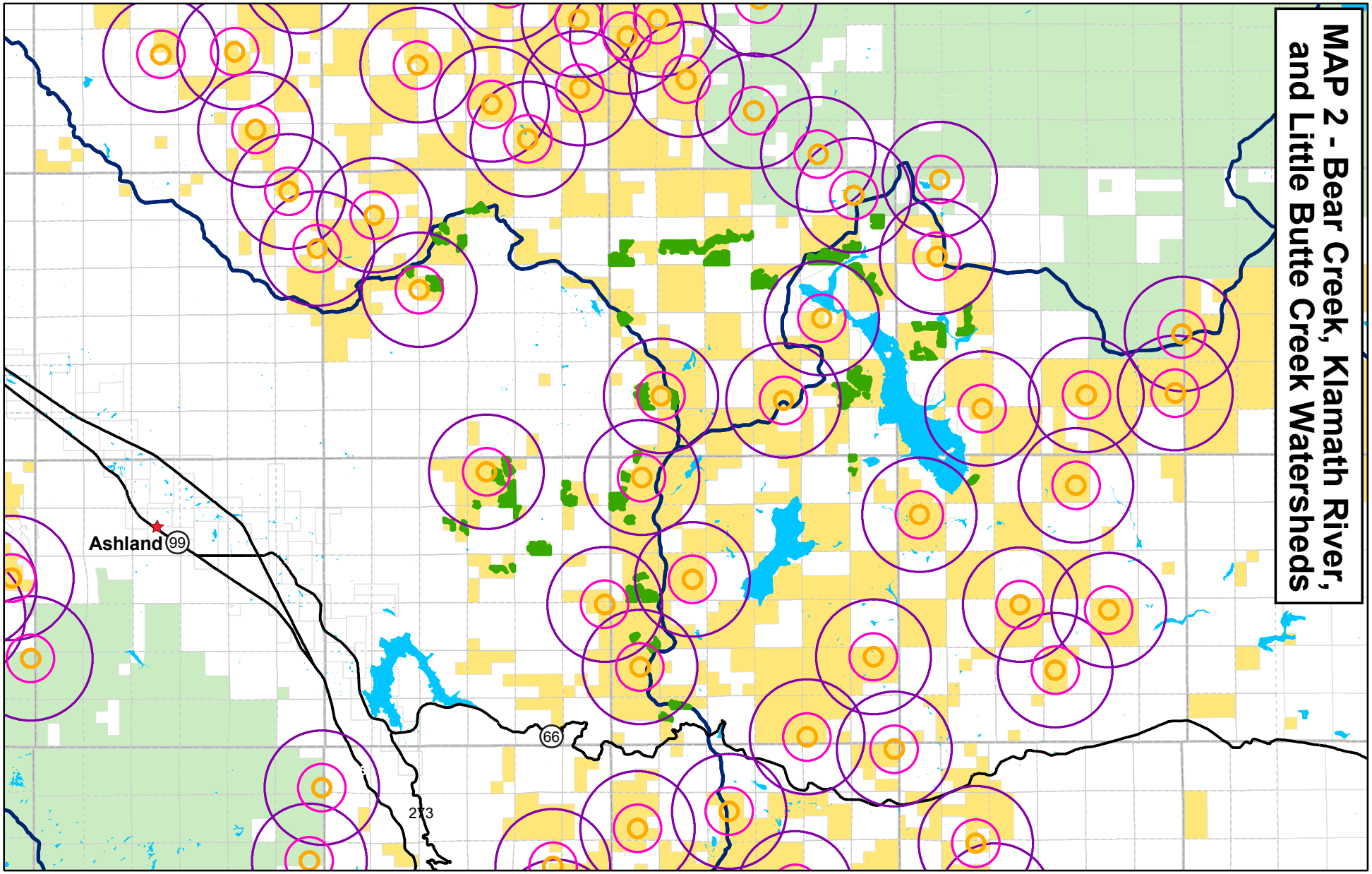

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Bear, Klamath and Little Butte Watersheds

Nest Patch, Core, Home Ranges & Project Units

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Legend

- Nest Patch
- Core
- Home Range
- Project Units
- Section 7 Watershed
- Bureau of Land Management
- U.S. Forest Service
- National Park Service
- State
- Private

Miles

0 2.5 5

N

Prepared By: dassali
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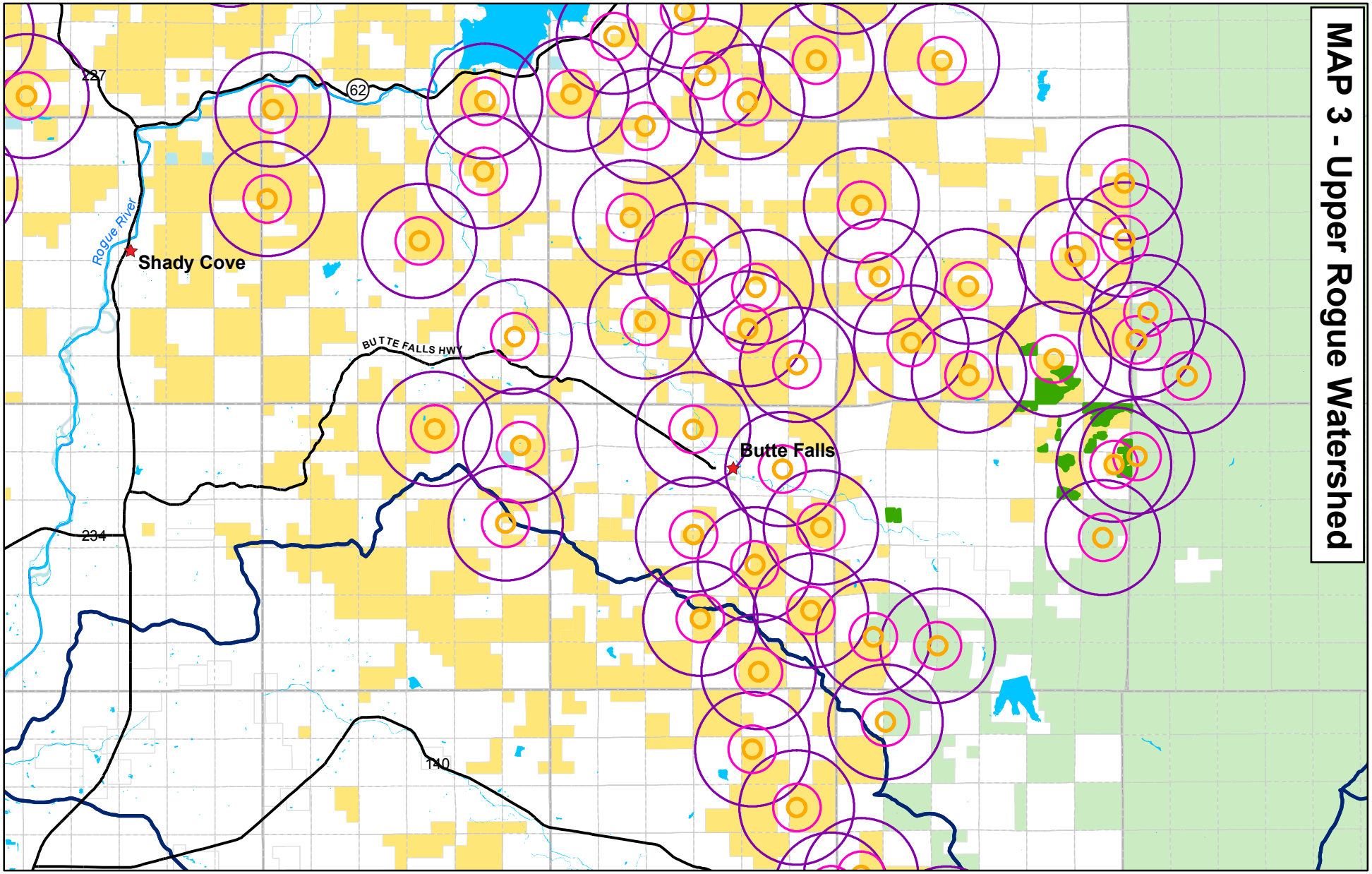

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Upper Rogue Watershed

Nest Patch, Core, Home Ranges & Project Units

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Legend

- Nest Patch
- Core
- Home Range
- Project Units
- Section 7 Watershed
- Bureau of Land Management
- U.S. Forest Service
- National Park Service
- State
- Private

Miles

0 2.5 5

N

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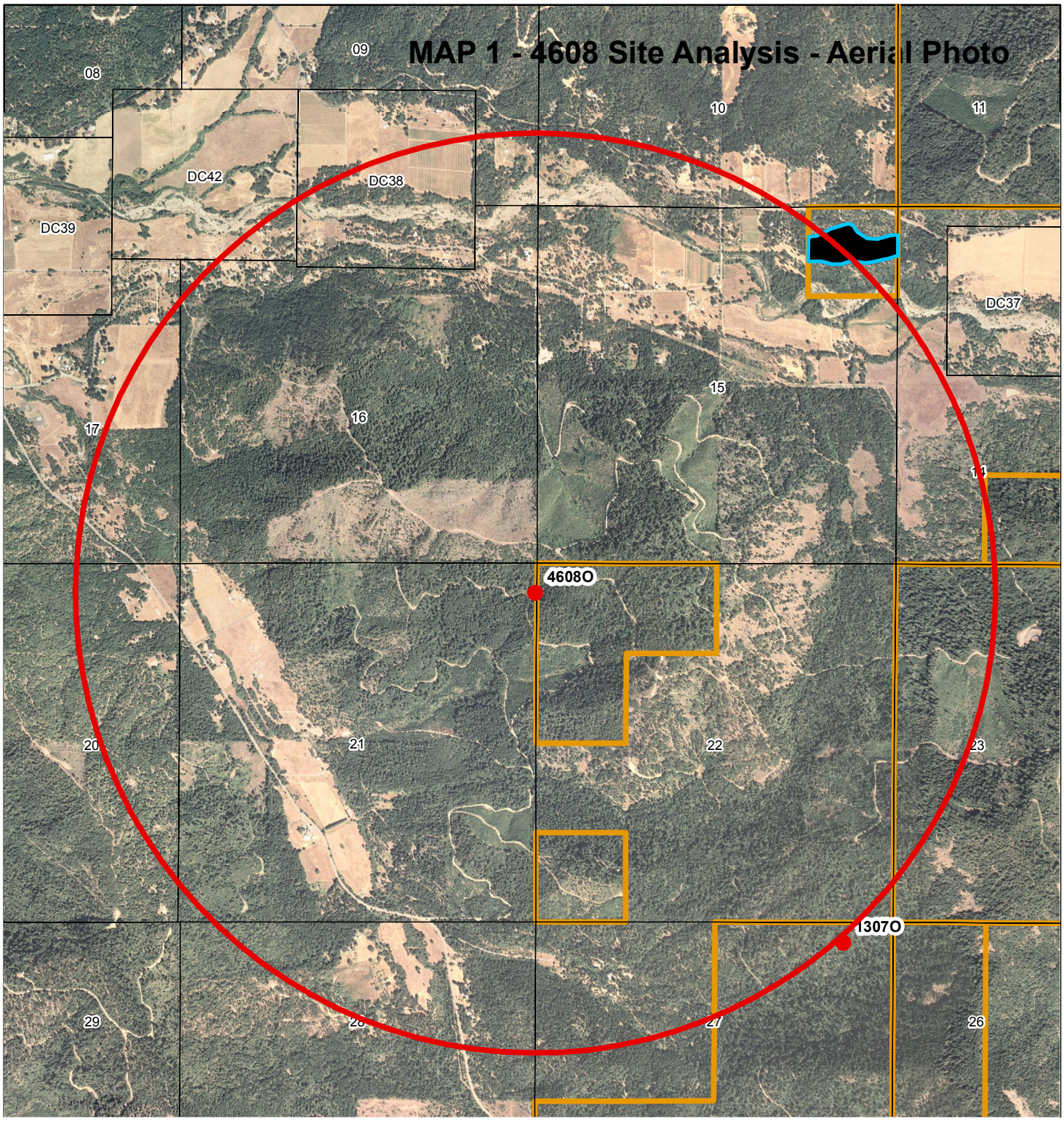
Appendix D: Specific Site Analysis

Map 1—Site 4608 Analysis Aerial Photo

Map 2— Site 4608 Analysis Habitat Layer



NSO Sites

- Generated
- Historic
- 1.3 mile home range

PROJECT UNITS

- DISPERSAL MAINTAINED
- DISPERSAL REMOVED
- NRF DOWNGRADE
- NRF REMOVED

Ownership

- BLM

N

Miles

0 0.25 0.5 1

Prepared by: R.Snider. 4/26/10

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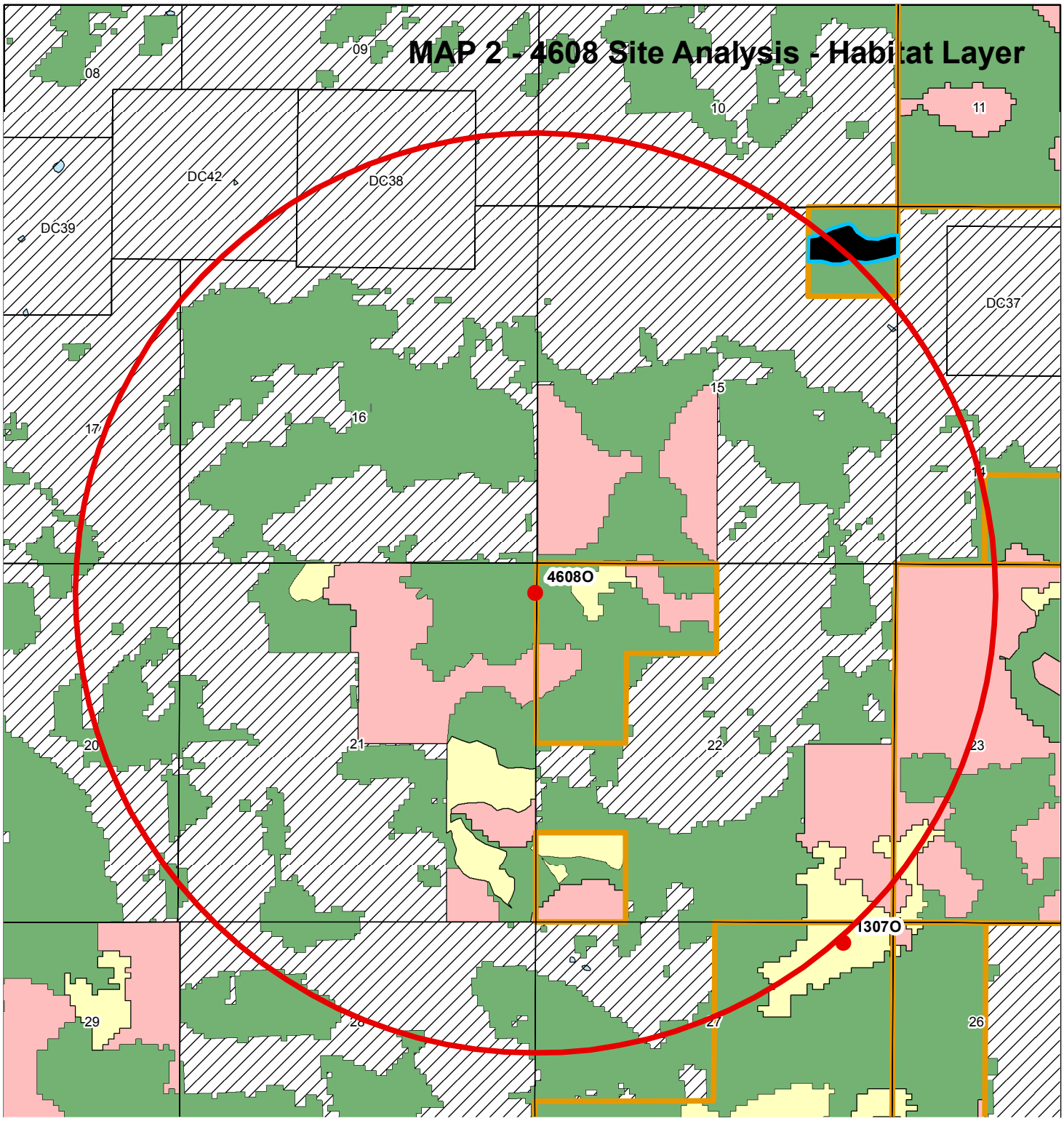
MAP 2 - 4608 Site Analysis - Habitat Layer



NSO Sites
- Generated
- Historic
- 1.3 mile home range

Ownership
- BLM

PROJECT UNITS
- DISPERSAL MAINTAINED
- DISPERSAL REMOVED
- NRF DOWNGRADE
- NRF REMOVED

Habitat Type
- Private - Non-Habitat
- Capable
- Dispersal
- NRF

N

Miles
0 0.25 0.5 1

Prepared by: R.Snider. 4/26/10

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