Appendix G: Wildlife Biological Assessment

Submitted July 24, 2015

USDA United States Department of Agriculture
Forest Service
Klamath National Forest
Supervisor's Office
1711 S. Main Street
Yreka, CA 96097-9518
530-842-6131
TDD: 530-841-4573

File Code: 2670
Date: July 24, 2015

Erin Williams
Field Supervisors
USFS Fish and Wildlife Service
1829 S. Oregon Street
Yreka, CA 96097

Dear Ms. Williams:

The Klamath National Forest has determined through the enclosed Biological Assessment that the proposed Westside Fire Recovery Project on the Happy Camp/Oak Knoll and Salmon/Scott River Ranger Districts is likely to adversely affect Northern Spotted Owl and Northern Spotted Owl critical habitat. As a result of consultation, I have made substantial reductions or modifications to the actions that were presented in the previously submitted Biological Assessment and letter requesting consultation dated April 22, 2015.

During the consultation process, your office has provided me recommendations covering about 2,600 acres of specific salvage harvest units. These recommendations included modifying prescriptions or completely removing salvage harvest from the proposal project to further reduce the effects to Northern Spotted Owls. After substantial consideration and discussion with my staff, I adjusted the proposed activities for consultation to the point practicable while balancing the purpose and need of the project. As a result, I decided to remove about 2,950 acres of salvage harvest from consultation. About 1,170 acres of salvage harvest removed overlap your recommendations while the remaining 1,780 acres of salvage harvest were removed for other reasons. It is important to note that while these 1,780 acres of deleted treatment were not included in the Service's earlier request for reduction, this reduced treatment will also lower the amount of disturbance and further reduce the effects to Northern Spotted Owl and its critical habitat.

In addition to the salvage harvest removed from consultation, my specialists have identified about 1,085 acres of retention areas in salvage units (i.e. hydrologic riparian reserves and snag retention patches) that will not be salvage harvested. These acres represent the minimum amount of retention and may increase as other retention areas may be added after sites have been identified for other wildlife species and possibly other resource concerns.

In addition to the reduction of salvage harvest, I have also considered reducing the amount of site preparation and planting and modifying the prescription for roadside hazard tree removal as part of your recommendations. About 780 acres of site preparation and planting were recommended by your office to be removed from the project proposal to reduce the amount of disturbance to the adjacent Northern Spotted Owl suitable habitat. After consideration of the possible effects to the Northern Spotted Owl and the potential benefits of site preparation and planting, I decided to remove about 420 acres of site preparation and planting from consultation. The roadside hazard

prescription was adjusted to focus on hazards created by the fire which will likely reduce the effects to habitat and the amount of disturbance to Northern Spotted Owls. It is important to know that, regardless of the Westside Fire Recovery Project, roadside hazards will continue to be evaluated as part of the Forest's regular operations and imminent roadside hazards will be reduced following the consultation process.

The other species evaluated in the Biological Assessment and determinations are summarized below. The project is outside of the range of the Marble Murrelet and, therefore, will have no effect on the Marble Murrelet or Marble Murrelet critical habitat. Although the project does occur within the range of the Yellow-billed Cuckoo or Yellow-billed Cuckoo critical habitat, the project will have no effect on Yellow-billed Cuckoo or Yellow-billed Cuckoo critical habitat. The project occurs within the possible range of the gray wolf and, for reasons disclosed in the Biological Assessment, the project is expected to have no effect on the gray wolf or gray wolf critical habitat. Finally, the Shasta crayfish, Oregon spotted frog, and vernal pool fairy shrimp, vernal pool tadpole shrimp, and Conservancy fairy shrimp may occur within Siskiyou County and, for reasons disclosed in the Biological Assessment, the project will have no effect on these species or their critical habitat. The fisher, currently identified as proposed for federal listing as threatened by the U.S. Fish and Wildlife Service, is not analyzed in this Biological Assessment, thus conferencing on this species is not requested at this time.

I am requesting formal consultation pursuant to Section 7 of the Endangered Species Act, as amended, regarding the effects of this project on the Northern Spotted Owl and its critical habitat.

Please call Chad Bell, Forest Biologist, at (530) 841-4416, if you have any questions.

Sincerely,

PATRICIA GRANTHAM
Forest Supervisor

USDA

United States
Department of
Agriculture

Forest
Service

July 23, 2015

Wildlife Biological Assessment

Westside Fire Recovery Project

Happy Camp/Oak Knoll and Salmon/Scott Ranger Districts
Siskiyou County, California

Prepared by: _____ **Date:** July 23, 2015

Patricia Johnson
Wildlife Biologist
US Forest Service
VMS Enterprise Unit

Reviewed by _____ **Date:** July 23, 2015

Chad Bell
Wildlife Biologist
Klamath National Forest

Approved by: _____ **Date:** 7.23.15

Patricia Grantham
Forest Supervisor
Klamath National Forest

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Summary of Project Modifications since the Submission of the Draft Biological Assessment

The actions proposed for the Westside Fire Recovery project have changed considerably between the Draft Biological Assessment and this analysis as a result of the consideration of multiple factors including, but not limited to: public comments, more detailed economic evaluations, additional on-the-ground evaluations, additional interdisciplinary review, additional minimization measures for effects to northern spotted owls (NSO), recommendations from the National Marine Fisheries Service, tribal governments, and the US Fish and Wildlife Service.

The NSO analysis area has been reduced in size to capture a reduced treatment footprint. The total number of NSO activity centers (AC) affected by the proposed treatments has subsequently been reduced from 94 to **85**, including one AC that was added as a result of newly detected NSOs that occurred outside of a known AC (see 2015 Survey Summary below). Ten activity centers were dropped from the analysis between the draft and the final BA due to the re-delineation of the analysis area bounding as a result of treatments either being removed or altered. Activity centers **0210, 0269, 0350, 0352, 0358, 1165, 4095, 4097, 4189**, and **0096B** are not further analyzed in this document because no activities are proposed within the core or home range for this consultation. The remaining 84 activity centers and the one new activity center are the focus of this analysis.

In summary, the revised project proposal contains: fewer salvage harvest acres; a clarification of the prescription for site preparation and planting units to exclude from treatment trees that contain green limbs and any trees/snags greater than 10 inches dbh; an adjusted roadside fuels treatment prescription that is based on solar radiation, slope position and aspect, and proximity to NSO core areas; a refined method of identifying hazardous trees/fuels along roadsides to include only trees damaged by the 2014 fires and exclude roads that would require substantial maintenance to become drivable. Effects to

NSO from prescribed burning were re-evaluated and the determination of effect was adjusted to reflect a refined treatment prescription (see Direct and Indirect Effects section below).

I. Introduction

The Westside Fire Recovery Project was developed in response to the 2014 wildfires on the Happy Camp/Oak Knoll and Salmon/Scott River Ranger Districts of the Klamath National Forest (Forest). The 2014 fire season ultimately burned about 215,000 acres on the Forest, of which the Beaver Fire, the Happy Camp Complex, and the Whites Fire of the July Complex overlap the Westside Fire Recovery Project area.

The project area comprises 218,600 total acres, including 187,100 acres of National Forest System land and 31,500 acres of private land. For the analysis within the EIS, the project is divided into three subparts: project area A (Beaver Fire), project area B (Happy Camp Complex), and project area C (Whites Fire of the July Complex).

This Biological Assessment (BA) analyzes the potential effects of the proposed USDA Forest Service action, the Westside Fire Recovery Project, on threatened or endangered species listed under the Federal Endangered Species Act (ESA) or on their designated critical habitat In accordance with the ESA and regulatory guidance, we considered: only those organisms that appear on the official species list as seen in Table G-1(below), and

only those wildlife species under the regulatory jurisdiction of the U.S. Fish and Wildlife Service (USFWS) within the area of the project as determined by the USFWS. If warranted for analysis, fish and plant species found on the USFWS list under the jurisdiction of the National Marine Fisheries Service (NMFS) or USFWS will be considered in a separate document. Federally listed fish and plants are addressed in separate documents.

Species that will not be affected by the proposed activities will be considered briefly and eliminated, with justification, from further, more detailed consideration. We will consider in detail those species that may be present in the action area and may be affected by the proposed activities. We will also consider the effects of the proposed project on the primary constituent elements (PCEs) and/or physical and biological features of designated critical habitat that may be affected by the proposed activities.

This document is prepared in accordance with the requirements of the ESA and its implementing regulations. It is also prepared in accordance with current Forest Service (FS) policy and follows the standards established in Forest Service Manual direction (FSM 2670) and the guidance provided in the USFWS Consultation Handbook (USDI FWS and NMFS 1998). Additionally, this BA is prepared in coordination with the USFWS as agreed upon under the consultation process.

This analysis is based on the best scientific and commercial data available at the time this document was written. This includes information such as data collected from Forest databases, remote sensing vegetation analysis, direct surveys in the field, the most recent and appropriate scientific research or species information, and direct observation on site visits to the project area.

The project area occurs entirely within Siskiyou County; therefore, a county-wide list was generated from the United States Fish and Wildlife Service (USFWS) Proposed, Endangered, and Threatened species which may occur in or be affected by projects within Siskiyou County (IPaC Trust Resource Report #ULVXQ-EIAZF-GN7IH-BBWNE-ZWOMWU*)*; accessed most recently on July 8, 2015.

Table G-1: Federally listed species derived from the species portal lookup on the USFWS website (IPaC Trust Resource Report) on July 8, 2015 for Siskiyou County.

	Common Name	Scientific Name	Status	Critical Habitat Designated?	Critical Habitat to be analyzed in project area?
Invertebrates	Conservancy Fairy Shrimp	Branchinecta conservatio	E	Y	N
	Vernal pool fairy shrimp	Branchinechta lynchi	T	Y	N
	Vernal pool tadpole shrimp	Lepidurus packardi	E	Y	N
	Shasta crayfish	Pacifastacus fortis	E	N	N
Birds	Western yellow-billed cuckoo	Coccyzus americanus	T	N	N
	Northern spotted owl	Strix occidentalis caurina	T	Y	Y
	Marbled murrelet	Brachyramphus marmoratus	T	Y	N
Mammals	Gray wolf	Canis lupus	E	Y	N
	Fisher	Pekania pennanti	PT	P	N
Amphibians	Oregon spotted frog	Rana pretiosa	T	Y	N

Species Dropped from Detailed Discussion

Gray wolf (*Canis lupus*) - A single male gray wolf , designated OR7, was radio collared by the Oregon Department of Fish and Wildlife (ODFW) in February 2011. Tracking data from the collar indicates that this animal entered California on December 28, 2011. The wolf travelled hundreds of miles within California, and since April 2013 has returned to Oregon. The future movements of this animal are unpredictable. He may remain in Oregon or return to California. Most other recent "wolf" sightings in California have been found to be something else, such as a coyote, a dog or a hybrid wolf-dog. No wolf pairs or dens, and no documented rendezvous sites have been found in California in recent history. During his movements in northern California, OR7 did not enter the analysis area. There is no scientific evidence that wolves have occurred within the analysis area for over 100 years. The closest wolf is about 60 miles from the analysis area.

Although the wolf is unlikely to occupy the project area, the species could occur in or near the project area and not yet be detected. If a wolf were present in the project area, it would be most likely a dispersing individual. Wolves are generalist predators and if present in the project area, a wolf could find enough food to survive. Despite many reported observations of wolves in recent years made to the California Department of Fish and Wildlife, there has been no confirmed presence of the species, no den sites and

no rendezvous sites recorded anywhere near the project area. In addition, wolves generally avoid areas of concentrated human use such as the project area. If a wolf was present in the project area, the wolf would likely not be near any project activity that may create measurable effects to the species. Therefore, we conclude the project will have "**no effect**" on the gray wolf and will not be further discussed in this document.

Shasta crayfish (*Pacifastacus fortis*) - The Shasta Crayfish occurs only in the mid-reaches of the Pit River drainage and is limited to Fall River, Hat Creek and Sucker Springs Creek, and does not occur in any of the drainages associated with this project (USFWS December 19, 1994). The analysis area lies well outside the expected range of this species. Therefore, the project will have "**no effect"** on this species and it will not be further discussed in this document.

Oregon spotted frog (*Rana pretiosa*) - The areas proposed for treatment are well outside of the sub- basins where this species is either historically or currently extant[2], as identified in the Final Rule for Listing (USDI 2014), and there is therefore a discountable chance for it to occur within the project area. Therefore, this project will have "**no effect"** on this species and it will not be further discussed in this document.

Vernal pool fairy shrimp (*Branchinechta lynchi*) and

Vernal pool tadpole shrimp (*Lepidurus packardi)* - The analysis area is outside the range of vernal pool tadpole shrimp and does not contain suitable habitat for vernal pool fairy shrimp and will therefore have "**no effect"** on either species.

Western yellow-billed cuckoo (*Coccyzus americanus*) – The cuckoo is strongly associated with dense riparian vegetation typically composed of woodlands with low, scrubby, dense vegetation and surface water. In some areas, the cuckoo can be found in willow thickets or dogwood patches. On the Forest, cuckoo habitat is limited in distribution to small areas along the Klamath River. The Forest has no record of a cuckoo detection and the closest known detection is located on the Six Rivers National Forest near the mouth of the Eel River. The Westside Fire Recovery Project proposes no treatment within cuckoo habitat. The project will not modify habitat nor disturb potentially nesting cuckoo thus the project will have "**no effect**" on cuckoo. In addition, the Forest doesn't contain any cuckoo critical habitat thus this project will have "**no effect**" cuckoo critical habitat.

Marbled murrelet – *(Brachyramphus marmoratus)* - From 1992 to 1998, extensive protocol surveys were conducted in the area designated by the Forest Ecosystem Management Assessment Team (FEMAT) as "Zone 2", and included the majority of the western portion of the Klamath National Forest. No detections of marbled murrelet were made during these surveys and Zone 2 was relieved of the need to conduct further surveys or consultation by the USFWS *(*see *Status and Distribution of the Marble Murrelet in Interior Northwestern California: Final Report* (May 18, 2000).

2 Lost River sub-basin: Lower Klamath Lake, Upper Pit River sub-basin: Pine Creek-South Pit River (near Alturas), Lower Pit River sub-basin: Town of Pittville-Pit River (near Fall River Mills).

On July 20, 2000, the Klamath National Forest received a letter, *Technical Assistance on the Final Results of the Status of the Marble Murrelet in Interior Northwestern California*, from the USFWS regarding future consultation within marbled murrelet Zone 2. The USFWS letter clarified the implications of negative survey results within the study area, and stated, "…implementation of existing and future projects in this area will not result in harassment of nesting marbled murrelets; therefore, section 7 consultation relative to disturbance of marble murrelets will not be necessary." The USFWS also supports the Forest Service recommendation to discontinue any further surveys for murrelets in the central study area (Zone 2).

The 2011 Revised Critical Habitat rule acknowledged a very low likelihood of murrelet occupancy in the eastern portion of Zone 1 and within Zone 2 between the Klamath River and the Oregon border. The proposed treatments are either in Zone 2 or outside of any marbled murrelet zone. In addition, no marbled murrelet Critical Habitat occurs within the proposed project area. Therefore, it was deemed extremely unlikely that any marbled murrelets would occur within the project area or be affected by the proposed activities. Thus, while the marbled murrelet was listed in the IPaC species list provided by the USFWS website on July 8, 2015, effects to this species and/or its Critical Habitat will not be discussed further in this analysis.

Fisher (*Pekania pennanti*) - The fisher will be addressed through the conferencing process with the US Fish and Wildlife Service as a Proposed Threatened species under the Endangered Species Act. For more information on the fisher, see the project Wildlife Biological Evaluation.

II. Consistency with Recovery Plans and Other Guidance

The content of this BA complies with legal requirements set forth under Section 7 of the Endangered Species Act (19 U. S. C. 1536 (c), 50 CFR 402), and standards established in Forest Service Manual direction (FSM 2672.42).

Northern spotted owl (NSO) Critical Habitat: In the 2012 designation of NSO critical habitat, the U.S. Fish and Wildlife (USFWS) developed suggestions for managing within critical habitat. These suggestions included conserving high quality habitat and actively managing forests to restore ecosystem health such as natural fire regimes. Although the Final Rule doesn't explicitly address the use of post-fire harvest of dead trees within critical habitat, the USFWS did comment on the need to conserve and recruit high quality NSO habitat and the need for late-successional reserve (LSR) management to be consistent with Standard and Guides of the Northwest Forest Plan (NWFP).

Northwest Forest Plan (NWFP): The NWFP was adopted in 1994 to guide the management of more than 9.7 million hectares (24 million acres) of Federal land in portions of western Washington and Oregon, and northwestern California within the range of the NSO. The Klamath Forest Plan incorporates the NWFP and is intended to provide the basis for conservation of the NSO and other late-successional and old-growth forest associated species. The NWFP identifies the high risk of large scale disturbance in mixed conifer forests and suggests, in the event of a stand-replacing fire, the resulting excessive fuel loads may interfere with stand regeneration. Excessive fuel loads also elevate the potential for future fires that may expand into existing high quality habitat.

The Westside Fire Recovery Project uses the Forest Plan Standards and Guidelines to minimize impacts to habitat and reduce the risk of additional fires resulting from the excessive fuel load through land management. This project will not eliminate the potential of future fires within the project area but is intended to, in part, reduce the potential of large-scale high-severity fire which, in turn, will reduce the loss of additional habitat.

Forest-wide Late-Successional Reserve Assessment (LSRA): The Klamath Forest-wide Late-successional Reserve Assessment (1999) sets the objective that salvage effects in LSRs should be neutral and should have a long-term positive effect on late-successional habitat. Salvage should not diminish suitable habitat now or in the future.

NSO Recovery Plan: The 2011 NSO Revised Recovery Plan (RRP) was prepared by a Recovery Team consisting of Federal agencies, State governments, and other interested parties. The RRP was published in June 28, 2011 (USDI 2011). This replaced the 1992 Draft Recovery Plan which had been used as a foundation for the 1994 Northwest Forest Plan, and the 2008 Final Recovery Plan.

The 2011 RRP identifies three main threats to NSO (current and past habitat loss and competition with barred owls) and describes a Recovery Strategy which includes habitat conservation and active forest management as a means by which to address these threats. As a result, the RRP identified a series of Recovery Actions to guide activities that would contribute to recovery objectives. For this Project, Recovery Actions 10, 12, and 32 are most applicable.

Recovery plans are not regulatory documents and are not required to be addressed as part of Section 7 consultation under the ESA. However, in order to provide decision makers and the USFWS, with relevant information, and to address the general compliance requirements as listed under 7(a)(1) of Endangered Species Act, we have provided information regarding project consistency with the Recovery Plan in Table G-2. In addition, see Appendix B for a description of all other Recovery Actions and the manner in which they were addressed for this project.

Table G-2. Recovery Actions Applicable to the Westside Fire Recovery Project

Recovery Action	Description	Applicable Recommendations
10	Conserve spotted owl sites and high value spotted owl habitat to provide additional demographic support to the spotted owl population	Intent of this recovery action is to protect, enhance, and develop habitat in the quantity and distribution necessary to provide for the long-term recovery of spotted owls. Project design features (PDF) have been incorporated to maintain key habitat features such as large snags and large coarse woody debris. Proposed treatments were designed to minimize effects to existing habitat and promote stand development throughout the treatment areas. The treatments provide for long term improvement to the habitat by removing fuels and consequently reducing the potential of high severity fire moving across the treatment into existing NSO habitat. Sites have been categorized based on their potential to contribute to the demographic support of the NSO

Recovery Action	Description	Applicable Recommendations
		population in the area. The identification of activity centers identified as having high and moderate potential to contribute to demographic support resulted in reducing the estimated effects from the proposed activities. All salvage units proposed in core areas of High potential ACs, and the majority of the cores of Moderate potentialACs, were dropped from the project. Fuels treatment prescriptions have been adjusted to reduce the effects of overlapping roadside hazard and roadside fuels treatments in areas with low solar radiation (areas that are more likely to grow high quality NSO habitat now or in the future). Many of the areas with adjusted fuels prescriptions also occur in the core areas.
12	In lands where management is focused on development of spotted owl habitat, post-fire silvicultural activities should concentrate on conserving and restoring habitat elements that take a long time to develop (e.g., large trees, medium and large snags, downed wood)	Intent of this recovery action is to focus silvicultural activities on conserving and restoring habitat elements that take a long time to develop such as legacy components, large trees and snags, and large downed wood for the benefit of future stand development. Project design features (PDF) have been incorporated into the project to retain legacy component trees and snags that provide important habitat component in a developing stand of future suitable habitat and will contribute to future large woody debris.
32	Federal and non-federal landowners should work with the Service to maintain and restore older and more structurally complex multi-layered conifer forests …allowing for other threats, such as fire and insects to be addressed by restoration management actions.	Maintaining forests with high-quality habitat will provide additional support for reducing key threats faced by NSO; protecting these forests should provide NSO high-quality refugia habitat from negative competitive interactions with barred owls that are likely occurring where the two species' home ranges overlap. Salvage treatments will avoid stands that currently provide RA-32 characteristic, though some accidental damage may occur during implementation. Fuels treatments will contribute to the overall reduction of stand replacing fire within areas of high quality habitat through the strategic placement of fuel breaks and prescribed fire.

III. Consultation History

Timelines for the consultation process were adjusted by the consideration by the Forest Service and the Council on Environmental Quality that the Westside Fire Recovery project is an emergency action subject to the provisions of National Environmental Policy Act (NEPA) regulation 40 CFR 1506.11 Emergencies, which states:

Where emergency circumstances make it necessary to take an action with significant environmental impact without observing the provisions of these regulations, the Federal agency taking the action should consult with the Council about alternative arrangements. Agencies and the Council will limit such arrangements to actions necessary to control the immediate impacts of the emergency. Other actions remain subject to NEPA review.

In order to facilitate implementation of this project, the Forest Service requested and received alternative arrangements that shortened the 45-day comment period requirement for the draft EIS by 15 days, resulting in a 30 day comment period (40 CFR 1506.10(c)). The Forest subsequently extended the comment period for 15 days because of the scale

and complexity of the project and to allow the public to consider the information in this draft BA.

The Forest Service is also requesting alternative arrangements with the Council on Environmental Quality in order to:

Eliminate the 30-day wait period between the final EIS and the Record of Decision (40 CFR 1506.10(b)(2)).

The purpose for requesting alternative arrangements is to shorten the time required to publish a Record of Decision for the project so that salvage of fire-killed trees can begin as early in the summer of 2015 as possible.

Therefore, the consultation process and the preparation of the Biological Assessment were accelerated to try to accommodate this timeline. Throughout the project development multiple meetings were held between FS biologists and USFWS Level 1 biologists often weekly or biweekly ("Level 1" teams are comprised of biologists designated by their respective agency as team members. Their role is to assist the participating land management agencies in designing programs and activities in such a way to minimize or avoid adverse impacts to listed and proposed species, and designated critical habitat, and to further those species' conservation in accordance with the Endangered Species Act and its applicable implementing regulations. The Level 1 team may review project design, minimization measures, conservation measures, or preliminary effects determination in part of the consultation process).

A Draft Biological Assessment was submitted to the FWS Yreka office on April 2, 2015 with the preliminary determinations for each NSO activity center (AC) and the affected Critical Habitat. Comments were received back from FWS biologists on April 13, 2015. A revised version of the BA was submitted on April 16, 2015.

Forest Service biologists began addressing the list of essential information but during this time, concerns about the quantity of Likely to Adversely Affect determinations from the project were presented by the Regional Offices of both the Forest Service and the FWS. In response to concerns regarding effects to NSO from the actions consulted upon in the Draft BA, a review of additional ways to minimize impacts to NSO was undertaken.

The FS and FWS held numerous meetings from April through June 2015 during this time period with the goal of minimizing impacts while still meeting the Purpose and Need of the project. Additional measures were identified for project modifications, in order to reduce the number of adversely affected ACs and adverse impacts to Critical Habitat. The FWS provided multiple recommendations for modifications to the action consulted upon that would reduce impacts to NSO across the project area.

During this time, the public comment period on the Draft EIS was in effect and public meetings were being held. Much of the input from public comment was also considered during the process of adjusting prescriptions, reducing the treatment footprint and minimizing impacts to NSO. The actions considered for consultation are described in the analysis below. **The following BA is a modification of the BA submitted April 16, 2015, and consists of a revised analysis that considers the numerous changes made to the proposed activities since the original analysis consulted upon.** While there

continues to be over 50 adversely affected activity centers[3], the overall effects from the project have been greatly reduced since the original analysis. Working in consultation with USFWS, numerous measures have been brought into the project design with the intent of further reducing the potential for "Take[4]" to occur within the adversely affected ACs; so that while adverse effects may occur within a given AC, they may not necessarily result in Take occurring when analyzed by the USFWS.

IV. Description of the Proposed Activities

This section of the BA describes the Proposed Activities with modifications in project design that have occurred during the Level I consultation process. The actions described in this section are for the entire project may or may not include actions that are in northern spotted owl habitat. In the remainder of the BA, acres of treatment will refer only to the areas where treatment occurs in northern spotted owl habitat. The acres of treatment described for the Proposed Activities with modifications will not match the acres described for those activities in the remainder of the BA because there are portions of activities described in this section that occur outside of northern spotted owl habitat.

Table G-3: General location by project area

Project Area	Fire	Legal Location Township (T), Range (R), and Section (S)	Elevation Range (Feet)	Watershed (5th Field)
A	Beaver Fire	Mt.Diablo: T46N R8W S 2-7, 9-11; T46N R9W S1-13,18; T46N R10W S1-3,10-15;T47N R8W S4-10,15-22, 27-35; T47N R9W S1, 9-17, 20-36; T47N R10W S 25, 34-36	1,700-6,300	Beaver Creek, Horse Creek-Klamath River, Humbug Creek-Klamath River
B	Happy Camp Complex	Humboldt: T14N R8E S 5, 8,17, 20; T15N R7E S 1, 2,12,13, 24;T15N R8E S3-10,15-22, 27-28, 34; T16N R7E S1, 2,10-15, 23-25, 35, 36; T16N R8E S6-10,15-22, 27-34 Mt. Diablo: T43N R12W S2-11,14-20; T44N R10W S6; T44N R11W S1-11, 15-22, 28-30;T44N R12W S1-35; T45N R10W S5-9,16-21, 28-32; T45N R11W S1-36; T45N R12W S1-36; T46N R10W S31-32; T46N R11W S 16-22, 26-36; T46N R12W S 10-11,13-16, 20-36	1,100-7,400	Elk Creek, Horse Creek-Klamath River, Indian Creek,Lower Scott River, Seiad Creek-Klamath River, Thompson Creek-Klamath River, Ukonom Creek-Klamath River
C	Whites Fire	Mt.Diablo: T39N R10W S 1-11,17-18; T39N R11W S 1-3,10-15; T40N R8W S 6-7,18-19,30; T40N R10W S 2-36; T40N R11W S 1-4, 9-16, 21-28, 33-36; T41N R10W S 8-22, 27-35; T41N R11W S 24-25,33-36	2,200-8,000	French Creek-Scott River, North Fork Salmon River, South Fork Salmon River

Proposed Treatments

The Westside Fire Recovery project, as described in the Environmental Impact Statement (EIS) , includes the following overlapping treatment types plus the connected actions: (1) **5,760** acres of

[3] A determination of Likely to Adversely Affect NSO (LAA)

[4] Take is defined as an action that would "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

salvage units[5] (495 acres of snag retention patches and 643 acres of riparian reserves have been subtracted for this net total of salvage harvest); (2) **320** miles (and 14,320 acres) of roadside hazard tree removal; (3) **24,450** acres of hazardous fuel treatments - including wildland urban interface (WUI), fuel management zones (FMZ), roadside fuels reduction, and prescribed burning; and (4) **7,130** acres of site preparation, planting, and release in existing plantations and seedling/sapling natural stands that burned. All salvage harvest units will also be site prepped and replanted with appropriate mix of species. In addition, 317 miles of National Forest System, state, and county roads, would be used, 4.8 miles of previously decommissioned roads would be reopened, 4.6 miles of existing temporary roadbeds and 3.3 miles of new temporary roads would be constructed within the project area.

The overall footprint of the proposed treatments is 42,760 acres. Acres for each treatment cannot be totaled because multiple treatments overlap each other, for example, roadside fuels treatment overlaps hazard tree removal, and prescribed burning overlaps site preparation/planting and FMZs.

- **Salvage harvest treatment** will identify trees for harvest using the Report #RO-11-01 "*Marking Guidelines for Fire-Injured Trees in California*" (Smith & Cluck, 2011). These guidelines are peer-reviewed scientific literature used to evaluate tree species in northern California for mortality. Trees considered for salvage harvest removal include merchantable timber defined as trees greater than 14 inches in diameter. Fire-damaged trees with a 70 percent or higher probability of mortality in the next three to five years were included in the salvage harvest proposal. These treatments will be accomplished by a combination of ground-based, skyline, and helicopter logging systems. Consideration for treatment for the salvage harvest treatment units used the following criteria:
    - Areas of moderate to high severity vegetation mortality with more than ten contiguous acres of medium to high severity vegetation mortality, though unit boundaries may not be exactly coincident with the RAVG high burn severity and will reflect use of logical, on the ground bounding and implementation design, and less than 40 percent crown closure.
    - Areas determined to be feasible in terms of logging systems, accessibility, and economics.
- **Roadside hazard tree removal** - Dead or fire injured, dying trees that are likely to fall and impact a system road and that have been determined to have a 60 percent or greater chance of mortality within the next 3 to 5 years due to fire (as indicated by "Marking Guidelines for Fire Injured Trees"; Smith and Cluck 2011) will be felled and/or harvested. The vast majority of trees to be harvested occur within areas of high and moderate fire severity (RAVG grid code 3 and 4), and generally within larger blocks of high tree mortality. Areas indicated by RAVG as grid code 2 had lower severity fire and are presumed to contain fewer fire-killed trees; though these areas are indicated as having between 25 to 50 percent basal area lost, with varying levels of tree mortality. Grid code 1 is indicative of a range from 0 to 25 percent basal area lost and so is either unburned or slightly burned to the degree that very minimal change is detected in the overstory canopy or basal area. These areas are less likely to contain fire killed trees, and as a result, would have very few, if any, trees removed. Within these low severity areas, there is a small chance that an occasional tree (or small pocket of trees) may have been killed by the fire and would therefore be identified as a hazard to the road, but this is expected to be infrequent and only occur sporadically across the project area. Areas that show no sign of having burned are not targeted for hazard tree removal. Roads that are not

5 Salvage harvest acres do not include Riparian Reserves and snag retention patches. These areas are part of the salvage unit, but will not be harvested.

currently drivable and that would require substantial work to open are not considered for hazard tree removal.

Approximately 14,320 acres would be considered for roadside hazard tree removal on 320 miles of roads. Acres used for the analysis were calculated using RAVG fire severity classes within a 200 foot buffer on either side of affected roads.

- **Hazardous Fuels Treatment** areas were considered based on the following criteria:
  - 200 feet on either side of selected Forest roads (including maintenance level 1 roads), prioritized based on volume of road use, evacuation routes, and ridge-top roads used for suppression efforts.
  - 250 feet on either side of historically-significant ridgelines for fire suppression efforts.
  - Areas determined feasible in terms of slope, accessibility, existing fuels conditions, and logical holding features (i.e. roads, streams, and ridges) and amount of solar radiation.

  Hazardous fuels treatments include wildland urban interface, roadside fuels treatments, fuels management zones, and prescribed burn. The following are summarized descriptions of each treatment type.

  1. Wildland Urban Interface (2,630 ac.) and Roadside Fuels Treatments (5,710 ac.): A combination of mechanical, mastication, and hand work is proposed. Treatment will include a combination of cutting dead trees between eight and 14 inches in diameter. Other understory vegetation, including conifers and hardwoods two feet or taller and less than eight inches in diameter will be thinned. Brush greater than two feet tall will be cut. After treatment, activity generated slash and brush will be piled, covered with waxed paper or black plastic sheeting, and burned. Retained conifers and hardwoods will be pruned up to seven feet above the ground on the uphill side of the tree to increase canopy base height, and reduce ladder fuels and the potential for crown fire. Hanging branches will be removed if they hang below seven feet above ground level. Areas identified as WUI or roadside fuels will be treated differently based on solar radiation exposure, slope, and aspect. Hot Slope and Cool Slope treatments are described below:
     - "Hot Slope" or complete—complete understory treatments are proposed in areas of higher solar radiation, including upper slope positions and easterly and southerly aspects. Leave trees that contain a mixture of hardwood and conifer species with good color and vigor will be retained.
     - "Cool Slope" or modified—modified understory treatments are proposed in areas with important wildlife habitat elements and areas of low solar radiation, including northerly and easterly slopes and lower slopes all aspects. Leave trees will be retained in mosaic pattern, incorporating clumps of at least 0.25 acres in size, which will be interspersed throughout areas proposed for modified understory WUI and roadside fuels treatment and will cover 10 to 20 percent of the treated area. Preference for retention will be hardwoods located away from areas identified as strategic for fuels reduction (e.g. future locations to hold fire line for planned or unplanned fire within the project area).
  2. Fuels Management Zones (4,930 ac.): maintain existing strategic ridge systems used to contain the 2014 fires as well as historic fire lines from previous large fires within the project area. Treatments will include removing all dead vegetation and live understory vegetation along with live conifer trees less than 12 inches in diameter at breast height. Pruning retained conifers up to seven feet high within these zones will increase canopy

base height and reduce the potential for crown fire initiation. Activity-generated fuels will be disposed of by a variety of methods to meet desired conditions.

3. Prescribed Burning (11,180 ac.): will use existing control lines established in recent large fires within the project area. Line construction activities will occur around the perimeter of the fire and will include using dozers to re-scrape control lines to mineral soil; where control lines are inaccessible for equipment, handline construction to mineral soil will occur.

- **Site preparation, planting, and release treatments** include treatment in plantations, natural stands (non-salvage harvested), and salvage harvest stands. The following is a summary of each treatment:

  1. Site preparation will include mastication, windrowing, and piling of dead material generally up to 10 inches in diameter. Hand treatments will include the cutting and piling of dead fuels up to 10 inches in diameter. No green trees or hardwoods would be removed for site preparation. Habitat identified as NRF, PFF, or FANR is not targeted with this treatment type (see habitat definitions below).

  2. Reforestation will be accomplished using hand methods to plant either bare root or container stock seedlings. Hand planting will increase the likelihood for survival and provide for the desired spatial variability within treatment units and across the project area. Tree species used for planting will include Douglas-fir, sugar pine, ponderosa pine, incense cedar, white fir, and red fir. A mosaic distribution will be achieved over time due to the spatial variability achieved by the planters' micro-site selection. An average of 130 to 300 trees per acre will be planted to achieve acceptable levels of stocking, depending on the site conditions. The goal for planted areas is to have a variable spaced conifer stand with a mix of species, densities and distribution. In general, understory brush will naturally regenerate in areas where grubbing around seedlings does not occur.

  3. Release includes manually removing all vegetation within a *maximum* of a five-foot radius from a planted or naturally regenerated conifer seedling (grubbing). This will result in approximately 40 percent of a given acre to be treated (i.e. grubbing and planting), with the remaining 60 percent regenerated naturally in herbaceous and brush vegetation; thereby avoiding the "row crop" appearance of older style plantations.

- Riparian reserves within the plantation site-preparation and planting units would receive site-preparation as needed to achieve ground cover and allow for natural regeneration of vegetation. Treatment will be focused in areas of high and moderate vegetation mortality and where the overhead hazards can be mitigated without equipment entry into the riparian reserves. Treatment will include hand-work only (no ground-based equipment) and lop-and-scatter or other fuels reduction will be implemented if fuel loading is above seven tons per acre; fuels may be hand-piled or windrowed and burned.

- Landing size will be commensurate with operational safety, using existing landings where possible. Helicopter landings will be up to two acres in size. Skyline landings will utilize roads wherever possible; new skyline landings off the road system, and ground-based landings, will average one acre in size but will not be larger than 1.5 acres in size.

- Patches of PFF1 (defined below) would be retained within salvage units where retention of the riparian reserve would not provide desired levels of connectivity between unburned or lightly burned suitable habitat. These areas are patchily distributed throughout the project

area, but are generally placed in larger units where large openings would have been created by the salvage harvest. These areas are also intended to provide snags and large downed logs for the future development of the stand (see description of direct/indirect effects of salvage harvest for more detail).

Proposed Treatment Implementation Methods

Proposed activities described above will use a variety of manual and mechanical methods. The three primary implementation methods will be ground based, cable yarding, and helicopter for extracting logs. Road construction, re-construction, and maintenance will use various equipment types such as bulldozers and excavators. Log trucks and pickup trucks will travel many of the roads in the project area at different levels and be typically concentrated in areas that are currently being implemented. Chainsaws and other small hand equipment will likely be used in all treatment units.

Prescribed fire treatments will use a variety of techniques to reduce the fuels within the treatment units. The fuels treatment method usually depends on the post-implementation fuel levels. High fuel levels may require a different prescription than areas with low fuel levels. Fuels treatments will occur over the next several years.

Project Design Features

The project design features listed in the following table shows the design features pertinent to this analysis and not a complete list of all project design features. The complete list of all project design features can be found in chapter 2 of the Environmental Impact Statement.

Table G-4: Project design features pertinent to this analysis.

Project Design Feature #	Description	Applicable Units
Wildlife – 1	A survey strategy has been developed in coordination with Fish and Wildlife Service for northern spotted owl (NSO) surveys. **Three NSO surveys will be completed each year prior to project implementation, except for roads identified as major ingress/egress access roads that do not occur within occupied core areas** (see Ingress/Egress roads discussion below). If surveys result in a positive detection of NSO, then: No treatment will occur within occupied core areas from February 1 to July 9 unless nesting is confirmed or suspected, then no treatment within the core area until after September 15. No treatment will occur within 0.25 miles of unsurveyed suitable NSO nesting/roosting or foraging habitat (as identified by the project biologist and FWS consultation) prior to July 9, except for the following areas: Units 005-9-1, 22, 23, 23-15, 23-16, 23-17, 23-18, 23-19, 23-30, 51, 52, 56-1-1, 56-2, 58, 059, 520, 523, 524, 525-1, and 525-2 **INGRESS/EGRESS ROADS with Roadside Hazard Treatment:** Limited Operating Periods will **not** apply to ingress/egress roadside hazard treatments occurring *outside* occupied core areas (as determined by the most recent surveys).	All units where applicable

Project Design Feature #	Description	Applicable Units
	Limited Operating Periods will apply to ingress/egress roadside hazard treatments occurring ***within*** occupied core areas (as determined by the most recent surveys); so treatments will not occur until after July 9. Unless nesting is suspected or confirmed then treatments will not occur within the occupied core area until after Sept. 15. Six NSO surveys will be completed along ingress/egress roads, though 3 surveys may or may not be completed prior to implementation.	
Wildlife – 2	No more than 50 percent of the suitable nesting/roosting, and foraging habitat within an occupied NSO core area and no more than 50 percent of the nesting/roosting, and foraging suitable habitat within an occupied NSO home range will be underburned annually. Underburning will not occur within occupied core areas between February 1 to September 15.	All units where applicable
Wildlife – 7	No roadside treatment between March 1 and June 15 to avoid disturbance of denning fisher.	ML1 roads
Wildlife – 11	Legacy Components Retention for Late Successional Habitat Retain legacy component trees and snags in treatment units. These legacy components will be identified using physical characteristics. • Legacy trees or snag size will vary depending on site condition, but are usually disproportionately large diameter trees that are often remnants of the previous stand on a given site. They are old standing trees that have persisted on the landscape after man-made and/or natural disturbances. For example, large trees containing one or more of the following characteristics: split or broken tops, heavy decadent branching, large mistletoe brooms, otherwise damaged to the degree that a cavity may form such as basal fire or lightning scars, or other features that indicate decay or defect. If the legacy component tree or snag must be felled for safety reasons, retain the log whole in the unit.	All units where applicable
Wildlife – 12	Snags or dying trees that contain cat faces, broken or forked tops, hollows or cavities, burned out cavities, or those that are otherwise damaged to the degree that a cavity may form will be favored for retention. Retain all large hardwood snags or live trees where practicable, particularly those with cavities, broken or split tops, or large broken branches.	All units where applicable
Wildlife – 13	Retain pre-existing (existing prior to the wildfire) conifer and hardwood snags (greater than 14 inches in diameter at breast height) and pre-existing coarse woody debris in the salvage	All units where applicable

Project Design Feature #	Description	Applicable Units
	units. If any pre-existing snags must be felled for safety reasons, these will be left on landscape whole as coarse wood.	
Wildlife – 14	Avoid placing cable corridors through retention patches or any actions that would potentially damage retention areas whenever possible.	All units where applicable
Wildlife – 15	Leave cull trees (greater than or equal to 20inches in diameter) in roadside units where possible. Leave as whole logs where practicable.	All units where applicable
Wildlife - 16	Avoid all salvage harvest within delineated retention patches.	All units where applicable
Wildlife—19	Trees without fire damage will not be removed from within roadside hazard tree units unless they are an immediate hazard.	All hazard tree units

V. Methods and Definitions

Project Area: The 'project area' encompasses all the treatment units using logical, on-the-ground boundaries. This project has been divided into three sub groups for the analysis completed within the FEIS, defined by the 2014 fire perimeters. Sub-group "A" refers to the northern portion of the project area where the Beaver fire occurred; sub-group "B" refers to the largest, more central portion of the project area where the Happy Camp complex; and sub group "C" refers to the southern portion of the project area where the Whites fire burned. Each sub grouping is unique in its geography, land allocation, ownership, vegetative composition, and habitat components and are subsequently analyzed as such within the FEIS. However, this Biological Assessment generally lumps all subgroups into one analysis area in order to capture overall effects to NSO, with the exception of a site specific analysis for activity centers in the Beaver fire area.

Treatment Units: A subset of the Project Area where salvage harvest units, reforestation units, fuels treatments, and hazard trees would be felled or removed; and includes only the areas that would be directly impacted by the proposed activities.

Analysis Area: The analysis area is different for each analysis category: 1) habitat analysis, 2) critical habitat analysis, and 3) activity center analysis. The habitat analysis area is defined as the area within a 1.3 mile buffer of all proposed treatments. The critical habitat analysis area is defined as the portion of each individual critical habitat sub-unit within a 1.3 mile buffer of treatment units that occur within that critical habitat sub-unit. The activity centers selected for this analysis are those that have treatment occurring in the core or home range or that have the potential to be otherwise affected by the proposed treatments (i.e. noise disturbance).

Temporal Bounding: Temporal bounding for this analysis is both short term and long term. The short-term bounding is the time during project implementation because it is tied directly to the potential for noise disturbance and habitat alteration. The vast majority of the salvage harvest and hazard tree removal will be completed in the first two years; fuels treatments and site preparation and planting activities may continue for multiple years as funding allows. Long-term bounding is the time needed for a coniferous forest overstory to begin to recover from a severe wildfire and begin to retain its original functionality, or at least 40 years. This bounding also encompasses the time needed for the re-establishment of the understory components such as duff, litter and large

woody debris and any structural components that may have been lost to fire within the understory.

Core or Core area: "Core" or "core area" are used interchangeably and these terms are referring to the same area. The core is the area within a 0.5 mile buffer (~500 acres) centered on the most biologically relevant point; the center usually represents (in order of importance) an NSO nest, pair sighting, daytime detection, or individual detection.

Home range: The home range is typically defined as the area within a 1.3 mile radius from the center of the activity center (e.g. most recent nest site) which would include the core area; for the purpose of this analysis to explain effects in the core (0 to 0.5 mile) versus effects to the "outer ring" of the home range (0.5 to 1.3 mile), we are using the "core" and "home range" as two separate portions of the activity center. The core is defined above. The home range is the area that begins at 0.5 mile from the center point of the activity center and extends to a 1.3 mile radius circle (a donut shaped area 0.5 to 1.3 mile from the center of the activity center).

Activity Center (AC): For this analysis, an activity center is the combined area of the home range and core area; also referred to as an owl 'site'.

NRF: Nesting/Roosting and Foraging habitat – as defined in detail below.

PFF: Post-fire Foraging habitat – as defined in detail below.

FANR: Fire-Affected Nesting/Roosting habitat – as defined in detail below.

RAVG: RAVG data are essentially remotely sensed vegetation burn severity data that is derived from Landsat Thematic Mapper imagery. The pre-fire and post-fire sub-scenes were used to create a Relative Differenced Normalized Burn Ratio (RdNBR). The RdNBR is correlated to the variation of burn severity within a fire. The RdNBR data are calibrated with the Composite Burn Index (CBI) as well as tree mortality variables. See the USGS National Burn Severity Mapping web site at: http://burnseverity.cr.usgs.gov/fire_main.asp for generic information on fire severity mapping procedures. The severity ratings provided by the derived products are based on the vegetation burn severity. RAVG grid code severity ratings for changes in basal area were converted to a vector format and overlaid with the NSO EVEG habitat layer (pre-wildfire) for each fire perimeter.

Placement of Activity Centers: The center of an activity center is typically identified using survey data and habitat quality. We used the California Natural Diversity Database (CNDDB) and the Forest Service species observations and survey database (Natural Resource Information System) to identify the locations where NSO have been detected. Since these NSO detections span 30 or more years, the landscape has changed and some of the older locations may not reflect current habitat condition. Several natural and manmade disturbances have occurred and resulted in changes to habitat quality (e.g. foraging habitat), quantity (e.g. patch size), and distribution (e.g. distance between patches of habitat); all of which influence current NSO habitat use. Therefore, each AC placement was reviewed for this analysis in order to capture the most biologically relevant placement using the historic and/or most recent survey data.

We started with the known activity centers that have been compiled within the databases and all the survey data. Nest sites were the most biologically relevant location for activity center placement. Lacking nest site information, other observation information was used to place the

center of an activity center, such as pair detections, daytime detections, and single individuals (in order of relevance).

The most recent NSO detections were used for AC placement if more than one year of detections was available; with the most recent nest detection having the most relevance for placement. For example, an NSO nesting detection last year is typically a better placement of the center of an activity center than a nest location identified several years ago. However, the collection of the recent and past detections can provide insight into the concentrated area of use. Comparing these detections, known activity center locations, and current habitat conditions (quality, quality, and distribution), the activity center locations where adjusted as needed. NSO detections from 2015 surveys were used in adjusting NSO activity centers when available.

However, some ACs represent one pair of owls (i.e. one territory) but have two overlapping cores and/or home ranges. This can occur when one pair of NSO associated with an area is not found within the delineated circles of a given core area and is effectively sharing the two activity centers.

Also, in the past, numerous ACs were established using observations of a single individual NSO that was then not detected again in any of the following years of survey. This process resulted in the identification of many ACs that are unlikely to be currently active and do not accurately reflect current or past owl use of the area.

Without consistent, consecutive years of surveys, this process of identifying ACs very likely represents an inflated number of ACs across the project area. However, for this analysis, all ACs on record for the analysis area were analyzed, regardless of the improbably high number, because we lack consistent survey data; nor do we have uniquely marked owls that would help to identify possible AC shifts, possible AC losses, or newly established ACs.

Assumptions for this Analysis

The following assumptions were made for this Biological Assessment in order to establish a baseline of information for an analysis of effects on NSO and its critical habitat. The following list is an attempt to capture areas where knowledge gaps or uncertainty exist and where assumptions were needed in order to facilitate an effective analysis. The assumptions below are not a complete listing of all assumptions that must be made for any effects analysis, but are a description of the uncertainty for particular aspects of the species' biology, in the habitat and/or species location data, and/or where an increased potential exists for differing interpretations of the project design and assumptions were stated for clarity.

- The NSO habitat layer, derived from the EVEG 2007 remotely sensed data, provides a generally accurate depiction of NSO habitat at the scale at which it was used for this analysis; however, variations exist across the landscape, where habitat will be under-typed in some areas and over-typed in others; generally the habitat is depicted accurately. The majority of the uncertainty in the habitat typing within the layer stems from the category assigned to the habitat (i.e. 'nesting/roosting' or 'foraging'), but the designation as 'suitable' is generally correct.
- RAVG data are an accurate depiction of burn severities.

- The fire effects (RAVG) on pre-fire NSO habitat (EVEG) are accurate and the resulting change in habitat type or loss of habitat is accurate (see the crosswalk of changes to habitat below).
- NSO home ranges and core areas represent the "best" placement of an activity center that we can make given the lack of recent surveys for the majority of the project area and the uncertainty inherent in using simple circles to represent owl use patterns at the home range and core area scale. Level 1 biologists reviewed the most current known NSO observation data to within NRIS and CNDDB databases to establish the location of each activity center in the analysis area (see Placement of Activity Centers in Methods section above)
- When salvage units contain inclusions of habitat that burned at low severity (RAVG grid code 1 and 2), the areas that burned at low severity will not be harvested but will instead be delineated as retention clumps; these clumps will be excluded from treatment unless specific circumstances occur where implementation is hampered and these areas must be entered or crossed in order to access a road. When this occurs, all efforts will be made to retain trees that don't meet the set probability of mortality (70% probability of mortality for salvage units and 60% of mortality for roadside hazard). However, in order to account for this potential impact to NSO habitat, we are assuming that 10% of the total grid code 1 and 2 inclusions will be degraded to the point that the NRF may not function as NFR post-treatment due to residual or unintentional damage during implementation.
- When hazard trees are identified along roads that are not within burned areas they will occur as scattered individual trees that occur randomly and are generally widely spaced along the road; areas of unburned forest will not have a substantial opening of the canopy as a result of hazard tree removal.
- Core and home ranges that contain at least the recommended habitat minimums by the USFWS are likely to remain at their current activity center position and have similar habitat use patterns. For example, if an NSO pair returned to their activity center (given the AC contains at least the recommended habitat minimums in the core and home range), the pair will likely nest in the core or possibly in the same nest stand or even the same tree as it did before the 2014 fires.
- For cores that are below the recommended habitat minimums by the USFWS, NSO are much more likely to move outside the core but within the home range to find another nest site. This is likely to occur when the habitat in the core has burned at high severity, but the home range contains adequate suitable habitat. Similarly, NSO activity centers with home ranges that are below recommended habitat minimums are more likely to shift away from the burned habitat to areas that are unoccupied and contain higher levels of unburned, suitable habitat. This topic is discussed in more detail in the section describing Habitat Fitness Potential and how the activity centers were categorization as High, Moderate and Low Potential activity centers.
- Post-fire foraging (PFF) area is most likely to be used by NSO within 500 feet of an existing patch of suitable habitat (patch size is >5 acres of NR and F combined).
- PFF is not equivalent to foraging habitat, but PFF may provide foraging opportunity for NSO. Fire-affected nesting/roosting (FANR) is not equivalent to nesting/roosting habitat, but FANR may provide foraging opportunity for NSO.

Methods for Assessing Pre-fire NSO Habitat suitability

Pre-fire NSO habitat was analyzed using a combination of remote sensing data and on-the-ground assessments. EVEG 2007 (a remotely sensed contiguous GIS layer) was used in conjunction with aerial photography (using the 2009/2010 and 2012 National Agricultural Imagery Program

(NAIP)), field verification, and knowledge and expertise of district and forest personnel. Field reconnaissance was conducted during the fall, winter, and spring of 2014/2015.

Suitable NSO habitat is commonly separated into nesting/roosting, foraging, and dispersal habitat; these habitat types are described in detail in the NSO Recovery Plan (USDI 2011). Nesting/roosting is generally described as mid- to late-seral forests that contain stands of large trees with high canopy cover, multilayered canopies, and nesting platforms. Foraging habitat can be described as slightly reduced canopy cover, fewer large trees, and enough space for NSO to maneuver through the trees for hunting prey when compared to nesting/roosting habitat. Dispersal habitat contains a moderate level of canopy closure and trees large enough to provide shelter and potential foraging opportunities for traveling NSO, but does not contain adequate amounts of other essential habitat components for long term NSO occupation, reproduction or survival. For this analysis, suitable habitat is defined as stated above in this paragraph and is generally referencing NR and F unless otherwise specified. Determination of NSO habitat suitability also considers many factors including size of stand and adjacency to other habitat types which owls may use.

Multiple aspects of suitable habitat are required for habitat to be considered suitable or high quality habitat, such as the presence of defect and decay in the stand, large downed logs and snags, and the presence of water in appropriate distance and juxtaposition to stands that contain these attributes (USDI 2011). These habitat elements cannot be queried from the EVEG data; for specific areas of the project, these elements were assessed through field evaluation, NAIP imagery, and discussions with field personnel familiar with the project area vegetative conditions, so the actual quantity of suitable habitat may be somewhat overestimated. Due to the scope and scale of this project, it was not practicable to field validate the remotely sensed habitat data (EVEG) for all areas affected by all project activities, but the portion that was field evaluated showed that the NSO habitat layer was a reasonably accurate assessment of the NRF habitat on the ground. Where errors occurred it was generally in the splitting of NR from F rather than in the identification of suitable habitat. Even though NR and F are sometimes presented separately in this analysis, most of the analysis combines NR and F to reduce this potential error.

Methods for Assessing Effects to NSO Habitat from Wildfire

To evaluate post-fire habitat conditions, the fire severity data (RAVG) and the percent basal area loss in the RAVG classes described below were applied to; the project area, the EVEG NSO habitat layer, and the treatment units using GIS. Interpretation of the RAVG data allows the spatially explicit assessment of fire effects to vegetation, including changes in the live tree density and canopy cover. In addition to changes in vegetation from the wildfire, changes in vegetation from all sources are also captured in the analysis. Loss of vegetative cover from fire suppression actions of the 2014 fires was also captured and was incorporated into the post-fire habitat baseline. Fire suppression actions that affected habitat were captured and accounted for in the project level, post-fire habitat layer.

Burn severity is defined as the degree of environmental change caused by fire, or how much fire has affected the ecological community, and is generally analyzed on a landscape level. Burn severity can be related to changes in vegetation by comparing the pre-fire vegetation to the post-fire vegetation condition. Burn severity is used to determine the likely effects of fire on habitat. Fire intensity is the driver for burn severity, but that relationship is not necessarily constant, as the ecological community will show varying responses and degrees of sensitivity to fire (USGS-NPS 2010). With all fires, there is a large degree of heterogeneity and range between very low and very high impacts, which results in a mosaic of effects, including patches that remain relatively green among areas of high impact. Burn severity is a measure along that gradient of change (USGS-NPS 2010). General categories used to indicate burn severity, as described by the metadata associated with the RAVG data are as follows:

Very Low or Unchanged: 0% – 25% Basal Area (BA) killed; grid code 1: This means the area was indistinguishable from pre-fire conditions. This does not always indicate the area did not burn.

Low: 25% – 50% BA killed; grid code 2: This represents areas of surface fire with little change in cover and little mortality of the structurally dominant vegetation.

Moderate: 50% to 75% BA killed; grid code 3: This severity class indicates a mixture of effects between low and high on the structurally dominant vegetation.

High: 75% to 100% BA killed; grid code 4: This represents areas where the dominant vegetation incurred high to complete mortality.

Due to the availability of a recent, and relatively local, Biological Opinion from the US Fish and Wildlife Service (USFWS) on a post-fire timber harvest project proposed by the Bureau of Land Management in southern Oregon (*Douglas Complex Post-fire Salvage Project – June 2014*), considerable information has been compiled and reviewed on the impacts of both wildfire and post-fire management actions on NSO. As the regulatory agency, the USFWS is the authority on the recovery of NSO and the effects to NSO from actions proposed by the Forest. Therefore, the USFWS compilation and review of the most recent and pertinent research on NSO use of the post fire landscape, as well as the determination of effects from the actions proposed in the Douglas project, had considerable influence on the effects analysis for the proposed Westside Fire Recovery project. Information within Appendix C of the Douglas Biological Opinion has been incorporated into the analysis of NSO use of a post-fire landscape and the assessment effects from the proposed project.

The approach to the post-fire NSO habitat analysis incorporates aspects of recent research (for example, Eyes 2014, Comfort 2013, Irwin et al 2012, and Clark et al. 2013,) on spotted owl use of burned habitat and the expectations of NSO use patterns and site fidelity to areas within their territories that burned at various fire severities. Two specific aspects of the following post-fire habitat effects analysis were intended to incorporate the findings of many of these studies and were delineated as; 1) "**post-fire foraging**" areas and 2) "**fire-affected nesting/roosting"** areas. More detail on how these habitats are estimated to be affected by the proposed project is described in the Indirect and Direct Effects section below.

"Post-fire foraging" (PFF) areas were delineated in order to capture the potential for continued use by NSO of previously suitable NRF, at least until the ultimate deterioration of the burned habitat and loss of standing trees. Even with the loss of canopy cover and key habitat components generally associated with NRF habitat, studies indicate that burned areas can still function as foraging after the fire, depending on many factors including patch size, edge type, burn severity, and proximity to suitable unburned habitat and known owl sites (Bond et al. 2002, Bond et al. 2009; Clark 2007, Clark et al. 2011, and Clark et al. 2013). The Level 1 team recognized the importance of tracking this habitat and analyzing the effects from post-fire salvage with the assumption that foraging habitat is important for providing a food supply necessary for NSO survival and reproduction, and PFF, although physically different from foraging habitat, may provide foraging opportunity. In addition, research on spotted owl use of post-fire landscapes indicates that spotted owls that use these burned forests may be affected by post-fire salvage occurring within areas of post-fire foraging (USDI 2011).

As described above, the EVEG NSO Habitat Layer provided the baseline of suitable NRF that existed prior to the fire (a.k.a. pre-fire NRF). Post-fire foraging habitat was then determined by applying the RAVG data to the pre-fire NRF. PFF was delineated where moderate fire severity (grid code 3) or high fire severity (grid code 4) occurred in pre-fire foraging habitat or where high fire severity occurred in pre-fire nesting/roosting habitat. Because a large portion of PFF is forest that burned at the highest severity and therefore contains minimal amounts of structure or cover,

it was anticipated that NSO would be less likely to use PFF when it occurred too far from existing cover. Recent research found that patch size and configuration of fire severity within a fire perimeter has a significant influence on how spotted owls will use the landscape (Comfort 2013). Comfort (2013) also found that where high-severity fire edges that occur as *small* patches dispersed in larger low-severity fire patches, habitat for small mammal prey may be improved by creating openings that allow for regeneration of brush and conifers, thereby increasing spotted owl use at these edges. However, edges that occur adjacent to *large* openings created by high-severity fire that may have improved prey habitat, but are farther from mature forest conditions , and therefore have a reduced level spotted owl use (Comfort 2013).

Comfort (2013) found that spotted owls had a strong negative association with hard edge after accounting for habitat suitability, disturbance severity, and amount of diffuse edge. Hard edge is often measured as the distance between suitable and non-suitable habitat (Comfort 2013). Hard edges may be created by disturbance events such as high-severity fire or logging where the disturbance is adjacent to mature forest. Diffuse edges often occur where less severe disturbance has occurred, or as the hard edges age. In most landscapes edges generally occur as a gradient depending on factors such as the severity of fire/disturbance and the pre-fire vegetation type. Diffuse edges may also create better access for hunting small mammals, in general, while simultaneously providing adjacent closed canopy cover habitat. Shrub fields adjacent to old forests may increase NSO's access to woodrats, who travel between the shrubs fields and openings in the old forest (Sakai and Noon 1997).

The research does not provide a precise distance that an owl may venture from the edge of suitable habitat into high severity burned areas; nor does it provide a way to measure the relative value of a particular edge for NSO, and the subsequent expected use of that edge. This is most likely due to the highly variable conditions present in any given wildfire or similar disturbance and the subsequent inability to make site specific recommendations for such a wide variety of conditions.

In order to incorporate the information described above on NSO use along the edge of habitat in a post fire landscape, the post-fire foraging (PFF) was further refined; using GIS, a 500-foot buffer was applied to areas of currently suitable NRF (greater than 5 acres), and overlaid with PFF. When PFF occurred **within this 500-foot buffer**, it was identified as **PFF1**. When PFF occurred outside this 500-foot buffer, it was identified as PFF2 (see below).

We estimated the most likely maximum distance NSO would venture out from the edge between habitat burned at low severity into habitat burned at high severity to be approximately 500 feet. This distance was derived from a review of recent literature on the use of edge habitat (Comfort 2013; Eyes 2014) and in consultation with Level 1 USFWS biologists, and professional judgment, and is anecdotally supported by our observations from 2015 surveys. Using NSO standard protocol surveys within post-fire habitat within the analysis area, we have consistently found NSO within suitable habitat or within 250 feet from the edge of suitable habitat using daytime and nighttime survey methods. Our 2015 data has 57 NSO daytime and nighttime combined locations and 53 of those detection locations are within NSO habitat or within 250 feet of NSO habitat. We acknowledge that this information is preliminary, but may support the methodology used for our analysis of PFF. Additional information is available below in section called "New information resulting from the 2015 surveys"

Figure G-1: Contiguous areas burned at high severity with the lowest likelihood of NSO use due to a lack of cover and structure.

Figure G-2: Post-fire foraging habitat with limited cover and structure; possible foraging opportunities, but substantially reduced function for NSO.

When the same habitats and burn severities as described for PFF1 occurred **outside** of the 500-foot buffer, it was identified as **PFF2** and was mainly considered in the analysis of critical habitat and the development of future stand conditions rather than areas of likely use by NSO; however, it is acknowledged that use of these areas by foraging NSO is possible but less likely. An analysis of future habitat development was considered in the tracking of the post fire effects to habitat within designated critical habitat.

Within this analysis, when 'PFF' is described, it is in reference to PFF1 unless otherwise specified. PFF2 is described for the critical habitat analysis and for the affected environment to differentiate between habitat types present in the analysis area.

"**Fire-affected nesting/roosting**" (FANR) areas were delineated for this analysis as nesting/roosting habitat that burned at moderate severity (grid code 3) because nesting/roosting habitat that has been affected at this level is not expected to function as nesting/roosting habitat that has been affected by low severity fire or unburned. Because stands of habitat that burn at grid code 3 can result in between 50 to 75% basal area loss, fire severity can result in a wide variety of stand conditions post-fire. If a stand was typed as nesting/roosting prior to the fire, it was comprised of high canopy closure and larger trees, among other variables. Therefore, if a fire burned at the low end of moderate severity (grid code 3, closer to 50% loss of basal area), then the stand may retain more canopy cover and sustained less tree mortality than a stand that burned at the higher end of moderate fire severity (grid code 3, closer to 75% basal area loss). Stands that burned at the higher end of moderate fire severity have more of the appearance of a high-severity burn and lack the characteristics necessary for cover and/or thermoregulation to be used as nesting/roosting or foraging habitat. Fire-affected nesting/roosting is a small portion of the total acres of NRF, PFF and FANR because FANR typically occurs on the fringes of high severity burn patches, in the transition zone between high and low burn severities of pre-fire NR habitat.

In this analysis, nesting/roosting habitat that burned at grid code 3 is categorized separately so that fire effects specific to these areas of habitat can be accounted for in the analysis and the role that this habitat type plays in NSO use of the post-fire landscape can be captured.

Figure G-3: NSO nesting/roosting habitat that burned at moderate severity (FANR) and the remaining structure that may provide foraging opportunities; shown with a small inclusion of lower burn severity.

Figure G-4: Higher levels of cover and structure in this FANR, with an increased potential for foraging for NSO.

Fire-affected nesting/roosting habitat is considered in this analysis as possibly providing foraging opportunity rather than as nesting/roosting because FANR no longer contains adequate cover and structure for nesting but it can contain enough prey habitat and perch structure to allow for effective foraging. When compared to PFF, FANR will generally have larger trees/snags on average that can provide more physical structure that is likely to persist standing for a longer period of time (assuming similar site conditions and disturbance). However, trees/snags in FANR will likely succumb to the eventual effects from the fire as many, but generally not all, of the trees in a stand that have burned at moderate severity will die, and many of these will fall, possibly as soon as 3 to 5 years of this analysis. In the short term, some of the fire-damaged trees will have needles and leaves and these trees may provide some cover for foraging NSO.

Figure G-5: Edge habitat in foreground and background.

Figure G-6: Edge habitat between areas burned at low severity adjacent to moderate and high severity, viewed at a distance.

The exact distance that NSO will forage into burned stands with limited cover is unknown; for this analysis we have assumed that NSO will venture into FANR to forage when these stands are juxtaposed with low severity and unburned stands of habitat. Recent research on NSO use of forest edges has indicated that they will use areas of transition between an opening (or area lacking sufficient cover) and suitable habitat for foraging but the extent of use depends on the amount of diffuse edge versus hard edge (Eyes 2014, Comfort 2013). Both of these studies indicated NSO use of diffuse edge, as would be found in FANR and areas of lower burn severity, but findings differed on the frequency and rate at which NSO will use these areas. We concluded from this research that NSO may use the FANR but to what extent is unknown.

PFF and FANR typing was heavily dependent upon EVEG data as well as the outputs of the post-fire RAVG assessment. However, individual salvage harvest units were visited and field validated for the presence of suitable habitat and the degree of modification or loss resulting from the wildfire. Therefore, assumptions of both habitat suitability and fire effects were made in order to facilitate a practical and timely evaluation of effects. Table 7 describes the outcome of this application and the result of the assumptions made for the effects of each RAVG class on NSO habitat suitability. Assumptions for post-fire habitat suitability derived from RAVG outcomes were agreed upon with the Level 1 consultation team.

Table G-5: Cross walk for assessing the post-fire NSO habitat type based on pre-fire habitat type and RAVG.

Pre-fire Habitat type	***RAVG Basal Area LOSS***			
	Grid code 1 0-25%	*Grid code 2 25-50%*	*Grid code 3 50-75%*	*Grid code 4 >75%*
Nesting/Roosting	Nesting/Roosting	Nesting/Roosting	**Fire-affected N/R****	**Post-Fire Foraging – (PFF1)** when occurring within 500' of *currently* suitable NRF*
Foraging	Foraging	Foraging	**Post-Fire Foraging (PFF1)** when occurring within 500' of *currently* suitable NRF*	**Post-Fire Foraging - (PFF1)** when occurring within 500' of *currently* suitable NRF*
Dispersal	Dispersal	Dispersal	Non-habitat	Non-habitat

*patches of NRF greater than 5 acres in size.

**FANR counts toward baseline amounts of NSO habitat as Foraging.

Methods for Analyzing NSO Habitat, Individual Activity Centers, and Critical Habitat

The northern spotted owl analysis is split into multiple biologically relevant spatial scales to estimate direct and indirect effects to habitat in: 1) the analysis area; 2) the activity center, or home range and core area combined (individual scale); and 3) the critical habitat (landscape scale). The habitat analysis estimates the number of acres of habitat affected by the proposed activities within the analysis area. The home range analysis estimates the effects of the proposed treatment on habitat within the NSO home range and resulting effects to NSO reproduction. The critical habitat analysis estimates the effects to habitat within critical habitat that may occur as a result of the proposed activities.

NSO Habitat Analysis: NSO Habitat was analyzed within the analysis area which encompasses an area larger than the project area.

Direct or indirect effects to habitat were assessed by estimating the level of change from the known existing habitat quality to the anticipated post-treatment habitat condition. Physical attributes such as canopy closure, basal area, and the quadratic mean diameter were used in this analysis. The resulting level of effects to the habitat was determined to be either no effect, degraded, downgraded, maintained/improve, or removed. No effect means that the action will not decrease the quality of habitat. Degrade means the effects are minimal and the habitat remains functional at the same level prior to treatment. Maintain/improve implies that treatments will have no meaningfully measurable negative effect to the quality of the habitat or may potentially increase the quality of the habitat. Downgrade means the habitat has been affected to the point where it will not continue to function at its initial level and it will drop down one level in habitat type. Downgrade to dispersal habitat means that habitat that was once either NR or F receives treatments that remove enough canopy closure of the previous cover and structure to lose function as NR or F but retain enough to function as dispersal habitat rather than a full habitat removal. Removal means the once functional habitat is no longer habitat.

NSO Activity Center Analysis: This analysis focuses on the potential effects to NSO territories by assessing potential effects to habitat at the two spatial scales: 1) home range; and 2) core area.

The core area is a 0.5-mile radius circle (~500 acres) used to delineate the area most heavily used by owls during the nesting season and is centered upon the most biologically relevant point representing (in order of importance) a nest, pair sighting, daytime detection, or individual NSO detection. Because the actual configuration of a home range is rarely known, the estimated mean annual home range of a northern spotted owl pair in the California Klamath Province is represented by a 1.3-mile radius circle (3,340 acres).

It is recognized that spotted owls may adjust the shape of their home ranges to encompass as much older forest habitat as possible (Carey et al. 1992). As such, the use of circles may not correspond exactly with the areas used by spotted owls which may be more defined by other factors such as topographic features (e.g., drainages), abundance and availability of prey species, and the distribution and/or abundance of competitors and predators (USDI 2011).

Temporal bounding for disturbance effects is narrowed to the time during project implementation when the possibility of disturbance is greatest to NSO, if present.

NSO Critical Habitat Analysis: Critical habitat analysis is focused on potential effects to the biologically important features (primary constituent elements) used to identify critical habitat. The areas within critical habitat that burned with moderate and high fire severity were delineated and identified as ‘fire-affected critical habitat’. These areas are made up of previously suitable NRF habitat that burned at moderate and high fire severity (RAVG grid code 3 and 4), and are intended to reflect the effects of the fires on the Primary Constituent Elements of critical habitat. Only changes to the Primary Constituent Elements as a result of proposed activities were analyzed.

Methods for Estimating Snag Retention in Salvage Units

In order to establish effects to overall habitat connectivity and future stand development, snag retention was quantified through an estimate derived from snag plot data samples.

About 70 plots were randomly identified within riparian reserves in salvage harvest units to measure the size and record the species and fate (dead or alive) of each tree within the plot. Plots were focused on riparian reserves because riparian reserves are generally representative of retention areas within salvage units, in terms of tree species and size class, and make up a large

proportion of the areas retained. The remaining retention areas are generally located within topographical features that resemble riparian reserves and consequently may contain similar tree species and size classes. The tree measurements and fate were recorded for each tree within a defined distance from the center of the plot. Although the tree species was recorded, we present the data as conifer and hardwood categories because the physical attributes of the trees and each tree's fate retained in the salvage units are the primary interests. Dead trees were defined as having a 70% or greater probability of mortality.

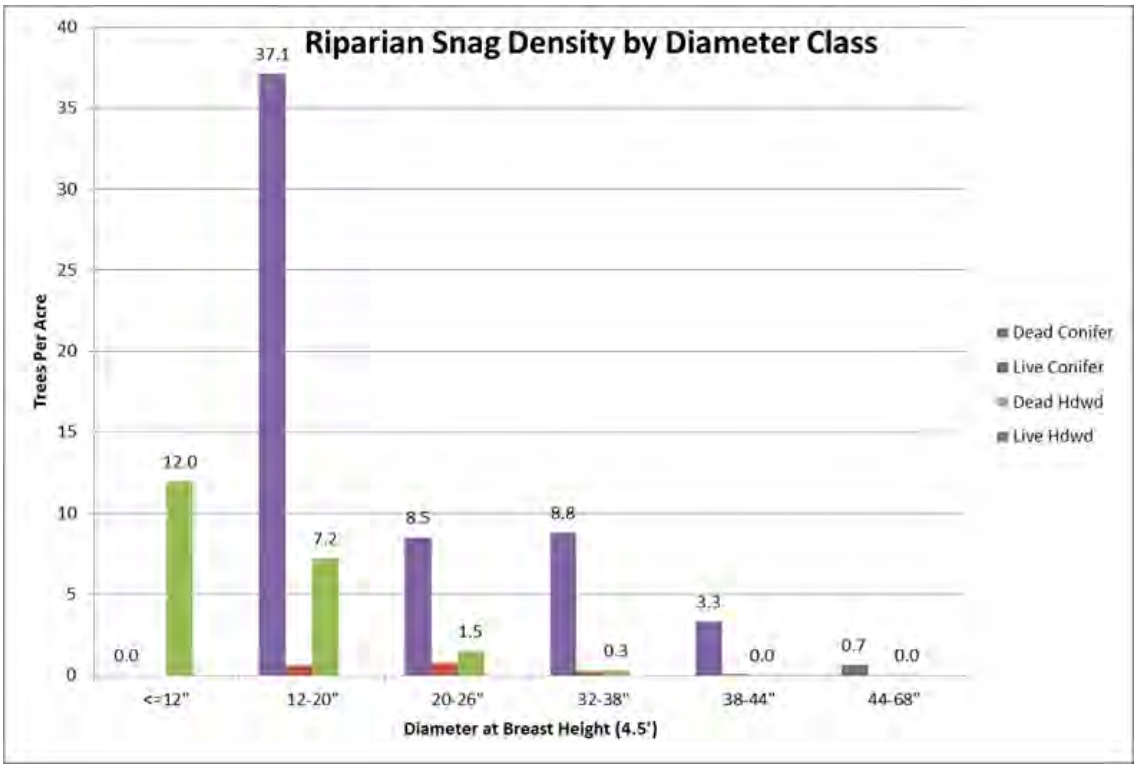

Figure G-7: Summary of tree and snag size class distribution within riparian reserves

Table G-6: Riparian reserves and retention patches occurring in salvage harvest units

Salvage Unit	Salvage Unit size (acres)[1]	Riparian Reserve (RR) in salvage unit (acres)	Retention Patches in salvage unit but outside of RR (acres)[2]	Sum of Retention (acres)[3]
3	31	0	0	0
5	144	4	9	12
21	11	0	0	0
22	115	3	22	25
23	571	31	63	94
32	295	13	59	71
35	16	0	0	0
36	26	0	0	0
39	28	0	0	0
40	34	0	0	0
50	96	0	13	13
51	254	10	53	63
52	84	0	4	4
53	50	1	14	15
54	14	0	0	0
55	193	1	29	30
56	95	18	16	34
57	26	4	0	4
58	563	46	52	98
59	12	6	0	6
60	214	27	17	45
61	170	16	24	40
62	129	57	5	62
64	10	3	1	4
65	50	0	0	0
203	30	0	0	0
204	32	0	0	0
206	14	0	0	0
208	32	0	5	5
209	5	0	0	0
212	45	0	0	0
213	14	0	0	0
224	61	6	0	6
226	73	23	0	23
227	16	0	0	0
228	55	0	9	9
243	151	19	16	35
262	33	0	0	0
263	26	2	0	2
265	35	0	0	0
266	7	0	0	0
268	20	0	0	0
400	15	0	0	0
403	10	0	0	0
406	123	55	0	55
407	16	0	0	0
409	48	8	0	8
410	11	0	0	0
411	30	5	0	5

Salvage Unit	Salvage Unit size (acres)[1]	Riparian Reserve (RR) in salvage unit (acres)	Retention Patches in salvage unit but outside of RR (acres)[2]	Sum of Retention (acres)[3]
414	22	1	0	1
415	171	23	0	23
417	85	24	0	24
423	47	0	0	0
501	41	0	0	0
508	117	0	0	0
510	16	0	0	0
517	25	0	0	0
520	193	85	12	97
521	36	0	0	0
522	32	1	0	1
523	175	11	35	46
524	153	29	0	29
525	238	24	11	35
528	196	0	61	61
530	18	0	0	0
536	15	0	0	0
539	3	0	0	0
540	35	0	0	0
541	21	0	0	0
542	8	0	0	0
543	6	0	0	0
544	2	0	0	0

[1]Salvage unit size does not include roadside hazard which sometimes overlaps salvage harvest.

[2]Retention patches are in addition to riparian reserves and are not overlapping.

[3]The combination of riparian reserves and retention patches represent a minimum of the snag retention within a salvage unit because additional retention areas may be identified for other species or possibly other resources but these additional retention areas haven't been included in these retention estimates.

Methods for Assessing *Habitat Fitness Potential* of Fire-Affected Activity Centers

Recently developed habitat-fitness and landscape models and other publications have demonstrated the validity of using the core area to establish site specific fitness potential and the importance of having sufficient amounts of NRF habitat within spotted owl core areas to adequately provide for spotted owl survival, reproduction, and access to prey (Franklin et al. 2000, Zabel et al. 2003, Dugger et al. 2005, USDI 2014). Research indicates that NSO survival and productivity are associated with large patch sizes of older forest or large forest patches containing a high proportion of older forest (Franklin et al. 2000, Dugger et al. 2005, USDI 2011).

Habitat-based fitness, or habitat fitness potential (HFP), is the "fitness conferred on an individual occupying a territory of certain habitat characteristics" and is a function of both the successful reproduction and persistence of the individuals associated with a given territory (Franklin et al. 2000). As described within the RRP (USDI 2011) and recent research (Dugger et al 2005), there is a high level of habitat fitness potential for a particular site when the core contains at least 50% suitable NRF habitat (Franklin et al. 2000, USDI 2014). Dugger et al. (2005) found that spotted owl fitness potential was positively related to the proportion of NRF in the core area where approximately half of the successful territories had core areas comprised of 50 to 65% NRF.

In consideration of this research, and in response to the negative NSO population trend, Recovery Action 10 within the RRP (USDI 2011) was developed in an attempt to reverse this trend by recommending agencies conserve NSO sites with a high likelihood to contribute to the demographic support of the NSO population. The RA10 recommendation provides interim guidance to prioritize known and historic sites for conservation and/or maintenance of existing levels of habitat. As stated within the interim guidance, for a site to be considered as an 'RA10 site' a specific amount and distribution of suitable habitat must be present in the core area and home range; the core area should be comprised of at least 50% (~250 acres) NRF habitat and the total acres within the core area and home range should be at least 40% NRF (~1,336 ac.).

The intent of Recovery Action 10 is to protect, enhance, or develop habitat in the quantity and distribution necessary to provide for the long term recovery of northern spotted owls, specifically by retaining occupancy and reproduction at established sites. Priorities for conservation are generally based on past occupancy, reproductive status and current levels of suitable habitat.

There are 85 activity centers within the Westside Fire Recovery project analysis area, but not all these activity centers are affected by proposed treatments. Activity centers within the analysis area were assessed with consideration to RA10 recommendations, in an effort to categorize sites both according to whether they contain recommended minimum levels of suitable habitat in the core areas and home ranges described for RA 10 and to assess their relative habitat fitness potential and the likelihood of occupancy post-fire.

To combat the main threats to NSO (competition with barred owls, as well as past and current habitat loss) the 2011 Revised Recovery Plan recommends conserving occupied spotted owl sites and retaining structurally complex or high-quality habitat to provide demographic support and to provide refugia from competition with barred owls. These recommendations are described under Recovery Action 10 and 32.

Prior to the 2015 surveys, only about 40% of the activity centers in the project area had been surveyed since 2005; post-fire habitat estimates in cores and home ranges were used to establish RA 10 priority because these estimates were directly comparable across all sites. In addition, Level 1 biologists made the assumption that as the amount of remaining habitat increases so does the likelihood that a site will contribute meaningfully to demographic support. In addition to RRP recommendations, information and recommendations within the *Biological Opinion for the Douglas Post-Fire Salvage project* (USDI 2014 – Appendix A) influenced and informed our use of habitat minimums and determinations on the likelihood that an activity center/core area may or may not shift due to a loss of habitat from high-severity fire in the core or home range.

An AC "shift" generally occurs when a disturbance results in a loss of habitat (no longer functional habitat)over a large portion of the core but sufficient habitat exists in the home range and/or adjacent habitat to provide sufficient resources to support reproduction. A NSO pair that experiences a large loss of habitat can change their use pattern to encompass better habitat or move ("shift") over to the higher quality habitat.

When a disturbance affects a larger portion of the activity center, the function of the AC may be diminished or lost. In the circumstance of fire, a "loss" of an AC may be a result of a large quantity of suitable habitat being burned at high fire severity which may result in the NSO shifting their use pattern to suitable habitat elsewhere (Gaines et al. 1997,

Clark 2007). Clark (2007) reported NSO returning temporarily to previously occupied territories after a fire removed large portions of the habitat; these observations were likely due to strong site fidelity, but ultimately the NSO looked elsewhere for habitat. The "loss" of an AC can occur when the existing amount of habitat in the core and home range is insufficient to support reproduction and there is a lack of habitat nearby to provide for a potential AC shift.

All known spotted owl activity centers in the analysis area were evaluated based on the amount of suitable habitat remaining post-fire within the 0.5 mile core areas and 1.3 mile home ranges, and were assigned a category of "High", "Moderate", or "Low" fitness potential. Activity centers containing a minimum of approximately 50% suitable NRF (~220 acres6) within the core area and 20% NRF (~665 acres) in the home range (inclusive of the acres in the core area) were classified as having "**high potential**" for the owls associated with that site to remain on site, continue to reproduce, and therefore contribute to the demographic support of the spotted owl population in the area, if present. Recent research on spotted owl reproductive success following high severity fire in their core use areas found that spotted owls tended to occupy sites where they were more likely to replace themselves and had a much lower tendency to be disturbed by natural or anthropogenic sources when they had been reproductively successful at that site (Lee and Bond 2015b). Reproductively successful sites are generally those that contain a large proportion of high quality habitat in the core and home range. Without consistent, current survey data on reproductive success in the analysis area, levels of suitable habitat provide the basis by which to infer high reproductive potential sites.

Activity centers containing *less than* approximately 50% suitable NRF within the core area were evaluated at the 1.3 mile home range scale. Home ranges (including core areas) containing more than 20% NRF were classified as having "**moderate potential**" for the owls associated with that site to remain at the current AC placement, reproduce, and contribute to the demographics of the population in the area. The Level 1 consultation team acknowledged uncertainty in all AC site placement and assumed that shifts in locations could occur in response to the modifications and/or loss of habitat caused by high and moderate severity fire. Those with "moderate potential" may shift away from their original core use area, but may remain within their home range in areas where adequate suitable habitat exists post-fire. Although dispersal is relatively uncommon for adult NSO (Franklin et al 2000, Clark et al 2011), NSO that have experienced high severity fire in a large portion of habitat within their core or home range have an increased likelihood of dispersal (Clark et al. 2011, Clark 2007). However, if a NSO pair stays within a burned home range or core area, they may need an increased amount of habitat and travel farther within that area to successfully forage (Clark 2007).

"Low potential" sites were defined as having less than approximately 20% (less than 665 acres) suitable habitat remaining within the core and home range combined. These sites were assumed much less likely to persist in that location based on significantly reduced levels of available habitat and the deleterious effect that this degree of habitat loss would have on fitness and survival (Franklin et al. 2000, Clark et al. 2011, USDI 2011). The subsequent low level of habitat fitness potential reflects the lack of potential for these sites to contribute to the demographics of the northern spotted owl population. These ACs were evaluated on a case-by-case basis for habitat quality and juxtaposition to suitable habitat, reproductive history, site placement, and past disturbances.

Using a minimum level of 20% NRF for habitat within the core and home range combined for classifying habitat fitness potential per site for this analysis, rather than the higher recommended levels of 40% NRF as described within the Recovery Plan interim guidance, accounts for both uncertainty in the post-fire habitat typing as well as the potential use, within their territory, of

6 50% of a 502 acre core is not 220 acres, but for the purpose of this analysis, we lowered the minimum to account for potential error in the placement of the AC.

fire-affected previously suitable habitat (PFF and FANR). Therefore, ACs with NSO that may be continuing to use habitat that may not otherwise have been typed as suitable habitat would be accounted for in this classification process.

Establishing the "habitat fitness potential" of each activity center to contribute to demographic support of the area (i.e. High, Moderate, or Low) can not only demonstrate consistency with Recover Action 10 but also provide additional information to identify the ACs that are likely more sensitive to project activities. Where the amount of habitat in a home range and core area are well above recommended minimum levels of habitat, proposed management activities have a lower potential for adverse effects to the owls that potentially occupy that site when compared to sites near the recommended habitat minimums. Where habitat levels are at, near, or below the recommended levels described above, a higher potential exists for adverse effects to NSO through loss or degradation of suitable habitat, particularly when actions reduce available habitat below recommended levels. When the quantity of suitable habitat within an owl's home range and/or core area falls below recommended levels, fitness and/or fecundity can be adversely affected, and that site's contribution to the demographic support of the area may be diminished (Franklin et al 2000, USDI 2011). See the Effects discussion below for the list of all ACs in the analysis area and the category to which each AC was assigned.

Methods for Assessing Impacts to Individual Activity Centers

The Westside Fire Recovery Project effects analysis provides a systematic approach of describing the anticipated effects resulting from each proposed activity or activities that occur in each activity center. An AC is typically divided into the core (0 to 0.5 mile from the center of the AC) and home range (0.5 to 1.3 mile from the center of the AC) to represent the anticipated relative use of an activity center by a reproducing NSO pair. The home range is generally defined as an area traversed by NSO for foraging, caring for young and mating. The core area, which is contained within the home range, receives concentrated use, is typically near the nest site, and its use is usually related to foraging, reproduction, and resting activities (Rosenberg and McKelvey 1999).

The quality, distribution, and amount of habitat within the core and home range are important for the function of the activity center to provide enough resources to support an NSO pair and offspring. There are several approaches to evaluating the quality, quantity, and distribution of habitat and the relationship to reproduction (for example: Franklin et al., 2000, Zabel et al. 2003, Olson et al. 2005, and Dugger et al. 2005). Even though several studies have provided various combinations of important habitat components related to NSO reproduction, one common thread runs through the research – NSO are strongly related to older, dense, structurally complex conifer forest (Carey et al. 1992, Hunter et al. 1995, Zabel et al. 2003, and Dugger et al. 2005). This habitat description is very similar to "nesting/roosting" habitat defined for the analysis in this project. Foraging habitat has a broader description than nesting/roosting and is important for nesting success, especially when nesting/roosting habitat may be limited. Foraging habitat has generally less canopy cover, smaller average tree size, absence of nesting platforms, and possibly less stand complexity when compared to nesting/roosting habitat.

The importance of the core area to NSO reproduction is likely indicated by the concentrated use of relatively small area. During nesting, the core provides most of the resources for the NSO pair and any offspring. Dugger et al. (2005) and Franklin et al. (2000) provide evidence that the amount, distribution, and quality of habitat in the core can influence NSO survival and reproduction. The reason for this relationship between cores with greater amounts of high quality habitat and increased survival and reproduction may be a result of a single factor or a combination of factors; however, the relationship between the amount and quality of habitat in the core may be a function of less habitat fragmentation (less low quality habitat or non-habitat) in these cores. Increased habitat fragmentation may result in increased predator (e.g. great horned owl) and competitor (e.g. barred owl) interactions that will negatively affect NSO reproduction.

Abiotic factors such as slope position, elevation, and proximity to water can strongly influence the spatial area used in the core and home range. NSO typically use lower slope positions more frequently than higher slope positions (Irwin et al. 2007). This relationship is likely related to the higher quality habitat that typically grows at lower slope positions with higher humidity and cooler microclimates than compared to the hotter, drier upper slope positions (Skinner et al. 2006). The lower slope positions are also commonly closer to water sources that are also important for prey species. Topography also relates to habitat use patterns for NSO. Even though NSO have been detected on all slope positions7 that contain habitat, an NSO, though capable, is not likely to expend the energy to travel over a prominent ridgeline from its nest to forage in an adjacent drainage.

The USFWS has reviewed the vast amount of NSO literature to suggest a minimum level of habitat within the core and home range (USDI 2009) which is reflected in the determination analysis for this project through the use of the "Intensity Factors" analysis and through site specific review. The Intensity Factor analysis used specific, measurable characteristics related to the amount (acres of habitat), quality (habitat type), and distribution (core and home range) of habitat. Each activity center was evaluated using a filter process that incorporates either a series of biologically relevant factors: 1) "Intensity Factors" which represent important biological minimum recommendations, **or** 2) a site-specific evaluation.

"Intensity Factors" use a systematic numerical approach that relates NSO reproduction and fitness to habitat quantity, quality, and distribution as it may meet the needs of an NSO pair and possible offspring. Using the quality (i.e. nesting/roosting or foraging), quantity (acres of each habitat type), and distribution (core, home range, or both) coupled with relevant research, effects to habitat from the project activities were related to potential effects to fitness and reproduction – see the individual Intensity Factors listed below.

When Intensity Factors could not be used to decisively conclude an effects determination from proposed activities, further evaluation of site specific factors for each AC was needed.

Each AC was given a determination of effect as: 1) "likely to adversely affect" (LAA); 2) "may effect, but not likely to adversely affect" (MANLAA); or 3) "no effect" (NE).

Intensity Factors

Intensity Factors are a series of questions used to evaluate each of the ACs and are described below. These questions factor effects from proposed activities to biologically important minimum levels of habitat and the potential effects to fitness and reproduction. Questions were derived from our understanding of NSO use of post-fire habitat based on recent peer reviewed research, the principle of a minimum level of suitable habitat required for fitness and/or reproduction based past and current research of NSO biology, and our experience in NSO response to management activities in occupied habitat. The purpose of these questions was to identify if sites were *Likely to be Adversely Affected* (LAA) by the proposed activities.

Depending on the existing condition (amount, quality, and distribution of habitat) of the core and home range and the level of anticipated effects resulting from the project, an activity center can accumulate more than one intensity factor. The number of intensity factors accumulated for a particular activity center provides a relative measure of effects anticipated to occur given the proposed activities, however, only one intensity factor is needed for an AC to be given a "likely to adversely affect" (LAA). Any site that wasn't identified to have a LAA determination was further evaluated using site-specific information.

7 There is generally a maximum elevation at which NSO are typically found (around 6,000 feet in the Klamath Province), but for this project, we are not considering an elevation maximum given the relatively low elevation of existing habitat in the analysis area (most of the habitat is below 6,500 feet in elevation).

***Intensity Factor A*:** Will treatments result in the core and home range combined falling below 20% NRF and FANR (665 acres)?

If 'Yes', then the activity center would likely not contain enough habitat to support reproduction. This question also establishes the degree of effect from a loss of habitat to the extent that the loss would result in lower fitness to a possible level where reproduction, and possibly occupancy of site, is no longer expected. This would result in a LAA.

A 'No' answer resulted in a site-specific evaluation that was completed using the location, type, and extent of the treatment(s) relative to habitat affected and likely NSO area of use.

Intensity Factor B: Will treatments result in the core and home range combined falling below 40% NRF and FANR (1,336 acres)?

If 'Yes', the loss of habitat may result in reduced fitness potential by causing the AC to fall below recommended levels of suitable habitat (as described above). This would result in a LAA.

If 'No', and the core and home range combined contain more than 40% NRF and FANR, then there is likely enough habitat to support reproduction and it may be possible to have treatments in the home range and not impact fitness potential. If treatment occurs in the core or home range but it does not result in the core and home range falling below 40% NRF and FANR, then the effect to habitat may not result in the reduction of fitness potential for that site. A site-specific evaluation was then completed using the location, type, and extent of the treatment(s) relative to habitat affected and likely NSO use area.

Intensity Factor C: For core and home range that combined contain more than 20% but up to 40% NRF and FANR prior to treatment, will treatment result in a downgrade or removal of NRF and FANR?

If 'yes', then the treatment will likely affect the reproductive fitness of the activity center by causing the AC to fall below recommended minimum levels of suitable habitat. Activity centers with 40% or more NRF and FANR appear to have more successful reproduction than activity centers with less suitable habitat (as described above) . Therefore, activity centers with less than 40% habitat likely do not have enough habitat to be able to "absorb" the loss of even a small amount of habitat and all NRF and FANR within the core and home range would need to be retained in order to maintain fitness and reproduction. The loss of any suitable habitat for these activity centers will likely affect reproduction. This would result in a "LAA".

A 'No' answer resulted in a site specific evaluation that was completed using the location, type, and extent of the treatment(s) relative to habitat affected and likely NSO area of use.

Intensity Factor D: Will treatment result in >25% of the existing NRF, FANR, and PFF combined in the core and home range receiving treatment that will degrade NRF or remove FANR or PFF? If 'Yes', then treatment will result in degrading NRF and removing FANR and PFF. Although it is difficult to interpret the potential effects of removing FANR and PFF on reproduction, actions affecting more than 25% of an activity center will likely affect reproduction due to disturbance in addition to any effects to NRF.

If 'No', then it may result in a MANLAA, due to the minimal impacts to habitat in an AC that is above recommended levels of suitable habitat; though a site specific evaluation was also completed using the location, type, and extent of the treatment(s) relative to habitat affected and expected NSO use of the area.

Intensity Factor E: Will treatment result in core areas with >220 acres of NRF falling below 220 acres of NRF?

This question establishes whether treatment would be reducing the fitness potential of the NSO associated with the affected core area by causing the core to fall below recommended levels of suitable habitat. A 'Yes' answer would result in a LAA.

A 'No' answer resulted in a site specific evaluation that was completed using the location, type, and extent of the treatment(s) relative to habitat affected and likely NSO area of use.

Intensity Factor F: Will treatment downgrade or remove NRF in the nest stand?

The nest stand is possibly the most highly valued area in the core and home range because nest stands are associated with previous nesting attempts. The nest stand likely holds unique habitat characteristics and the NSO using the core are likely sensitive to changes to that stand. However, some nest stands have been burned through completely with high severity fire and are no longer expected to provide their original function. If this has not occurred, and the nest stand has only been lightly impacted by fire, or unburned, then a 'Yes' answer to this question would result in a LAA.

A 'No' answer resulted in a site specific evaluation that was completed using the location, type, and extent of the treatment(s) relative to habitat affected and likely NSO area of use.

Site Specific Evaluations

Each activity center that was not assigned an "LAA" determination in the Intensity Factor assessment was evaluated using site-specific information. The location, type, and extent of treatment and the resulting potential effect to habitat were assessed at the core and home range scale. The result of the assessment is described in the effects section.

Evaluation of Activity Centers Specific to the Beaver Fire Area

Prior to the Beaver Fire, NSO habitat in the area was patchy in distribution with small pockets of higher quality habitat typically near riparian areas, which generally met the needs of the NSO in the area and some were even able to successfully reproduce. When the Beaver Fire occurred, a large portion of the area burned at moderate and high fire severity and a large portion of the NSO habitat was affected. In addition, a large proportion of the private industrial timber lands that occur within the checkerboard ownership pattern in the area were harvested directly following the fire, causing further fragmentation and loss of habitat. Large areas of private lands across USGS sections (one square mile) have either already been or are likely to be harvested in the near future.

As a result of the Beaver fire, the increased timber harvest on private lands and the patchwork ownership, the remaining habitat within the fire perimeter occurs on national forest land. This series of events has increased the difficulty for NSO to find sufficient habitat to meet the needs for reproduction. In the Beaver fire area, many of the ACs lost most of their suitable habitat and most of the fire affected habitat where it occurred on private land.

The combination of the fire and the estimated harvest of private land resulted in eight ACs (0239, 0283, 0346, 4144, 4145, 4146, 99913, and 99914) with less than 500 acres of suitable habitat remaining in the combined core and home range. Given the combination of the low amount of suitable habitat and patchy distribution of habitat, these ACs are far less likely to have successful reproduction than ACs with more habitat.

Because of the extremely low levels of habitat within activity centers in the Beaver fire area, the process of analyzing individual activity centers using recommended levels of habitat, and the subsequent effect of proposed activities causing further reductions in the amount of habitat per AC as a basis for the effects determinations (as done for the rest of the analysis area) did not fully capture the effects from proposed activities in the Beaver fire area. In other words, the levels of habitat were already so low for each AC that they would not have met the minimum levels used as triggers for adverse effects, even before any activity was proposed. Therefore, each AC was

analyzed using site specific methods that incorporated the already low levels of habitat – see AC analysis for the Beaver fire area below.

VI. Existing Environment

The existing environment refers to the current conditions of the analysis area that would affect listed species. It is a component of the environmental baseline for any listed species, as maintained by the U.S. Fish and Wildlife Service. The environmental baseline includes:

"… the **past and present impacts** of all Federal, State, or private actions and other human activities in an action area, the **anticipated impacts** of all Federal projects in the action area that have already undergone formal or early section 7 consultation, and the **impact** of State or private actions which are contemporaneous with the consultation in process" [50 CFR §402.02].

The past and present impacts of all Federal, State and private activities in the action area, along with the natural disturbance events and the in-growth of vegetation result in the current conditions. These current or existing conditions fully reflect the aggregate impact of all prior human actions and natural events that have affected the environment and have contributed to the environmental baseline. The existing environment also best represents the biological baseline relative to listed species for the analysis of project-related effects. The past and present impacts of Federal, State and private actions are reflected and summarized in the current conditions. For the purposes of this analysis, the existing environment analysis focuses on the habitat and species status for NSO within the analysis area. It will also include other aspects of the existing environment such as the known or possible presence of a competitor or predator like the barred owls, as relevant to species level effects.

Although a litany of past actions in this area is not necessarily informative for purposes of ESA analysis, a list of future foreseeable and ongoing actions in the analysis is provided in Table G-29of Appendix A to further inform this analysis.

Environmental Baseline

Forest-wide, there are 586,487 acres of NSO NRF habitat (188,700 acres of nesting/roosting habitat and 397,787 acres of foraging habitat) as reported for 20148.

The Environmental Baseline conditions for NSO in the analysis area are a product of timber harvest activities of various intensities, several wildfires, and a century of fire suppression on both public and private lands. These acres include the effects of the Beaver, Whites and Happy Camp Complex Fires, fire suppression and suppression repair actions during these fires, all past activities on Federal lands, and all past salvage activities on private lands have been included in the NSO habitat baseline for this project. The total size of each fire area within the analysis area is: Whites fire area = 55,794 acres; Happy Camp fire area = 161,589 acres; Beaver fire area = 74,321 acres, regardless of habitat or vegetation type. Acres of habitat and treatment are described in more detail within the following analysis.

Forest Service projects that were planned in the analysis area (Jess project, Thom Seider, Two Bit, Eagle Springs, McCollins) have been either put on hold, blended into the proposed project, or re-consulted upon with the FWS.

Multiple activities (e.g. road maintenance) have been recently completed using the Forest programmatic Biological Assessments for facilities maintenance and watershed

8 NSO baseline habitat tracking for the Klamath National Forest updated after 2014 fires.

restoration; No suitable nesting/roosting or foraging habitat was removed or downgraded with these activities. Therefore, baseline habitat figures reflect these projects.

General Vegetation with the Analysis Area

Vegetation types within the project area generally consist of mixed conifers, oaks, brush, and grasses. Oaks, brush, and grasses are typically found on low-elevation sites on shallow, rocky soils located on the southerly and westerly aspects. These southerly and westerly aspects exhibit harsher conditions as opposed to the northerly and easterly aspects. Deeper, more developed soils than those at low elevations support mixed conifer stands of Douglas-fir, ponderosa pine, incense cedar, and sugar pine. Higher elevation sites within the project area are favorable conditions for Douglas-fir and white-fir survival and growth, with white fir becoming a substantial component of the mixed conifer type. Hardwood species, including Pacific madrone, California black oak, canyon live oak, Oregon white oak, tanoak, and bigleaf maple are generally a lesser component of mixed conifer stands.

The project area provides complex habitat for many species. The Beaver project area contains checkerboard ownership and has been strongly influenced by land management over the past several decades. Even though the Beaver project area is capable of growing late-successional habitat in isolated pockets, the project area is largely composed of oak woodlands and brush with varying size pockets (about 5 to 100 acres) of mid-seral mixed conifer.

The Happy Camp and Whites Project Area are similar to each other in distribution of habitat. These two project areas are mostly mid to late-successional habitat with pockets of early seral and brush and provided some of the most contiguous conifer habitat on the Forest before the 2014 fires. Overall, these three project areas contained over 60% mid to mature mixed conifer forest habitat[9] and the remaining 40% was made up of oak woodland habitat (5%), early serial forest habitat (20%), and brush habitat (15%) prior to the 2014 fires.

The 2014 fires burned about 40% of the project area at moderate and high severity and reduced two important habitat types on the Forest – oak woodland and mid- to late-successional mixed conifer habitat. The fire resulted in large portions of mid- and late-seral habitat being lost or greatly reduced in habitat quality. About 35% of the pre-fire mid- and late-seral habitat and about half of the pre-fire oak woodland was affected by moderate and high severity fire. These fire affected areas are now set back to an early seral state. Overall, most of the moderate and high severity affected areas will not support the same wildlife species as it did pre-fire for many years while the low severity burned habitat is likely to continue to function similarly to the pre-fire condition and support many of the same wildlife species as it did pre-fire.

2014 Fire Information

Information for the Beaver Fire, Happy Camp Fire, and Whites Fire within the analysis area are presented below. For information on the acres of forest burned within each fire area, see the EIS for the project. The Beaver Fire, Happy Camp Fire, and Whites Fire burned a total of

9 These percentages and habitat descriptions represent wildlife habitat and not necessarily the Project Vegetation Report.

approximately 183,120 acres, including approximately 162,260 acres of National Forest System lands and approximately 20,860 acres of private land10.

Fires within the Happy Camp Complex were ignited by lightning near the town of Happy Camp, which is located on the middle portion of the Klamath River. Nineteen fires were ignited in this storm and comprised the complex. Due to hot, dry and windy conditions, three of the original 19 fires could not be readily contained, eventually grew together and spread east to the Scott River and south into the Marble Mountain Wilderness over the course of several weeks. This fire burned approximately 116,900 acres. The Beaver Fire occurred on the north side of the Klamath River about 30 miles east of Happy Camp, and eventually burned approximately 32,400 acres. The Whites Fire burned approximately 33,760 acres southeast of Fort Jones. The Whites fire was part of the July Complex which burned both private and National Forest land, ultimately spreading into the Marble Mountain Wilderness and into the North Fork drainage of the Salmon River. Multiple boundaries exist for the fire areas and can create varying acre summaries for each fire depending on the method used for delineating the boundary of the area measured. The fire perimeter boundaries, analysis area delineation, and project area boundaries can create differing reported acres per fire.

All the large fires of the 2014 season burned with mixed severity, meaning there was a mosaic of light, moderate, and severely burned forests within each fire area. Of the approximately 183,000 acres that burned on the western Klamath National Forest, a wide range of fire severities were exhibited, with the overall range that burned at moderate and high burn severity between 5-40%. Within high severity areas, fuel consumption of duff, conifer and hardwood litter, saplings, and small and large dead material occurred within the ground and surface profile. Areas of high severity burns experienced 75 percent or greater vegetation mortality, loss of canopy and understory cover, and loss of duff layers and large woody debris. The stands that burned at high severity ranged in species composition and structure, including shrub/oak stands, single layered conifer plantations, multi-layered mixed conifer stands, and higher elevation stands dominated by true fir. Most trees within high severity burn areas are expected to die in the short term.

Areas characterized by moderate severity burns experienced 50-75 percent vegetation mortality, substantial reduction in canopy and understory cover, as well as duff layers and large woody debris. Moderate severity fire areas generally experienced consumption of surface fuels leaving the canopy structure primarily intact; however, the conifer and hardwood canopies are generally brown needle foliage. A substantial portion of the trees within moderate severity areas have either been killed by fire or are expected to experience high mortality due to intense heating, fire injury, insects, and the effects of prolonged drought. These continuing dry conditions will further decrease the survivability of fire damaged trees, even in areas that burned in lower severity.

Areas characterized by no or low severity burns experienced 0-50 percent vegetation mortality. In low severity burn areas, most of the stand mortality occurred in smaller understory trees. Over time, these smaller trees will fall to the forest floor and contribute to future fuel loading, but in much smaller quantities than in the moderate to high severity burn areas.

For additional information on the fuel loading, as well as the fire history and specific information on the 2014 fires within the project area, see the project Fuels Report.

10 These totals do not include the Man and Log fires.

VII. Species Life History and Status

Species Status refers to the known or likely occurrence of a species within the project area and focuses on those actual or assumed individuals that are likely to be affected by the proposed project. Larger biologic and demographic issues of species status are best summarized by species specialists in cited literature, Recovery Plans and critical habitat designations and will be cited and referenced as appropriate in this document. Aspects of the species biology and ecology that are relevant to the project analysis will be described and cited in the effects analysis section.

The following is a species account summary for the NSO and is not a complete life history. For additional information on the life history of the NSO, including threats to the species and the status of the species' recovery, see the 2011 Revised Recovery Plan for the northern spotted owl. Aspects of the species' biology pertinent to the potential effects to the individual NSO that may occupy the analysis area, in addition to potential impacts to prey or suitable nesting/roosting or foraging habitat, are discussed below. The Revised Recovery Plan also contains a detailed description of threats to the northern spotted owl from West Nile virus, sudden oak death and inbreeding depression, genetic isolation, and reduced genetic diversity. These threats were not applicable to this analysis as the discussion of these issues goes beyond the scope and scale of this analysis.

Spotted owl habitat is generally associated with older, dense forests that provide opportunities for nesting, roosting, and foraging. Nesting/roosting habitat is generally described as a multilayered, multi-species canopy with large overstory trees with various deformities (large cavities, broken tops, mistletoe infections, and other decadence); large snags; large woody debris resulting from fallen trees; and sufficient open space below the canopy for spotted owl flight (Franklin et al. 2000). Foraging habitat generally has attributes similar to those of nesting/roosting habitat but contains less canopy cover, forest structure complexity, and large trees. Dispersal habitat consists of adequate tree size and canopy closure to provide protection from avian predators and minimal foraging opportunities but does not contain sufficient amounts of other essential habitat components for long term NSO occupation, reproduction or survival (USDI 2011).

Nesting/Roosting Habitat

In 2009, the USFWS conducted a thorough review and synthesis of published literature, unpublished data sets and direct communication with NSO researchers to develop guidance for describing NSO habitat and evaluating the effects of habitat management on NSO within the interior Klamath Province. Nesting/roosting habitat for this analysis is generally defined by (1) average crown closure >60%, (2) average diameter at breast height for canopy trees (>18 inches), basal area (>180 square feet per acre), and trees with cavities or platforms.

On the Klamath National Forest, in the California Klamath and Cascade provinces, 41% of 29 nests were in cavities and 59% on platforms, with cavity nests occurring predominantly in Douglas-fir forest and platform nests found mainly in mixed conifer forest. Eighty-six percent of the 29 nests were in Douglas-fir trees. Marshall et al. (2003) noted that approximately 90% of known Spotted Owl nests on the Applegate Ranger District of the Rogue River National Forest (Klamath Province, Oregon, 50 miles northwest of the Project area) were in dwarf mistletoe brooms in Douglas-fir trees.

Foraging Habitat

The 2009 NSO Guidance describes foraging habitat as including a mix of basal areas ranging from 120 to180+ square feet, and $\geq$ 15 Quadratic Mean Diameter (QMD) with $\geq$ 5 trees per acre of $\geq$ 26" DBH and a mix of >40% to 100 % canopy closures. It also recognizes "low quality" foraging habitat as a mix of basal areas ranging from 80-120+ square feet, $\geq$ 11" QMD and $\geq$ 40% canopy closure (USDI 2009, Irwin et al. 2004, Irwin et al. 2007).

In recent years, fire exclusion, white fir ingrowth and stand diseases have influenced stand conditions to be denser in canopy on the upper slopes (Silviculture Report). This may have

provided some level of increase in foraging habitat for NSO. Fire histories show that these upper slope stands will not be sustainable under current conditions of wildfires due to the high probability of stand replacing fires on the upper 1/3 of slopes (Fire and Fuels Report).

The quality, quantity and distribution of NSO nesting/roosting and foraging habitat in the analysis area are variable due to the size and scope of the project area. In the Whites and Happy Camp areas, nesting/roosting habitat is located on the lower third of slopes, often on northern aspects and within drainages. The 2014 fires had the largest impact on the habitat in the central portion of the Happy Camp fire area and large amounts of nesting/roosting habitat were lost to high-severity fire. The Whites fire area was less impacted by fire but had patches that burned hundreds of acres at moderate and high severity, surrounded by mixed and low severity fire. The Beaver fire area was already highly fragmented habitat due to past fire and land management and the 2014 fires compounded this fragmentation. NSO nesting/roosting and foraging habitat is limited and low quality where it occurs.

NSO Prey

Northern spotted owls feed mainly on small forest mammals, particularly arboreal and semi-arboreal species (Courtney et al. 2004). Northern flying squirrels and woodrats comprise the bulk of their diet but secondary species such as mice (*Peromyscus sp*.) may be important for survival and reproduction. In portions of the NSO range, deer mice, red-backed voles, and two species of lagomorphs are considered locally and/or seasonally important in their diet (Courtney et al. 2004). Within the analysis area, it is expected that mice, woodrats, and flying squirrels are the most likely prey item based on available habitat.

NSO use of the post-fire landscape

Wildfire can potentially limit foraging resources by reducing prey abundance and essential cover for protection for foraging endeavors, predator avoidance, and thermal protection. These essential habitat elements can be depreciated or lost when high-intensity wildfire moves through a forested stand.

Habitat attributes such as coarse woody debris (CWD) for prey habitat and cover for foraging (multi-layered stands) can be altered drastically and be limiting after severe wildfire until fire-killed trees fall. Replacement woody debris may replenish from falling snags and trees or may remain in areas where fire intensity was less severe. Foraging impacts from direct mortality of prey species due to immediate changes in habitat or direct kill are also associated with wildfires. Additionally, these forested stands that have burned at high severity and lack protection from weather and predators will take many years to re-establish the multi-layered stands necessary to compliment other essential suitable habitat attributes.

Burned forests can influence small mammal populations and distribution (Zwolak and Foresman 2007). Zwolak and Foresman (2007) found small mammal communities differed between burned and unburned forest habitat. Generally, burned areas had a higher proportion of deer mice when compared to other species captured in the study area, but species diversity increased the year following the fire. Generally, deer mice numbers increased in fire affected areas (Zwolak and Foresman 2008). However, red-backed voles, bushy-tailed wood-rats, and flying squirrels avoided burned areas for at least two years after the fire. This avoidance of burned areas was attributed to the possible reduction in food resources, predation, and distance from cover.

The primary prey species associated with NSO in California is the dusky-footed woodrat, northern flying squirrel, red tree vole, and deer mice presented in order of importance (Franklin 1997). The Westside Fire Recovery Project contains all these species except red tree vole. When comparing frequency and biomass, the woodrat and flying squirrel are the most important prey species (Franklin 1997). Woodrats are associated with brush habitat and are in low abundance in

old-growth forests (Sakai and Noon 1993). Northern flying squirrels are associated with mid- and late-seral forests (Carey et al. 1992).

Because high severity fire has affected a large portion of the project area, deer mice are likely present and will likely increase in density. Shrubs are likely to establish within most areas that lack tree canopy cover. After shrubs establish, woodrats should become more abundant and these woodrats may enter the adjacent closed canopy forest where NSO could capture these prey. Prey capture in the brushy areas is difficult for NSO (Franklin 1997). However, until brush covers these fire affected areas, deer mice are likely accessible to NSO as a food source. Northern flying squirrels are not likely present in high severity fire affected areas since these areas lack tree canopy cover. As the forest develops into mid-seral conditions, flying squirrels may return to these areas but this will likely take several decades before flying squirrel habitat may regenerate in high fire severity areas.

Areas burned with high burn severity are no longer considered suitable habitat for NSO nesting, roosting or long term occupation by spotted owls because these areas no longer supply the habitat attributes needed for thermal protection, nesting structure and cover from predators necessary for long term viability (see description of suitable NSO habitat in Affected Environment and Species Account section above). While these stands do not contain the attributes that define NSO habitat, burned forest has been found to be used by NSO, at least in the short-term, particularly if the habitat was nesting/roosting or foraging habitat before the fire.

While spotted owls may use former nesting, roosting, and foraging habitat burned with high- and moderate-severity located within their home range for foraging, the overall importance of these areas to NSO's is still unknown. Results from radio-telemetry studies of spotted owls in post-fire landscapes indicate that spotted owls will use forest stands that have been burned, but many other factors dictate the extent and degree to which this will occur (Bond et al. 2002, Bond et al. 2009, Lee et al. 2013, Lee and Bond 2015).

Current research offers differing perspectives in regards to the use of severely burned coniferous forests by spotted owls (Elliot 1985, Gaines 1997, Bond et al. 2002, Bond et al. 2009, Clark 2007, Clark et al. 2012, Comfort 2013, Eyes 2014, Lee and Bond 2015). Some studies have shown owls to exhibit site fidelity, mate fidelity, and reproductive success after fires have burned a portion of their territories at varying severity levels, including high severity (Bond et al. 2002, Lee et al. 2012). Others studies have shown owls to move completely away from previously occupied areas after high severity burns (Elliot 1985, Gaines 1997) particularly when burns occurred within core areas of resident birds. Bond (2010) reported 30 percent of California spotted owls' nonbreeding-season roost locations were within the fire's perimeter. In another study, radio-telemetry locations demonstrated that the owls selected low-severity burned forests for roosting during the breeding season, and selected low, medium, and high-severity burned forests for foraging within 1.5 km of the nest or roost site (Bond et al. 2009). Irwin et al. (2012) found that NSO in the Klamath region would often forage within more open stands that contained brush or a low basal area of conifer trees, and that the presence of a few scattered trees or snags likely facilitated hunting for prey such as woodrats, citing a particular telemetered pair that made extensive use of a burned area with manzanita shrubs and scattered live trees. This would indicate that, at least under certain circumstances, NSO will venture into more open habitats, such as areas burned at high and moderate severity, when enough structure is present to offer perching or a certain degree of cover, though the exact level of cover is unknown.

Lee et al. (2013) found that California spotted owls in southern California forests had an increased likelihood of site abandonment only when >50ha (124 acres) of their 81 ha (200 acre) core areas burned at high severity. This represents approximately 62% of their core use area, suggesting strong site fidelity. In addition, for spotted owls affected by the Rim Fire, Lee and Bond (2015) concluded that fire severity did not affect pair occupancy, which also suggests strong site fidelity.

Clark (2007) found that severe wildfires in NSO home ranges caused owls to increase their home range size in order to encompass more suitable habitat. He also found that spotted owls with territories located immediately adjacent to moderate- and high-severity burned areas, avoided these areas and had < 5% of their locations fall within the boundaries of the fire. Owls that ventured into the burned areas were typically individuals that were displaced by fire and periodically visited their old territory. According to Clark's study, when given the opportunity, owls focused their activities in unburned habitat. In his study, several owls with territories inside the fire frequently traveled long distances to forage in unburned habitat, supporting his prediction that owls would focus activities in the oldest forest stands with the least amount of fire damage (Clark 2007).

While severely burned coniferous forest is not considered suitable nesting or roosting habitat for NSO (USDI 2011), Clark (2007) study included telemetry detections of NSOs in Oregon within some areas that were burned with high and moderate severity. The condition of the burned stands in Clark's study area, such as the percentage of overstory mortality, the presence or absence of green trees, the ratio of high, moderate and low burn severities, and the juxtaposition of suitable NSO habitat in relation to severely burned areas wasn't reported. While in Clark's study owls were present within severely burned areas, it was not concluded that these areas were suitable habitat for nesting, roosting or long-term occupation by spotted owls. The burned areas may have contained individual features that were providing a short term structure for either roosting or foraging but were not suitable for long-term sustainability of a given owl or owl pair.

It is the spatial context of the overall habitat available for use by spotted owls that is critical for an analysis of habitat suitability. The proportion and arrangement of unburned or low burn severity suitable habitat in relationship to moderate- or high-severity burn areas within an NSO home range is one of the key factors in determining the likelihood of use by NSOs (USDI 2014, USDI 2011). This relationship is important because NSOs will focus their use of burned areas for foraging in areas with adjacent cover. This distance to cover is a key factor influencing use of burned areas (Comfort 2013). Because habitat selection by NSO is strongly influenced by abiotic features such as distance to water, proximity to nest, slope position, and elevation, it is possible that use of the burned habitats by NSO as described by Clark et al. (2013) or Bond et al. (2009) may occur due to the juxtaposition of the burned areas in relation to some other feature, such as a pre-fire nest location or water, rather than based on the "suitability" of the area, particularly if the owls were accustomed to using the area prior to the fire. Factors involved in the NSO's periodic selection of burned areas for foraging are not known at this time, and further research is needed to account for the many other aspects of a burned landscape that would factor into the NSO selection process.

Owl use of burned areas is well documented but links between owl use, fire severity, and intensity of salvage are not clear. Researchers were typically unable to separate effects of pre-fire timber harvest, wildfire, and post-fire salvage harvest. Research results are highly variable, depending on methods, burn severities, proximity of NSO to fire and spatial arrangement of habitat. Research of NSO use of burned areas has also been confounded by small sample sizes. In addition, general terms used in the literature including "moderate severity" and "salvage logging" make comparison to specific conditions found within the proposed project area difficult. Most references to "salvage logging" in the literature refer to clear-cut logging, and do not factor in design features used by the Forest Service such as leave tree groups, legacy tree retention, core area avoidance or even limited operating periods.

Studies noting changes in owl behavior or habitat selection after wildfire and/or salvage harvest have been largely unsuccessful in assigning causal factors. Clark (2007) was unable to separate the potential effects of pre-fire land management, high-severity fire and salvage harvest on NSO. Lee et al. (2012) and Clark et al. (2013) were also unable to distinguish the effects of salvage harvest in comparison to, or in combination with, other variables studied.

Findings from within recent research, including but not limited to, Bond et al. (2009), Clark (2007), Clark et al. (2012), Lee et al. (2012), Lee et al. (2013), Irwin et al. (2012), Eyes (2014), Comfort (2013), pertinent to this analysis include the following:

- NSO appear to display site fidelity by returning to burned areas that were suitable pre-fire, even if they no longer meet the definition of suitable NSO habitat.
- NSO foraging activity in moderate and high severity burned areas is supported in the literature, although the value of this foraging opportunity as it pertains to survival and reproduction is not known.
- NSO select unburned or low fire severity affected habitat for nesting.
- NSO use of burned areas may be influenced by standing snags and surviving green trees as perch sites for foraging, particularly along edges where sufficient cover is available.
- The likelihood of a burned area being used by NSO may be strongly affected by the pre-fire habitat type and distance from suitable forest cover; NSO may be more likely to use the edge between suitable habitat and high fire severity affected areas than the interior portion of a high severity burned area.
- Most studies on NSO use of burned areas examine short term occupancy and use and have been unable to factor in duration or persistence at a site over an extended period time.

Status of the NSO Habitat within the Analysis Area

Recent evaluation of NSO nesting/roosting and foraging habitat reported approximately 586,487 acres of NSO nesting/roosting and foraging habitat (188,700 acres of nesting/roosting habitat and 397,787 acres of foraging habitat) across the entire Forest (excluding Ukonom Ranger District – not administered by the Klamath NF).

See

Table G-8 below for the acres of habitat in the analysis area after the 2014 fires.

Table G-7: Pre-fire and post-fire NSO habitat, FANR, PFF1 and PFF2 within the analysis area after the 2014 fires.

Habitat	Pre-fire Acres	Post-fire Acres	Change in Habitat Acres resulting from 2014 fires
Nesting/Roosting	33,485	26,435	-7,050
Foraging	62,341	50,134	-12,207
Dispersal	67,170	54,504	-12,666
Fire-Affected Nesting/Roosting(FANR)	-----	1,314	----
Post-Fire Foraging (PFF1)*	-----	10,297	----
Post-Fire Foraging (PFF2)**	-----	7,646	----

*Acres of pre-fire NR that burned at grid code 4 (RAVG data) and pre-fire F that burned at grid code 3 and 4 **within** the 500 foot buffer described above in the Methods section.

** Acres of pre-fire NR that burned at grid code 4 (RAVG data) and pre-fire F that burned at grid code 3 and 4 **outside** the 500 foot buffer described above in the Methods section.

Table G-8: Pre-and Post-fire NSO habitat and fire severity in analysis area and associated fire severity after the 2014 fires.

Habitat	Pre-fire Habitat (Acres)	RAVG assessment*				Post-Fire Habitat (acres)
		Very low (grid code 1)	Low (grid code 2)	Moderate (grid code 3)	High (grid code 4)	
Nesting/Roosting	33,485	15,331	1,891	1,314	5,736	26,435
Foraging	62,341	25,390	2,986	2,174	10,033	50,134
Dispersal	67,170	23,313	3,279	2,391	10,275	54,504

* The analysis area contains the fire-affected area plus an area outside the fire perimeter; thus the acres of habitat affected by fire presented in this table will not equal the acres in "Pre-fire Habitat" or "Post-Fire Habitat".

Status of the NSO Activity Centers within the Analysis Area

Eighty-five NSO activity centers (ACs) are included in the analysis area. The degree and intensity of treatment varies considerably, as described below in the discussion of Effects to Individual Activity Centers. See tables A-1 and A-2 in Appendix A for the pre-fire and post-fire acres of NRF habitat within the core areas and home ranges of all 85 activity centers in the analysis area.

As described in the Methods section above, each activity center has been assigned a category that reflects the assessment of the habitat present in each home range and core area following the 2014 fires, and the subsequent "habitat fitness potential" for that activity center as High, Moderate or Low habitat fitness potential. The "habitat fitness potential" categories assigned to each site are not influenced by potential effects from the proposed activities; the categories only reference the likelihood of that site to successfully reproduce and continue to support the demographics of the NSO population in the area based on existing habitat conditions (Table G-9).

Table G-9: All activity centers within the analysis area and the category of habitat fitness potential to which they were assigned* – see Methods section above for the methodology of the categorization process.

Activity Center Number	Category of Habitat Fitness Potential	Activity Center Number	Category of Habitat Fitness Potential
0229	Moderate	1122	Moderate
0239**	Low	1130	Moderate
0241	High	1164	High
0245	Moderate	1202	Low
0247	High	1212	Moderate
0252	Low	1213	High
0254	Low	1214	High
0255	Moderate	1258	Moderate
0257	High	1265	Moderate
0272	High	1266	High
0277	High	2124	Moderate
0283**	Low	4026	Moderate
0284	Moderate	4099	High
0293	Moderate	4128	Moderate
0315	High	4129	Low
0322	High	4133	Moderate
0346	Low	4143	Moderate
0365	Moderate	4144	Low
0380	High	4145**	Low
0381	Moderate	4146	Low
0383	Moderate	9990	Low

Activity Center Number	Category of Habitat Fitness Potential	Activity Center Number	Category of Habitat Fitness Potential
0499	High	9991	High
0567	High	9992	High
1027	Moderate	9993	Low
1028	High	9994	Moderate
1029	High	9995	Moderate
1030B	High	9996	Moderate
1039	High	9998	High
1040	High	9999	Moderate
1041	High	99910	High
1046	High	99912	High
1047B	High	99913**	Low
1100	Moderate	99914	Low
1101	High	99915	Moderate
1109	High	0096A	High
1110	Moderate	0276A	Moderate
1111	Low	0276B	Moderate
1112B	Moderate	0278A	High
1116	High	0278B	Moderate
1117	Moderate	NEW3A	Moderate
1119	High	NEW3B	Low
1121	Moderate	NEW7A	Moderate
		NEW7B	Moderate

*A few activity centers contain slightly less suitable NRF than the minimum levels described for High Fitness Potential but were categorized as High due to the lack of on the ground habitat typing and subsequent lack of exact acres of habitat, in order to err on the side of caution.

**These ACs are being displayed in the table as “low” potential because of the treatment occurring on private land. Although treatment isn’t complete on private land, we are assuming treatment may continue as it has, which may result in the remaining suitable habitat to be reduced in quality to the point that it will not function as suitable habitat. This may be an over estimate of effects.

Without long-term monitoring data, it is very difficult to determine demographic trends within the analysis area. For the purposes of this analysis, it is assumed that not all activity centers are occupied consistently through time, and that “currently” unoccupied activity centers that have been occupied in the past could re-activate at any time, if habitat conditions remain similar over time.

Site occupancy and reproductive rates have been shown to exhibit substantial annual variation that may be influenced by individual’s site fidelity, climatic extremes, shifts in prey availability, or presence of other raptors (Loschl 2008, Olson et al. 2005, Anthony et al. 2006). Activity centers in this analysis area have displayed some of this variation in occupancy and are considered important for current or future NSO demographics; multiple sites have been substantially affected by fire and currently contain well below the recommended habitat minimums.

Survey History and Strategy

Past Survey Summary

The Whites Fire, Beaver Fire, and Happy Camp Fire areas have had a long but intermittent history of NSO surveys since the early 1990s. All three fire areas have had partial coverage due to years of overlapping past project surveys. Most recently, a portion of the Whites Fire area was surveyed to protocol in 2003-2004 and again in 2013-2014, though at least four of the ACs in the fire area were not covered. The Beaver Fire area had approximately 70% survey coverage over the past decade. These surveys were conducted by U.S. Forest Service and private land biologists. The Happy Camp Fire area had recent surveys from past project surveys (2005 or

earlier) covering about 50% of the area. In the Happy Camp Fire, portions of upper Grider Creek watershed and the sub-watersheds north of Tom Martin Peak have had very little or no survey coverage in recent years due to a lack of road access. The Tompkins Creek, Middle Creek, and O'Neil Creek watersheds of the Happy Camp Fire have had recent surveys from 2007 to present. It is important to note that following a landscape level disturbance of the magnitude of the 2014 fires, surveys that occurred prior to this event are not necessarily applicable to the landscape now. Many of the home ranges, core areas and nest stands have likely moved and shifted away from previous locations due to fire effects.

NSO Survey Strategy

Surveys are intended to reduce the possibility of direct harm and/or disturbance that could result from implementing project activities (i.e. felling trees, removing understory fuels) within an area occupied by NSO during the reproductive period when owls are less mobile and therefore less capable of moving away from a source of disturbance.

NSO surveys are planned for six surveys per year for two years. The intent is to survey the project area annually through implementation. Surveys started in the spring of 2015, beginning after March 15th. All first year surveys will be completed prior to implementation.

For the second year of surveys, ***three surveys would be conducted prior to implementation and three surveys conducted concurrently***.

It is important to note that surveys will cover areas of nesting/roosting and foraging habitat that burned with **all** severities, including high severity, so that occupancy and use of potential treatment areas can be determined, in addition to establishing occupancy of core areas or home ranges. Surveying the high and moderately burned previously suitable NRF will help to inform the analysis in regards to the assumptions made about NSO use of post-fire habitat, at least on a site specific level, though additional monitoring would be needed to further our understanding.

Survey strategy for this project is delineated according to the locations of proposed treatments units, roads, and known activity centers. Surveys can be prioritized to cover particular treatment areas first in order to gather as much information as possible prior to implementation. NSO surveys will be comprised of three main components:

1) *Activity Center Searches (ACS)* will be conducted in the majority of historic activity centers in the project area for each year of survey. ACS's will be conducted in all activity centers that have treatment proposed in core areas. Only activity centers that have no treatment in the core area, and very little, or none, in the home range and that lie outside of areas potentially impacted by other project activities (i.e. landings or road construction) may not receive ACS's.

2) *Pre-determined call routes* will be placed along all roads with proposed treatment and/or that are associated with treatment units. The analysis area encompasses the area within a 1.3 mile buffer of all treatment units; therefore, the call routes will be delineated along all roads within this area. The area within 0.25 miles of these roads/call routes will be considered as covered by the survey, though a greater area is often covered due to topography and landscape features.

   Areas with difficult access due to a lack of roads, such as Upper Grider and Tom Martin Peak watersheds, will have daytime walk-in routes to cover portions not reachable via nighttime survey routes.

3) *Stand searches* will be conducted in salvage units that fall outside of 0.25 miles of the designated call routes in order to ensure complete coverage of units that do not have direct road access (i.e. helicopter units) and therefore may not have been within range of the call route.

Unsurveyed Suitable Habitat in the Analysis Area

While much of the analysis area has been surveyed at some point in the past, survey coverage of the area is incomplete and irregular. Activity centers have been placed based on NSO detections, but many of those detections were in the 1990's which elevates the uncertainty of the current home range and core area use by NSO. There are also areas that have either never had a detection or have never been surveyed, and subsequently do not have activity centers designated. These areas are included in the current survey strategy for this project and will receive surveys prior to implementation. If NSO are detected, the FWS will be consulted and if required, the project will be re-assessed for effects to any newly discovered NSO territories.

However, two areas in the project area that are currently being surveyed may not fully meet NSO survey protocol for a landscape with potential barred owls; the Grider Ridge roadless area and the north facing slope of the Klamath River from Tom Martin Peak to Slinkard Peak. No treatments are proposed for the Grider Creek roadless area, but a portion of this area is within 1.3 miles of proposed treatment. The Grider Creek roadless area is being surveyed along the boundary of the roadless area, using existing roads but the interior portion is only accessible on foot. The interior portion is about 5,100 acres and was largely affected by moderate and high severity fire. Nighttime call route surveys from existing roads along the boundary are unlikely to cover this interior, unroaded area. For safety reasons, the interior is being surveyed using daytime walking call routes and will be surveyed three times. The walking call route goes through most of the remaining habitat that occurs within the Grider Creek roadless area. Approximately 1,510 acres of suitable habitat occur in the area covered by daytime surveys, mostly concentrated along Bark Shanty and Grider Creeks. Based on the amount of habitat, this area may support one NSO pair, but with a linear distribution of habitat across about four miles. The southern portion of the roadless area also has habitat which may be part of known ACs further south of the analysis area but without access or surveys, is difficult to establish for certain.

The other portion of the project that will likely not meet survey protocol is the north facing slope of the Klamath River from Tom Martin Peak to Slinkard Peak; and will be surveyed six times as a combination of daytime and nighttime surveys. Nighttime surveys will be completed along the road, but due to the topography, NSO broadcast calls may not carry far enough to fully cover the area. Daytime walking surveys will occur farther up the drainages but access and concerns over surveyor safety may limit the ability of the daytime surveys to reach the entire area needed to fully meet protocol. However, where nighttime surveys are conducted, they are expected to fully meet protocol. No treatments are proposed in any of the habitat occurring in areas with more limited surveys.

New information resulting from the 2015 surveys

As a result of the extensive surveys throughout the analysis area during the 2015 survey season, additional information was discovered regarding NSO locations, activity center placement, and reproductive status of the NSO within the project area. This information resulted in adjusting the location of specific activity centers, the removal and/or reshaping of numerous salvage harvest units, and the assignment of limited operating periods (LOP) to specific treatment units where NSO have been observed nearby.

Since NSO are known to exhibit strong site fidelity, we expected recently active ACs to be occupied in 2015. However, where a high proportion of a core area burned at moderate and high severity, it may not meet the needs of a NSO pair; but areas within the home range may provide sufficient unburned or low severity burned habitat for reproduction and/or survival if the owls were to shift their use patterns within their home range. If a pair does move to a new location, reducing the potential effects to the occupied area is important for current or future nesting potential.

Our 2015 surveys have detected two nest sites (1030 and 1047) and one pair (1112) that appear to be using an area not previously identified as a nest site but still within the core. Whether or not these NSO pairs moved because of effects to the habitat in their AC from the 2014 wildfires is not part of this analysis and would be extremely difficult to establish. NSO surveys are intended to locate activity centers so that effects can be minimized to the extent practicable.

The 2015 NSO surveys also located an NSO pair (0383) in an area not previously recorded in our databases. A new activity center was established and centered on the pair location (0383). Using survey protocol, nesting was not confirmed nesting for this pair. A male NSO has been detected in the core of NEW3A and in the core of NEW3B on separate survey visits; then a pair was found in the area of overlap between each core area, indicating that they are likely from the same activity center. However, without unique identification of each bird, it is difficult to definitively assign these detections to one activity center, though survey results have only found one male and one female NSO per night in a given area, suggesting that there is only one pair for both ACs. However, in order to account for the possibility that this may actually be two occupied ACs, we are analyzing each AC separately.

During 2015 surveys of the project area, multiple observations of NSO, both daytime and nighttime, have been recorded. The 2015 preliminary observation data were reviewed for our analysis to help inform our assumptions on NSO use of assigned activity centers as well as their use of the post-fire habitat. We reviewed locations of daytime detections overlaid with habitat type, including fire affected habitat (PFF1 and FANR) for some anecdotal insight into how NSO in the analysis area may be using the landscape after a disturbance of such large magnitude as the 2014 fires. This information also helps to inform the placement of LOPs.

Nighttime detections of NSO are less informative regarding NSO use of a particular habitat type because these sightings result from an NSO call route that uses vocalizations to elicit a response from an NSO that is usually out foraging, often calling them to the surveyor's location, and would therefore not indicate any particular type of habitat being used by the responding owl. An NSO can be called from over 0.25 miles away to the location of surveyor. For example, several nighttime detections have been made in moderate burn severities, but these were along a road that the birds were called to as part of the call route; in other words, the NSO were not found in the moderate severity burned areas, they were called into these areas from elsewhere. Assumptions about the habitat a particular NSO was using prior to responding to a nighttime surveyor cannot accurately be made without knowing where the bird was prior to having been detected (NSO in the project area are not equipped with location/tracking devices).

Unlike nighttime surveys, daytime surveys can provide more insight into NSO habitat selection because the surveyor has a much greater chance of detecting the owl in the stand that the NSO selected itself (and may be using for nesting or roosting) rather than having been called to it. If an NSO pair is attempting to nest, there is a higher likelihood of finding the bird in the stand being used for nesting when using a daytime survey.

We have 11 daytime NSO detections resulting from the 2015 surveys and 10 of these observations occurred in unburned or very lightly burned (grid code 1) habitat.[11] This supports our original assumptions in this analysis that NSO are less likely to use moderate and high severity burned areas for nesting and/or roosting. The one exception to this was a single male daytime detection in burned (grid code 3) habitat in the Beaver fire area where the private land surrounding the national forest land within the activity center has been heavily harvested this year and is no longer providing any usable habitat or even cover; thereby leaving the NSO in the area very few options for habitat. The extreme situation in Beaver is the anomaly in our observation data. Subsequent surveys have not detected an NSO in this area since the first observation.

[11] Reflects daytime detections within the fire perimeter only

We acknowledge that our information regarding NSO use of post-fire habitat in the project area is anecdotal and preliminary, but it does provide some site specific data that can be used, in conjunction with the most recent available research, to inform our analysis of effects to NSO from project activities.

The following table describes the reproductive status of activity centers where NSO were detected during 2015 surveys and the subsequent measures applied to the project design to account for the new information. The highest level of occupancy, i.e. nest, pair, or single, found for each activity center is listed. Treatment units that were removed from the project due to updated NSO observation information are also listed. Certain treatment units within in the project will have LOPs assigned, and as new information becomes available, LOPs will be applied as necessary.

Table G-10: Summary of active NSO activity centers within the analysis area and the subsequent measures applied during project development.

AC #	Highest Reproductive Status (nest, pair, or single)*	Units dropped in this project alternative as a result of new survey information	Units retained but assigned September 15 LOP	Did AC shift in 2015 from originally analyzed location?	New AC added to system?
0283**	Single	SSP096-1, SPP097-1 and Salvage units were dropped in the core early in project as a result of AC fitness potential analysis	none	No	No
0278B	Single	No salvage units were proposed in the core	none	No	No
0381	Single	SPP220, SPP278, and SPP354	none	No	No
0383	Pair	S242 and S243-2; S243 –Retention patches incorporate portions of the unit that occur in the core so that no salvage is proposed in the core.	none	No (no previous AC location)	Yes
1030B	Nest	No salvage units were proposed in the core	none	Yes	No
1041	Single	SPP031-1 and Salvage units were dropped in the core early in project as a result of AC fitness potential analysis	none	No	No
1047B	Nest	S426	Roadside fuels	Yes	No
1109	Single	SPP051-1 and Salvage units were dropped in the core early in project as a result of AC fitness potential analysis	none	No	No

AC #	Highest Reproductive Status (nest, pair, or single)*	Units dropped in this project alternative as a result of new survey information	Units retained but assigned September 15 LOP	Did AC shift in 2015 from originally analyzed location?	New AC added to system?
1110	Pair	Salvage units were dropped in the core early in project as a result of AC fitness potential analysis	none	No	No
1112B	Pair	SPP003-2	none	Yes	No
1130	Pair	S005, S005-8, and S23-34 Plus, salvage units were dropped in the core early in project as a result of AC fitness potential analysis.	none	No	No
1212	Single	Salvage units were dropped in the core early in project as a result of AC fitness potential analysis.	none	No	No
9991	Single	SPP352, SPP351 and salvage units were dropped in the core early in project as a result of AC fitness potential analysis	none	No	No
9996	Single	S240	none	No	No
9998	Pair	No salvage units were proposed in the core	none	No	No
New3A/3B	Pair	S005-5, S005-7, S57-1, S57-2, S59-1, S59-2, and S23-12; Retention patches incorporate portions of units where NSO detections were made and where prior year's nest stand was located.	23-11 and 23-2	No NSO detections occurred within the core areas of either ACs.	No

* NSO surveys haven't been fully completed at the time of writing this document thus AC status may change as the new information becomes available.

** Our initial analysis of this AC assumed only moderate and high severity affected habitat would be removed on private land, but it appears that this isn't an accurate assumption. The change in this assumption has reduced the fitness potential level for this AC from moderate to low, though salvage harvest will continue to be dropped from the core of this AC to reduce potential effects.

"S" = Salvage unit, "SPP" = site preparation and plant

VIII. Effects of the Proposed Activities

The analysis contained herein uses specific terms that categorize the estimated degree of change (effect) to spotted owl habitat elements. The term **maintain/improve** implies that treatments will have no meaningfully measurable negative effect to the quality of the habitat or may potentially increase the quality of the habitat. The term **degrade** signifies when treatments influence the

quality of habitat by the removal or reduction of habitat elements but not to the degree where existing habitat function is changed. Units may simultaneously degrade certain components of a stand while maintaining or improving other components. The term **downgrade** applies to treatments that reduce habitat elements to the degree the habitat will not function in the capacity that exists pre-treatment, but activities will not remove habitat entirely (e.g., downgrade from nesting/roosting to foraging). Treatments may also downgrade suitable nesting/roosting or foraging habitat to dispersal, in which case the habitat has become no longer suitable for any type of long term occupancy but is still a forested stand that contains enough cover and structure to provide habitat for dispersing NSO. The term **remove** pertains to treatments that reduce habitat elements to the degree that habitat will no longer function as suitable for NSO. For habitat to be removed, a reduction in the abundance and spatial extent of specific habitat elements or conditions must be great enough to result in a change to habitat function. For example, while the construction of new landings might remove virtually all trees in a 0.25 to 0.5 acre area, that small gap in a fairly contiguous forest stand of 10 to 20 acres would be unlikely to change the ways NSOs use that forest stand.

Direct and Indirect Effects of the Proposed Activities

Direct effects are those effects that are caused by or result from proposed activities and take place at the time of implementation. Generally these effects are a result of project implementation acting directly in suitable habitat where individuals may reside. For example, if the smoke from a prescribed burn irritates an individual animal or when noise flushes an individual from its nest, these are both direct effects. Effects that are likely to adversely affect a listed species are not discountable, insignificant or wholly beneficial. A discountable effect would be determined to be extremely unlikely to occur and, based on professional judgment, these effects are not expected to occur. Insignificant effects relate to the size of the impact and the effects would not be expected to reach the scale where take occurs. Using the best available data and professional judgment, a person would not be able to meaningfully measure, detect or evaluate insignificant effects.

Indirect effects are those effects that are caused by or will result from proposed activities and take place later in time but are reasonably certain to occur (50 CFR §402.02). Generally these are effects on resources that act indirectly on the listed species such as when changes to vegetation modify the abundance or availability of prey.

Effects to NSO and NSO habitat from the proposed activities

Direct Effects to NSO

Six NSO surveys and at least one activity center search per AC were completed in the project area in 2015. In 2016, three surveys will be conducted prior to implementation for that year and three surveys will be conducted concurrently with implementation in the project area (same survey area as 2015) unless otherwise agreed upon after site specific evaluation by Level 1 biologists. For 2017 and 2018, three surveys will be completed prior to implementation in that year, but surveys will be focused around the remaining treatment. Surveys are intended to reduce the possibility of direct harm and/or disturbance that could result from implementing project activities (i.e. felling trees, removing understory fuels) within an area occupied by NSO during the reproductive period when owls are less mobile and therefore less capable of moving away from a source of disturbance. If NSO are detected, adverse impacts would be avoided by shifting operations that occur within the core area of the detected bird to after July 10, when both breeding adults and fledgling young are mobile. If nesting is detected or suspected, the operations are

shifted to after September 15, as this time frame is generally accepted among the FWS, the USFS and research biologists as the end of the reproductive period for NSO and is used by the FWS during consultation (based on review of years of research and professional expertise).

Fuels treatments, salvage harvest, site preparation and planting

Project activities associated with fuels treatments, salvage harvest, site preparation and planting may cause noise and smoke levels to rise above ambient levels. If these treatments were to occur within 0.25 miles of suitable nesting/roosting habitat during the NSO breeding season, they have the potential to affect NSO breeding success by causing loud and continuous noise disturbance and/or smoke disturbance to NSO.

Even though the research does not provide a clear relationship between salvage harvest and effects to NSO, for the purposes of this analysis we are assuming that this level of disturbance is likely a negative effect to NSO currently occupying the areas where PFF and FANR occur. However, the application of the LOP described above, in addition to the extensive NSO surveys, is intended to alleviate direct effects to NSO from project activities. See discussion in the Indirect Effects section below for effects to NSO habitat from these activities.

Noise Disturbance

Ground based and cable yarding harvest equipment typically creates noise above ambient levels and at times, the combination of equipment use may create noise levels well above ambient levels. This noise usually occurs during the daytime hours and can last for a few days. For any given acre of tree harvest, the duration of noise generating activity is relatively short (i.e. days). In some situations, the noise could last for a longer duration (i.e. weeks) because of the position of the treatment and the number of acres being treated.

Helicopter based harvesting can create high levels of noise in concentrated areas during the daytime hours. The topography can influence the level of noise, especially in narrow drainages where the sound can resonate. Helicopters will typically fly in short patterns (usually less than 0.25 mile) from within the treatment unit to the landing which is typically on the edge of the treatment unit. The helicopter may move logs for three hours before refueling or maintenance, depending on the type of helicopter and other logistical factors. Helicopter service landings are typically near a main road where fuel and maintenance equipment can be accessed. The flight path from the treatment unit to the service landing will likely cross over NSO habitat, but given the altitude of the flight, the sound will be less than the noise level in the treatment unit and much shorter in duration.

Log trucks and other service vehicles are likely to travel Forest roads frequently during operations. Log trucks are somewhat limited to maintenance level 2 and higher roads. There are maintenance level 1 roads that will be used to access treatment units but these roads will generally be traveled only during the harvest of the units. Specific maintenance level 2 and 3 roads will likely be used at a much higher frequency because there are limited number of roads that enter any given drainage. A typical main road in a drainage may experience up to 20 to 50 truckloads a day.

Roadside Hazard Tree Removal

Dead or fire injured, dying trees that are likely to fall and impact a Forest system road and that have been determined to have a 60 percent or greater chance of mortality within the next 3 to 5 years due to fire damage (as indicated by “Marking Guidelines for Fire Injured Trees”; Smith and

Cluck 2011) will be felled and/or harvested. The vast majority of trees to be harvested occur within areas of high and moderate fire severity (RAVG grid code 3 and 4), and generally within larger blocks of high tree mortality and are therefore not considered NSO nesting/roosting or foraging habitat. Treatments in these areas would remove PFF or FANR or non-habitat. The potential for direct effects to NSO from treatment in these areas is reduced due to the lower likelihood that NSO would be using these areas for anything except occasional foraging and would be capable of moving away from a disturbance.

Areas indicated by RAVG as grid code 2 had lower severity fire and are presumed to contain fewer fire-killed trees; though these areas are indicated as having between 25 to 50 percent basal area lost, and the fire resulted in varying levels of tree mortality. Acres of grid code 2 may be indicated as suitable habitat, due to a lack of fire effects, or they may be included in a roadside hazard unit, due to a small pocket of mortality that may have occurred along the road. Generally, NSO habitat that has burned with grid code 2 continues to serve as habitat and remains within the category to which it was assigned (i.e. nesting/roosting or foraging) post-fire. Treatments in grid code 2 have an increased potential for direct effects due to the increased likelihood that an NSO may occur in areas of suitable NRF in the areas immediately surrounding the treated areas.

Grid code 1 is indicative of a range from 0 to 25 percent basal area lost and so is either unburned or slightly burned to the degree that very minimal change is detected in the overstory canopy or basal area. These areas are less likely to contain fire-killed trees, and as a result, would have very few, if any, trees removed. Within these low severity areas, there is a small chance that an occasional tree (or small pocket of trees) may have been killed by the fire and would therefore be identified as a hazard to the road, but this is expected to be infrequent and only occur sporadically across the project area. Areas that show no sign of having burned, and subsequently contain no fire-killed trees, are not targeted for hazard tree removal and effects to NSO are not expected.

Because RAVG data is modeled as a snap shot at the time relatively soon following the fire, it does not account for delayed tree mortality that may result from site specific conditions such as heat stress, drought stress, or impacts from beetles and may not therefore fully capture all mortality that may occur post fire. Mortality guidelines (Smith and Cluck 2011) do address the chance for delayed tree mortality and the use of these guidelines for marking fire-killed trees along roads is therefore likely to capture the delayed tree mortality alongside roads in the project area that may or may not be indicated with RAVG. So, where RAVG data may indicate that no basal area loss occurred as a result of the fire at the time the RAVG data was gathered (i.e. grid code 0), it is possible that additional mortality may have occurred since that time, resulting in periodic dead/dying trees that would be targeted for removal if in proximity to a road. Therefore, there is potential for delayed mortality to not be fully captured using RAVG grid codes; however, field review has indicated that this circumstance is infrequent and sporadic across the project area and that in general, RAVG data captures areas of hazard tree removal.

Table G-11: Acres of NSO habitat occurring within each fire affected category within roadside hazard treatment unit. Grid code 0 and 1 are not expected to have meaningful effects to NSO; grid code 2 has an increased potential for effects.

Treatment	RAVG Grid Code 0		RAVG Grid Code 1		RAVG Grid Code 2	
	NRF	Dispersal	NRF	Dispersal	NRF	Dispersal
Roadside Hazard	774	379	1,385	789	217	129

Acres of affected habitat are an overestimate of effects to habitat because the exact effects are difficult to evaluate due to the uncertainty as to exactly where, what size, and how many hazard trees will be harvested.

There is a low likelihood that an NSO may be occupying a hazard tree slated for removal because only fire killed trees with a 60 percent chance or higher will be removed; and fire killed trees lack the structural aspects of a nest or roost tree, as green trees that have been killed by fire do not generally contain the decay, defect or heart rot and cavities that a tree/snag that occurred prior to the fire would have. Trees targeted for hazard tree removal generally occur within areas of high and moderate severity fire, whereas discussed above, NSO are unlikely to be nesting or roosting. It is possible that an NSO may be using the areas targeted for removal for foraging, and may use some of the fire killed trees as perches for hunting or resting, and may therefore be disturbed by the activities associated with implementation. However, the act of removing a perch site or sites is unlikely to cause a meaningful level of disturbance to an NSO that may be using the area.

It is possible that an NSO may occupy the area within 0.25 miles of the road, in which case the potential exists for disturbance; however, trees along major roads are less desirable sites for NSO due to the higher volume of traffic and noise associated with major roads.

There are multiple aspects of the design of roadside hazard tree removal treatments that have the potential to reduce potential ***direct*** impacts to NSO.

- all roads targeted for hazard tree removal would receive 3 surveys prior to implementation and 3 more concurrently with implementation (in addition to 6 surveys the prior year) with the exception of hazard removal along major ingress/egress roads described below; if NSO are detected, a Limited Operating Period (LOP) from Feb. 1 to July 9 would be in place for all actions along the segment of road that crosses the occupied core of the detected bird. If NSO are determined or suspected to be using an area for nesting, a Limited Operating Period from February 1 to September 15 will be applied to all treatments within a 0.25 miles of the known or suspected nest stand. Nesting status is typically determined by the end of June using protocol methods or the visual confirmation of offspring so there is no expected gap in the LOP for nesting owls. Because surveys are generally conducted from the road, there is an improved chance of detecting NSO using the targeted road or the area nearby. If NSO are detected, these protective measures would alleviate, though not completely eliminate, disturbance from project activities.
- the vast majority of the hazard tree removal would occur within areas of high and moderate fire severity, and would only remove fire-killed trees, where NSO are least likely to be using trees targeted for removal for nesting or roosting (see description above of NSO use of post-fire landscapes); therefore the potential to directly impact an NSO with hazard tree removal is subsequently reduced. It is more plausible that NSO could be using the burned areas (i.e. PFF or FANR) along roads, particularly lower level roads, for foraging or dispersing, depending in large part on the presence and juxtaposition of nearby suitable, unburned (or lightly burned) habitat that would offer cover to foraging NSO.
- higher maintenance level roads have a lower likelihood of use by NSO due to the higher level of traffic and subsequent disturbance; hazard tree removal along these roads is expected to have a lower level of impact to NSO than treatment on roads with a low level of traffic.

Ingress/Egress Road LOP Exemption

The exception to the LOP described above (Feb 1 - July 9) may apply to hazard tree removal along major ingress and egress roads that are necessary for community access and cannot be blocked by LOPs or an imminent hazard. See Appendix XI for a map of exempted roads. Where suitable unsurveyed NRF occurs within 0.25 miles of roadside hazard tree removal units proposed for harvest before July 9, there is potential for disturbance to NSO. Foraging habitat is included in the estimates because of the uncertainty in using remoted sensed habitat data and the potential for misclassification of suitable habitat into either nesting/roosting or foraging, though the remotely sensed data has demonstrated accuracy in identifying suitable NRF habitat in general. Including foraging habitat into estimates of habitat potentially used by NSO for nesting (and the potential for disturbance therein) increases the tendency for overestimation in this analysis.

NSO are not expected to be using areas burned at moderate and high severity for nesting, as described above, so only grid codes less than 3 are used in this estimate. Higher fire severity (grid code) indicates a *lack* of nesting habitat.

To quantify this impact in terms of acres of suitable NRF affected by noise disturbance, the roadside hazard treatment units[12] along major ingress/egress roads were buffered in GIS by 0.25 miles; where this buffer intersected suitable NRF it was determined that NSO may occur within this habitat and may be disturbed by project activities. Where this habitat occurs within core areas, an increased potential for disturbance exists, and was therefore also quantified (Table G-13). Grid code 3 and 4 are not displayed because habitat burned with this level of severity is not expected to be used by NSO for nesting; NSO reproduction is the focus for the estimate of disturbance.

Acres derived from this process were estimated as having disturbance to potentially nesting NSO as a result of implementation of hazard tree removal along major ingress/egress access roads during the nesting season prior to the completion of surveys. Acres described in the table below are an overestimate of the disturbance from implementation because all habitat would not be occupied, nor would it be impacted to the degree that NSO would be disturbed.

Grid codes are listed in order to display the degree of treatment anticipated. A greater potential for effects to NSO exists as fire effects increase (higher grid codes), due to the higher number of trees likely targeted for removal within a given acre of treatment; so that when grid code 0 or 1 occurs in NRF habitat along a road targeted for hazard tree removal, those acres are not expected to contain a meaningful number of trees targeted for removal and the subsequent effect to NSO from treatment in that habitat is expected to be minimal. Conversely, if grid code 2 occurs in NRF habitat, the increased fire effect is expected to indicate more fire-killed trees and a subsequently higher number of trees would potentially be removed. Where additional treatment occurs, additional disturbance is anticipated. Table G-12 shows 680 acres of NRF habitat that burned at grid code 2 with potential roadside hazard treatment during the reproductive period, across the entire project area. These acres have the most potential for disturbance due to the higher level of fire effects and subsequent amount fire-killed trees targeted for removal, though it is an overestimate of what will actually occur on the ground since not all acres are occupied nor would each acre represent disturbance to a nesting owl. The remaining acres of hazard tree removal

[12] Hazard tree units extend up to 200 feet on either side of the road or may occur only as small pockets of fire killed trees, but since units are not delineated on the ground assumptions are made using fire severity in proximity to roads.

occurring in the least fire-affected habitat, burned at grid code 0 (948 ac) and grid code 1 (7,619 ac.), represent a reduced level of treatment and subsequent reduced level of disturbance.

Table G-12: NSO habitat within 0.25 miles of roadside hazard treatment units that occur along roads designated for major ingress/egress access, where nesting/roosting and foraging (NRF) habitat is estimated for potential disturbance from implementation during the reproductive period.

NSO Habitat	Grid Code 0	Grid Code 1	Grid Code 2	Total
NRF	948	7,619	680	9,247

Table G-13: NSO habitat within cores that overlap Ingress/Egress roadside hazard treatment with the potential to be affected by noise disturbance (0.25 mile buffer) within occupied core areas (as of 2015 surveys).

AC Number	Grid Code 0	Grid Code 1	Grid Code 2
	NRF	NRF	NRF
0241	0	95	20
0380	0	2	1
0383	0	117	20
1027	0	74	2
1039	0	140	0
1040	0	0	0
1041	0	182	14
1046	0	94	3
1100	0	50	5
1109	0	225	4
1110	0	52	4
1122	0	19	1
1130	0	102	24
1213	0	167	4
1214	5	58	1
1258	0	0	3
4133	0	4	4
9990	0	76	12
9991	0	32	1
9992	0	155	13
9996	0	13	2
9998	0	81	8
99912	0	153	11
1047B	111	136	0
NEW3A	0	22	8
NEW3B	0	6	6
NEW7B	13	0	0
TOTAL	129	2,055	173

Indirect Effects

Proposed treatments that have the most potential for indirect effects to NSO habitat in the analysis area are salvage harvest, roadside hazard tree removal, and fuels treatments other than prescribed burning. Areas proposed for site preparation and planting do not generally contain suitable NSO habitat, and this treatment is intended to result in beneficial impacts to the recovering forest. In addition, site prep and plant units would remove only fire killed trees less than 10 inches DBH that display no green branches, and would consequently not affect habitat suitable for NSO. Prescribed burning would generally occur within areas previously burned by the 2014 fires in order to maintain lower levels of fuel loading; NSO habitat would be maintained, as the overall function of the habitat would be retained and the quality of the habitat would either remain the same or be improved by the treatment.

Table G-14 displays the crosswalk with which effects to habitat were established, both for individual treatments and when treatments overlap causing additive impacts to the habitat where they occur. The crosswalk in the table shows the effects resulting from each type of treatment and overlapping hazard tree removal. The affected habitat may be removed, degraded, maintained, downgraded or downgraded to dispersal habitat depending on the type of treatment and the burn severity in which it occurs. Table G-15 displays the acres of NSO habitat affected by the proposed activities and the percent change in the quantity or the change in quality (i.e. downgraded to dispersal) to the habitat affected.

Table G-14: Crosswalk for establishing the effects of treatments individually and in combination with other treatments

Fuels Treatment	No additional Treatment	Roadside Hazard Tree Removal (RAVG grid code 0 & 1)	Roadside Hazard Tree Removal (RAVG grid code 2)	Roadside Hazard Tree Removal (RAVG grid code 3 & 4)
FMZ	Downgrade to Dispersal Habitat*	Downgrade to Dispersal Habitat*	Downgrade to Dispersal Habitat*	Remove PFF/FANR
Roadside Fuels- Modified	Degrade	Degrade	Degrade	Remove PFF/FANR
Roadside Fuels- Complete	Downgrade to Dispersal Habitat*	Downgrade to Dispersal Habitat*	Downgrade to Dispersal Habitat*	Remove PFF/FANR
WUI	Downgrade to Dispersal Habitat*	Downgrade to Dispersal Habitat*	Downgrade to Dispersal Habitat*	Remove PFF/FANR
Underburn	Maintain	Degrade	Degrade	Remove PFF/FANR
No Fuels Treatment	No Effect	Maintain	Degrade	Remove PFF/FANR
Salvage Harvest	Remove PFF/FANR**	N/A	Degrade	Remove PFF/FANR
Site Prep and Plant	N/A	N/A	Degrade	Remove PFF/FANR

*Nesting/roosting and foraging habitat that overlaps this treatment will be downgraded to dispersal habitat. Dispersal habitat will remain dispersal habitat.

**Although salvage harvest is not planned to occur within NRF and dispersal habitat, a combination of unintended impacts during implementation and natural effects (e.g. wind) may degrade habitat features to the point where the habitat may not retain its function. To account for these potential effects, 10% of the NRF and dispersal habitat occurring in the salvage treatment units is reported here as a loss of habitat. This is likely an over estimate of effects since these effects should be incidental and infrequent.

N/A = Treatment would not occur within this grid code or affect habitat.

Table G-15: Percentages of habitat treated across the analysis area and the *proportion* of available habitat treated; displayed as percent change in NSO habitat within the analysis area, by treatment.

Treatment Type	NRF Removed (acres)	NRF Downgraded (acres)	NRF Degraded (acres)	NRF Maintained (acres)	FANR Removed (acres)	PFF 1 Removed (acres)	PFF 2 Removed (acres)	Dispersal Removed (acres)	Dispersal Degraded (acres)	Dispersal Maintained (acres)
%Change in NSO Habitat in Analysis Area	82 (0.1%)	2,222 (3%)	1,671 (2%)	5,463 (7%)	202 (16%)	2,074 (23%)	1,623 (24%)	31 (<0.01 %)	3,050 (6%)	3,368 (6%)

Where roadside hazard tree removal occurs alone, the treatment is anticipated to *degrade* NRF habitat when in mixed severity (grid 2) burned areas and *remove* PFF and FANR when in high or

moderate severity (grid code 3 and 4). Post-fire habitat removal occurs because the high severity areas will receive a more extensive treatment that removes all fire killed trees within 200 feet from the road as identified using the mortality guidelines for salvage (Smith and Cluck 2011); the lower burn severities (or unburned) will have more infrequent, sporadically occurring pockets of mortality along the roads, as described above in Direct Effects section.

Effects to NSO habitat are summarized in Table G-16 below to reflect the process of this crosswalk.

Salvage harvest

In determining which individual trees will be harvested, standing dead trees 14 inches in diameter at breast height or greater will be considered for salvage using the guidelines in Report #RO-11-01 "Marking Guidelines for Fire-Injured Trees in California" (Smith and Cluck, 2011). These guidelines were developed using peer-reviewed scientific literature to evaluate tree species in Northern California for mortality following a fire. The guidelines provide a sliding scale of the probability for tree mortality based on percent volume or length of crown scorched by fire. The responsible official has chosen to salvage trees with a 70 percent or greater chance of dying within the next 3 to 5 years. It is anticipated that a majority of the trees within salvage units will be harvested because most units burned at moderate or high fire severity and consequently most trees have a high probability of mortality.

There are several ways that trees or snags would be retained within salvage units: green tree retention (low fire severity or unburned); retention patches targeting previously suitable NRF habitat burned at high and moderate severity(PFF1); legacy tree retention, and riparian reserves (based on proximity to streams channels or inner gorges).

Green tree retention areas are identified as areas that burned at low fire severity (grid codes 1 or 2) and may be delineated as individual patches of retention or may be located in riparian reserves within the salvage unit boundaries; these patches may contain NSO habitat, but these areas will not be harvested.

Patches of PFF1 (see definition of PFF1 in 'Methods' above) would be retained within salvage units where riparian reserve retention would not provide desired levels of connectivity between unburned or lightly burned suitable habitat. PFF1 was selected in the delineation of retention patches in salvage units because it is assumed to contain not only the larger trees (since it was previously suitable NRF), and subsequent cover and perch sites, but also to contribute to future stand development, so that when the large snags eventually fall, they would become large downed logs. These retention patches are important particularly in the larger salvage units in order to avoid the creation large openings devoid of snags and large downed logs that would be unlikely to be used by NSO.

Riparian reserve retention is based on proximity to stream channels or inner gorges regardless of burn severity or NSO habitat suitability, but often is comprised of larger trees due to improved soil and water conditions near stream channels. Riparian reserves are managed differently than the surrounding uplands to protect the aquatic ecosystem (Forest Plan page 4-107). Riparian reserves are defined on the project scale based on the hillslope, and riparian and channel processes and are consequently divided into several possible categories, but the categories most pertinent to the design of retention areas in the project are: fish bearing streams; permanently flowing non-fish bearing streams; and seasonally flowing/ intermittent streams. The width of the riparian reserves is dependent upon the type of stream (permanent or intermittent) and whether the stream bears fish. Fish bearing streams have a width equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest. Permanently flowing streams have a width equal to the height of one site-potential tree, or 150 feet slope distance (300 feet total, including both sides of the stream

channel), whichever is greatest. Intermittent streams have a width equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest. The project area contains all three of types of riparian reserves in addition to other types described in the Forest Plan.

Legacy trees (as defined in the PDF's above) can be found in any of the retention patches or riparian reserves, or as individual trees anywhere in a unit; their location on the landscape is not predictable.

Patches of snags/trees may help to provide cover for an NSO to move from one patch of unburned habitat to the next. For most salvage units, the combination of low fire severity retention patches, riparian reserves, and legacy tree retention will reduce the size of openings (areas void of snags or trees) which may increase the likelihood of an owl crossing the opening or using the area for foraging.

Retention areas are not part of the salvage harvest treatment and will be avoided during implementation, though a portion of these areas may be affected along the edges when they occur in the unit where harvest operations would occur. Retention areas occur in many different shapes and sizes within the salvage units, but the type most likely to be affected by salvage harvest are inclusions (where salvage may occur around all sides of the retention area) or peninsula shaped retention areas within a salvage unit. These areas may pose implementation challenges that may result in damage to trees within the retention areas. In order to account for these potential effects to habitat within retention areas, it was estimated that 10% of the NRF that occurs within retention areas may be damaged during implementation – as estimated by a professional forester with experience in harvest operations (T. Coughlin personal communication). The level of effect to NSO habitat (i.e. degrade, downgrade, or remove) is difficult to estimate so we assumed that the habitat would be removed even though this is likely an overestimate. This effect to habitat was calculated using the NSO habitat layer (EVEG) and fire severity data (RAVG) and was accounted for within the effects analysis (see Table G-16).

The combination of these retention areas is intended to result in; a reduction in the overall size of openings and an increase in the connectivity between remaining suitable habitat; foraging options within post-fire habitat for NSO; and increased levels of snags and large downed logs for future stand development.

Diffuse edges between habitats is reportedly used by NSO for foraging (Comfort 2013); possibly related to higher prey abundance (Clark 2007, Bond et al. 2009). Woodrats occupy a variety of habitats, but have been reported at high densities in early-seral habitat (brush/sapling) and late-successional forests (Sakai and Noon 1993). Early-seral habitat commonly develops after a high severity burn. Early-seral habitat adjacent to older forest may increase NSO access to woodrats, who travel between early-seral and older forest (Sakai and Noon 1997). Comfort (2013) suggested that a diffuse edge between these habitats could provide additional benefits to NSO for accessing prey. Where salvage harvest units have snag clumps retained, it may create an irregular, diffuse edge if sufficient amounts of low severity or unburned habitat is present. This diffuse edge would be created between the salvage harvest units that will develop into early seral-habitat and older forest (NR or F habitat) thus creating an opportunity for woodrat density increases. Diffuse edges that provide foraging opportunities will also be facilitated by the retention patches.

Areas where fire burned most intensely, especially large patches of continuous moderate- and high- fire severity that do not have nearby cover available, such as the Grider, East Walker, and West Walker Creek drainages are the least likely to be used by NSOs due to the lack of important habitat attributes such as canopy cover and distance from suitable habitat (see figures 1-4 above). These highly fire affected areas have very little NSO habitat or patches of green trees that would provide cover. l. Generally, most of the remaining habitat in these highly fire-affected areas is located in the riparian reserves on the lower third of the slope. Recent research on spotted owls indicated that the amount of forest with high canopy cover (>70%) was the primary driver of

population growth and occupancy of a site at the scale of individual territories (Tempel et. al 2014). Without adequate canopy cover, spotted owls showed a higher probability of territory abandonment; in sites with high canopy cover, adult survival and territory colonization probabilities were high (Tempel et. al 2014).

Salvage harvest units would contain snag retention clumps situated around riparian reserves, drainages, and groups of pre-existing snags that would offer cover adjacent to open areas for prey species. Not every acre within a salvage unit is expected to contain large woody debris after treatment; rather, a mosaic of downed logs of a variety of size and decay classes would provide a heterogeneous layer of cover/habitat for understory regeneration and subsequent prey habitat.

As described above in the discussion of "NSO use of the post-fire landscape," NSO have been observed in high severity burn areas in a variety of settings. In order to capture this aspect of NSO use patterns and foraging behavior and to quantify potential effects of the proposed activities, fire-affected habitat was delineated and analyzed in areas where NSO could be expected to use it. It is difficult to assess the amount of actual use and determine the value of severely burned habitat since precise information about these aspects of NSO habitat and biology is not available. However, these habitat types have been distinguished from other areas of burned forest due to their anticipated, possibly short-term, use by NSO. These habitats are distinguished from each other based on their pre-fire suitability and the severity with which they burned.

As described in the Methods section above, fire-affected nesting/roosting (FANR) was identified separately from unburned or low fire severity affected nesting/roosting habitat to reflect the change in habitat quality that resulted from having burned at moderate severity (grid code 3). FANR is generally found in areas of transition from higher to lower burn severity, and may provide the diffuse edge characterized by some of the recent research (Comfort 2013, Eyes 2014).

Post-fire foraging (PFF1 and PFF2) habitat was also delineated based on pre-fire habitat suitability and burn severity, PFF is comprised of foraging habitat that burned at moderate and high fire severity as well as nesting/roosting habitat that burned at high severity. A large proportion of PFF is pre-fire foraging habitat that burned at the highest severity and subsequently contains minimal amounts of structure or cover; high severity fire usually consumes most of the understory and branches of the trees that makeup the overstory, and removes the majority of the structure and/or cover within a stand, and is therefore considered the least likely to be used by NSO for foraging (see figures 1-4 above).

Due to the lack of cover or structure, it was assumed for this analysis that NSO would not use PFF that was too far from cover to escape possible predation. Although the exact maximum distance an owl might travel from the edge of suitable habitat into PFF to forage is unclear, we are assuming the likelihood that an owl will use PFF decreases as the distance from suitable habitat increases; consequently, the value of PFF for foraging will decrease as the distance from suitable habitat increases. After review of recent literature on the use of edge habitat (Comfort 2013; Eyes 2014) and in consultation with Level 1 FWS biologists, and professional judgment, we assumed that PFF within a 500 foot buffer from existing, currently suitable NRF was the most likely type of PFF used by foraging owls. A minimum patch size of five acres of suitable NRF was used to delineated this buffer. This does not mean that owls would not use areas beyond 500 feet for foraging, but rather that the incidence of this is likely uncommon. The PFF that occurs within the 500 foot buffer was termed PFF1 (as described in the 'Methods' section). PFF2 was termed for PFF habitat that did <u>not</u> fall within the 500 foot buffer but was quantified for the purposes of tracking where burned habitat occurs in the project area and in critical habitat.

As described in the Assumptions section above, NSO are assumed to be using fire-affected habitat for foraging during the short term, possibly a few years, depending on the time it takes for the branches and needles to fall off and/or fire killed trees to fall. PFF and FANR may be used more in areas where unburned habitat types are more common. FANR is expected to contain

more structure and cover than PFF because it was higher quality habitat prior to the fire. FANR is also expected to possibly provide foraging opportunity for a longer period of time because FANR likely contains more snags/trees that are generally larger in diameter on average than the PFF. Larger snags generally tend to remain standing for longer periods of time compared to smaller trees, given similar environmental conditions.

NSO may find patches of unburned or lightly burned suitable habitat within their territories and concentrate their use in these areas, while venturing into the PFF or FANR to forage. The ability of an NSO to remain in their core or home range post fire depends in large part on the availability of these patches of still suitable habitat. The relative amount of suitable NRF habitat remaining post-fire will have a strong influence on the fitness and reproductive potential of the NSO at the affected site. The relative importance of the quantity and distribution of the PFF and/or FANR is unknown. Each activity center that has been affected by fire has a widely differing amount of these habitats.

The proposed salvage harvest will remove post-fire foraging and fire-affected nesting/roosting. Table G-16 shows the removal of 1,031 acres of post-fire foraging habitat (PFF1) and 133 acres of fire-affected nesting/roosting (FANR) through salvage harvest. This habitat may be providing foraging opportunities for NSO in areas where the fire has already reduced the available habitat and the removal of this would further reduce NSO foraging opportunities. See Table G-22 for a list of each activity center that is affected by salvage harvest (and other treatments).

It is unknown how the removal of fire affected habitat will impact NSO that may occupy the affected areas. Each NSO in the analysis area is likely to respond differently to depending on a wide variety of factors, with the primary factor being the current distribution and abundance of suitable habitat in their activity center. Salvage harvest units would contain snag retention clumps situated around riparian reserves, drainages, and groups of pre-existing snags that would offer cover and potential edge habitat between the unit and unburned areas in an attempt to offset the effects from the removal of the fire affected habitat and the creation of large openings. Without knowing the exact role that fire affected habitat plays in NSO fitness and fecundity, it is extremely difficult to establish the full extent of effects to NSO from the removal of this habitat. Inferences can be made, when considering the current research on NSO use of post-fire landscape, that when this habitat is present within core use areas (particularly if recently occupied) that it is likely used to some degree for foraging and its removal would constitute a reduction in foraging opportunity, at least in the short term.

Snags and large downed logs

Large snags and large down logs are considered biological legacies in the post-fire environment and play an important role in the long term growth of the future stand (Lindenmayer et al. 2008). Large snags and large down logs are also essential attributes for the development of the old forest ecosystem and associated species such as the NSO. Snags may stand for decades and in time, may become future nest trees as the regenerating forest nears maturity, although few large snags may be expected to remain intact by that time.

Snag dynamics are complex and depend on many factors (Cluck and Smith 2007). Once recruited into coarse woody debris on the ground, it serves as an important element in owl habitat as part of many aspects in the life cycles of NSO prey (Verner et al. 1992). Thus, decaying wood serves different functional roles overtime, first providing cover for spotted owl prey in the complex early seral stage of the forest, and ultimately decaying and playing a critical role in soil development of older forests.

The removal of dead/dying trees and down woody material through salvage harvest reduces fuel loading, and the reduction in fuel loading may promote the development of old forest habitat. However, the effectiveness of salvage (and fuels) treatments proposed is difficult to predict and there is considerable uncertainty with how salvage logging influences future fire. A review of

recent research on post-wildfire management and the associated controversy can be found in Long et al. (2014). Salvage harvest is controversial because few short-term positive ecological effects and many potential negative effects have been associated with post-fire logging (Long et al. 2014). However, it is known that salvage harvest reduces fuel loading over time (i.e. as snags fall, large surface fuel loadings result) and reduced surface fuel loads may reduce soil and forest regrowth damage in a re-burn. Re-burns in areas of high severity can lengthen the time for establishment of late successional forest needed for the reproductive success of the NSO (USDI 2011). Further, salvage may improve the likelihood of future reforestation that, contingent upon future surface fuels management and treatment at appropriate scales, would re-establish forests with large trees and sufficient canopy cover within shorter time frames (see project Silviculture report).

The effect salvage logging has on re-burn fire severity of future mature forest habitat is highly variable depending on numerous factors including fuels treatments, fire management, climate and drought conditions. However, as stated in the Fuels report, reducing fuel loads, especially activity generated fuels, is expected to reduce flame lengths and fire line intensities. Also, preventing high fuel loadings along roadsides is expected to play an important role in reducing fire severity in the developing mature forest habitat, especially where roads are identified as critical fire management features. Salvage harvest may provide some benefit to NSO in the project area by providing some method for reducing the size and effects of high severity fire that can remove large portions of suitable NSO habitat for extended periods of time, though the degree of effectiveness of treatment is debated in current research.

In summary, according to the physical characteristics associated with NSO habitat, as defined in multiple peer reviewed documents including the NSO Revised Recovery Plan, severely burned habitat does not meet the characteristics of NSO habitat. Therefore, salvage harvest is not expected to represent a meaningful change in the availability of suitable nesting, roosting or foraging habitat. However, salvage harvest will remove substantial amounts of fire-affected habitat, though the degree to which NSO would be affected by this is relatively unknown and will likely be highly variable depending on habitat conditions within individual NSO territories. Based on the current research, we can anticipate some level of negative effects resulting from the removal of PFF or FANR, at least in the short-term. In addition, the effect of salvage harvest on fire behavior and management is controversial and debatable, but it may provide some benefit to NSO through the prevention of habitat loss and the promotion of future habitat.

Roadside Hazard Tree Removal

As described above in the called “Direct Effects”, impacts to suitable NRF habitat are expected to be minimal due to an overall lack of treatment in these habitats. Areas with lower fire severity have substantially fewer fire killed/injured trees and would therefore have less treatment. Where hazard tree removal occurs in suitable NRF, it would degrade 217 acres of NRF habitat by removing elements of the habitat (i.e. snags) that may be used by foraging NSO. NSO are not likely to use areas that have experienced high severity fire for nesting or roosting, and consequently the removal of the fire-killed trees along roads in high fire severity is not expected to remove nesting/roosting habitat, though PFF and FANR is targeted for removal.

Snag density will be largely affected in areas of high and moderate severity burns where all commercial-sized hazard trees that have a 60 percent probability of mortality or greater based on the mortality (salvage) marking guidelines within 200 feet (in rare circumstances, the treatment distance may extend to 250feet) from the road may be removed, and depending on remaining fuel load, understory fuels treatment may occur. Given the uncertainty in the number of trees harvested in treatments in moderate and high severity burn areas, we are assuming that removing all dead or dying trees (≥60 percent probability of mortality) affected by moderate and high fire

severity will remove too many trees for PFF or FANR to provide physical structure for foraging NSO and will result in the removal of FANR and PFF; 31 acres of FANR and 547 acres of PFF would be removed with hazard tree removal. When evaluated across the entire project area, these acres represent a relatively small amount of habitat. In addition, treatments are spread across a wide area, within numerous different watersheds and are not concentrated in specific areas.

Impacts from roadside hazard removal are expected to be essentially the same as those described for salvage harvest, except that roadside hazard removal would more commonly occur in smaller units, since harvest would generally only occur within 200 feet on either side of the road in pockets of moderate and high fire severity. However, these harvest areas differ from salvage harvest in that they would not contain snag retention patches, legacy trees and riparian reserve retention, as these would defeat the purpose of removing hazards from along the road. Retention would only occur where pockets of lower burn severity are interspersed with the high severity and not targeted for treatment.

Many hazard tree removal units occur along roads within core areas and the removal of FANR and PFF may negatively affect the NSO associated with that core if the treatment units were located in areas used by NSO. Impacts to NSO would be dependent on the availability and distribution of habitat within their home range and core areas; so that ACs with sufficient NRF habitat would likely be less affected by the removal of relatively small amounts of FANR and PFF, whereas ACs that were heavily impacted by fire, would be more limited on habitat and the removal of even small amounts of fire-affected habitat may cause negative effects. Impacts to individual ACs are described and tabulated in the discussion on individual activity centers and in the tables in Appendix C.

Felling hazard trees within post fire habitat will make them unavailable as future nest, roost, and perch sites as future stands develop thus nest, roost, or perch sites will not be available until the regenerating trees reach a size where they can be used by NSO. In addition, the large fire killed trees removed in these areas would have been large downed logs if they were not removed through harvest; removing these large snags may have negative impacts to prey species that use downed logs and woody debris during many of their life stages. When hazard tree removal occurs in combination with fuels treatments, there is an additive negative effect to the habitat from treating both the overstory and simplifying the understory structure. The acres where this occurs are tabulated in the summary of effects tables, and will be described below in the fuels treatment discussion.

Fuels treatments – WUI, FMZ, Roadside Fuel Treatments and Underburning

Roadside Fuel Treatments – ‘Complete’ and ‘Modified’ Treatments

Roadside fuel treatment prescriptions are based on an analysis of the solar radiation and the influence this has on fire behavior and vegetation/habitat. Areas with high solar radiation are generally hotter, drier slopes such as south and southwest facing slopes and/or the upper slope positions. These areas generally do not contain high quality NSO habitat, and often lack the basic elements of suitable habitat. Consequently, the fuel treatments in these areas (known as “complete understory” prescription) will have a much lower likelihood of negative effects to NSO, though where treatment occurs in suitable habitat it is expected to downgrade NRF habitat to dispersal habitat.

Areas of low solar radiation generally occur on lower slope position, closer to the bottom of drainages and are the cooler, moister habitat often on north facing slopes and are more likely to

contain suitable and/or high quality NRF habitat. Treatments in these areas (considered "modified understory" prescription) have a higher potential of negative effects to NSO habitat because these treatments can occur in high quality habitat. However, the "modified understory" prescription has been adjusted specifically to reduce the level of negative effects to NSO habitat from treatment by retaining as much of the habitat function as possible while still achieving the fuels objective. The 'modified understory' prescription is expected to degrade habitat as compared to the 'complete understory' treatment that is expected to downgrade nesting/roosting and foraging habitat to dispersal.

Both treatments have short term impacts to habitat with the ultimate goal of long-term benefits in the form of habitat protection and promotion. These fuels treatments are intended to protect the remaining habitat within these areas by creating breaks in the fuel loading and clearing roads that may facilitate fire suppression when another fire occurs in the area.

Wildland Urban Interface (WUI) and Fuel Management Zones (FMZ)

WUI treatments and FMZ fuels treatments result in very similar effects to NSO habitat. These treatments are intended to break up the fuel continuity to provide effective breaks for fire control and suppression, and are therefore more intensive treatments to the understory than the roadside fuels prescriptions described above. These treatments will remove all the small trees and shrubs that provide cover habitat for prey species but the treatment will not target overstory trees except to prune limbs of larger trees. Therefore, these fuels treatments will reduce and simplify the understory to the point that nesting/roosting and foraging habitat will be downgraded to dispersal habitat.

Underburning

Underburning in suitable NRF habitat does not target overstory canopy, though it may somewhat simplify the understory structure. Underburning is tied to specific burn prescriptions that are typically related to fuel moisture content and other weather related conditions that allow for enough control of the timing and conditions as to result in a typically accurately applied burn. Generally, an underburn will consume most of the fine fuels (e.g. leaf litter) in a mosaic pattern, but occasionally a flare-up may occur and consume small trees. In rare occurrences, an underburn may create enough heat to kill a tree that is contributing to canopy cover. Despite these infrequent alternations to the overstory, the overall effect would not result in a degrading or downgrading of suitable NSO habitat. Underburning would occur within areas already burned during the 2014 fires, with the purpose of maintaining the reduced fuel load and create conditions conducive to naturally occurring fire. In addition, underburning would result in the regeneration of new growth in understory herbaceous vegetation and a subsequent increase in the amount of food and cover for NSO prey. It is in this way that underburning is considered to maintain and/or improve NSO habitat.

Site Preparation and Planting

Site preparation will remove small dead trees generally occurring within plantations. Plantations are not typically used by NSO possibly because of the relatively dense pattern of trees that would be difficult for an NSO to fly through for foraging. Given the small size of the trees in the plantations, NSO are not likely to have used these areas for nesting or roosting prior to the fire; and post-fire NSO are even less likely to use these areas for nesting or roosting. There is a

possibility that NSO may use the edges of these areas if prey becomes more accessible after the fire, where openings were created.

The proposed planting prescription of trees is a general minimum spacing of 12 feet between seedlings. The seedlings have an estimated probability of mortality of about 40-50% thus increasing the spacing between seedlings when mortality occurs. The seedlings will be planted after the fuels are reduced to meet desired fuels conditions in the salvage harvest and site preparation and plant units. No herbicide will be used to control shrubs in the project, but proposed treatments may post-pone shrub growth (i.e. fuels treatment) or interrupt shrub growth in small pockets (i.e. possible hand treatment around seedlings). The goal for planted areas is to have a variable spaced conifer stand with a mix of species, densities and distribution. In general, understory brush will naturally regenerate in areas where grubbing around seedlings does not occur.

Release includes manually removing all vegetation within a maximum of a five-foot radius from a planted or naturally regenerated conifer seedling (grubbing). This will result in approximately 40 percent planted of a given acre to be treated (i.e. grubbing and planting), with the remaining 60 percent regenerated naturally in herbaceous and brush vegetation; thereby avoiding the “row crop” appearance of older style plantations.

Treatment units will likely have a variety of stages of early seral vegetation that will likely diversify food sources for foraging for NSO with a wide-range of vegetation conditions. Overall, NSO will have diverse habitat types to forage within and the species and density of which will to reflect the habitat type. Effects to NSO prey are presented in the section below (Effects on prey, competitors, and predators).

Table G-16: Acres of habitat affected by treatment type within NSO analysis area. Overlap occurs within treatment areas that results in the appearance of increased acres of treatment. This overlap was not counted in the Effects Analysis, as each acre was counted only once for the analysis.

NSO habitat within Analysis Area	NRF				FANR	PFF 1	PFF 2	Dispersal		
	74,175				1,259	9,536	6,864	52,554		
Treatment Type	NRF Removed (acres)	NRF Downgraded (acres)	NRF Degraded (acres)	NRF Maintained (acres)	FANR Removed (acres)	PFF 1 Removed (acres)	PFF 2 Removed (acres)	Dispersal Removed (acres)	Dispersal Degraded (acres)	Dispersal Maintained (acres)
Salvage Harvest	58*	0	0	0	133	1,031	1,127	17*	0	0
Roadside Hazard Only	0	0	217	2,163	31	547	353	0	0	1,298
Wildland Urban Interface	0	430 (downgrade to dispersal)	0	0	1	12	5	0	539	0
Fuel Management Zone	0	1,354 (downgrade to dispersal)	0	0	8	105	60	0	1,151	0
Roadside Hazard overlap with complete fuels	0	298 (downgrade to dispersal)	0	0	15	91	61	0	424	0
Roadside Hazard overlap with modified fuels	0	0	849	0	6	20	2	0	294	0
Underburn only1	0	0	0	3,304	0	0	0	0	0	2,070
Site/prep and plant	0	0	0	0	0	0	0	0	0	0
Roadside hazard overlap with underburn	0	0	223	0	5	48	22	0	240	0
Treatment Type	NRF Removed (acres)	NRF Downgraded (acres)	NRF Degraded (acres)	NRF Maintained (acres)	FANR Removed (acres)	PFF 1 Removed (acres)	PFF 2 Removed (acres)	Dispersal Removed (acres)	Dispersal Degraded (acres)	Dispersal Maintained (acres)

NSO habitat	NRF				FANR	PFF 1	PFF 2	Dispersal		
Roadside Complete – Fuels Only	0	118 (downgrade to dispersal)	0	0	1	7	5	0	138	0
Roadside Modified – Fuels Only	0	0	405	0	2	7	2	0	266	0
Landings	24	0	0	0	1	9	9	15	0	0
Temporary Roads	0	0	0	0	0	6	6	0	0	0
	TOTAL									
Acres (% Change in Analysis Area NSO Habitat)	82 (0.1%)	2,200 (3%)	1,694 (2%)	5,467 (7%)	203 (16%)	1,883 (20%)	1,652 (24%)	32 (<0.01%)	3,052 (6%)	3,368 (6%)

* Although salvage harvest is not planned to occur within NRF and dispersal habitat, a combination of unintended impacts during implementation and natural effects (e.g. wind) may degrade habitat features to the point where the habitat may not retain its function. To account for these potential effects, 10% of the NRF and dispersal habitat occurring in the salvage treatment units is reported here as a loss of habitat. This is likely an over estimate of effects since these effects should be incidental and infrequent.

Effects to Individual Activity Centers

The purpose of this analysis is to determine the level of anticipated effects resulting from the proposed activities which will result in a determination: 1) "likely to adversely affect" (LAA); 2) "may affect, but not likely to adversely affect" (MANLAA); or 3) "no effect" (NE). Each activity center was analyzed for effects to habitat from all treatment types individually as well as from the additive impact of overlapping treatments. Some activity centers were affected by only one treatment type while others had many overlapping treatments that impacted large proportions of the home range and core areas. Salvage harvest is not proposed in core areas for ACs identified as "high" or "moderate" "habitat fitness potential" (except four "moderate" ACs) but all other treatments may occur in both home ranges and core areas. In order to determine the level of effects for a large number of activity centers affected by the proposed activities, a systematic numerical process was developed that relates NSO reproduction and fitness to habitat quantity, quality, and distribution as it may meet the needs of an NSO pair and possible offspring. This process was applied to all ACs but resulted in numerous ACs requiring further site specific analysis in order to decisively conclude an effects determination.

The first step in the process was to identify the ACs that are expected to receive treatment that will clearly affect important biologically relevant habitat minimum recommendations. This first step is displayed as a series of statements or "intensity factors" (described in the Methods section above) (Table G-17). Intensity factors were established to determine the potential for adverse effects to activity centers based on amount and degree of treatment, treatment type (whether it removed, downgraded or degraded habitat), in addition to the amount of existing suitable NRF in the core area and home range (and the relative impact of high severity fire to that habitat).

Each activity center was evaluated using "intensity factors" (Table G-17); if the treatment(s) resulted in effects as described in each of the intensity factors, then that AC was identified with a letter ("A", "B", "C", "D", "E", or "F") to match the intensity factor (Table 16). All ACs that were assigned a letter will receive the determination of "likely to adversely affect" (LAA). Of the 85 activity centers evaluated for this project, 30 have LAA determinations resulting from the intensity factor analysis. However, the other activity centers that did not receive a LAA determination using the intensity factor process received further site-specific evaluation, as described below.

Table G-17: Intensity factors used to evaluate activity centers for adverse effects and subsequent determinations.

Category	Intensity Factors for LAA Determinations
A	Treatment will result in the core and home range falling below 20% of NRF and FANR.
B	Treatment will result in the core and home range falling below 40% of NRF and FANR.
C	For core and home range with 20% – 40% NRF and FANR, treatment will result in a downgrade or removal of NRF and FANR.
D	Treatment will result in >25% of the existing NRF, FANR, and PFF combined in the core and home range to receive treatment that will degrade NRF or remove FANR or PFF.
E	Treatment will result in cores with >220 acres of NRF falling below 220 acres of NRF.
F	Treatment will downgrade or remove NRF in the nest stand.

Table G-18: The activity center determinations based on the intensity factors described above. LAA = Likely to Adversely Affect.

Activity Center Number	Intensity Factor	Determination	Activity Center Number	Intensity Factor	Determination
0241	C	LAA	1258	B	LAA
0277	C	LAA	1265	C, F	LAA
0293	C	LAA	1266	C	LAA
0380	C	LAA	4099	C	LAA
0381	C	LAA	4143	C	LAA
0383*	C	LAA	9991*	B, E	LAA
1046	C	LAA	9992	A, C, E	LAA
1109*	C	LAA	9994	A	LAA
1112b*	C	LAA	9996*	C	LAA
1121	C	LAA	9998*	C	LAA
1122	C	LAA	0276A	C	LAA
1130*	C	LAA	0276B	C	LAA
1212*	C	LAA	NEW3A	A, C, D	LAA
1213	C, F	LAA	NEW3B*	D	LAA
1214	C	LAA	NEW7A	C	LAA
			NEW7B	C	LAA

*Indicates an occupied AC as of 2015 surveys.

Following the analysis of intensity factors, the remaining ACs either did not warrant a LAA determination or they required further site specific evaluation to establish the magnitude and intensity of effects of the proposed activities. These determinations were made based on a variety of conditions that extended beyond the analysis of intensity factors in order to incorporate finer details, such as potential noise disturbance from project activities nearby, as well as treatments occurring within the core or home range.

Several ACs have treatments proposed that would trigger both an Intensity Factor and additional site specific disturbance due to actions that would occur before the first three surveys are complete and would not occur within the LOP described in the project design features. Activity centers 4133, 1265, 1202 and NEW3A have salvage treatment proposed within their core and/or home range that may occur prior to July 9 and completion of the first 3 surveys. Effects from this action to NSO are expected to be minimal because the harvest would occur within extensive high severity burned areas that do not contain, and are not adjacent to, patches of suitable habitat and NSO are not expected to be occupying these areas. Units without LOPs have been evaluated for their location in relation to areas of suitable habitat, topography, NSO detections and overall probability that an NSO would occur in or near the area. Where it was deemed extremely unlikely that an NSO would use the area, or the even lower probability that they would nest in the area, the necessity for an LOP was evaluated and lifted as appropriate. If year of action surveys indicate NSO within or near the designated units, then LOPs would be re-evaluated and potentially re-assigned.

In addition, the ACs within the Beaver fire area had extenuating circumstances as a result of the patchwork ownership and extensive harvest on private lands where suitable NRF is being removed within many of the ACs. Therefore, the ACs in the Beaver fire area were evaluated separately to distinguish the effects from the proposed activities on national forest lands from the currently ongoing effects from private land harvest and the subsequently reduced amount of

baseline habitat present within each AC. The determinations and rationale for each determination are shown in the tables below.

Table G-19: Activity Center determinations for the remaining ACs where further site specific evaluation was needed following the analysis of intensity factors. LAA = Likely to Adversely Affect; MANLAA = May Affect, Not Likely to Adversely Affect; NE = No Effect. Where a MANLAA determination is made, the assumption is that *no meaningfully measurable negative effects are expected to NSO habitat or to NSO that may occupy this AC from the proposed treatments.* Where the determination is made for NE*, the assumption is that No effects, including beneficial effects, would occur as a result of the proposed activities.* Where a LAA determination is made, the assumption is that effects from the proposed treatments are *not insignificant or discountable* and may cause adverse effects to that AC[13].

Determinations for Activity Centers in the Happy Camp and Whites fire areas		
Activity Center	Determination	Rationale for Determination
0229	MANLAA	FMZ proposed along outer portion of home range but does not overlap suitable NRF. No appreciable increase in the level of noise disturbance. Roads present in core and home range would not receive hazard tree treatment.
0245	MANLAA	FMZ proposed along outer portion of home range but does not overlap suitable NRF. No anticipated increase in noise disturbance from project activities.
0247	MANLAA	Small amount of habitat (11 ac.) is affected in the home range, but the habitat will be 'maintained' with treatment. No anticipated increase in noise disturbance from project activities.
0252	MANLAA	Very small amount of roadside fuels treatment on outer portion of home range but does not overlap suitable NRF. No anticipated increase in noise disturbance from project activities. Roads present in core and home range would not receive hazard tree removal treatment.
0255	MANLAA	Roadside modified treatment along outer edge of home range, not within suitable NRF. Possible noise disturbance in outer portion of home range from helicopter landing located outside of home range. Disturbance may occur in portion of home range where NSO use is less likely due to topographic features and limited amounts of habitat.
0257	MANLAA	FMZ treatment proposed along prominent ridgeline at approximately 7,000 ft. elevation. Treatment may downgrade 31 ac of foraging habitat along this ridgeline, though this habitat is less likely to be used by NSO due to the high elevation so effects are not anticipated. Site prep and plant (SPP) units and a very small amount of hazard tree removal are located on the opposite side of the prominent ridgeline away from core and are unlikely to impact NSO.
0272	LAA	Low certainty of AC placement due to a lack of access for surveys and adequate levels of habitat across activity center allowing for multiple options for concentrated use areas. Two salvage units and a portion of another unit are located along the outer edge of home range, but situated amongst suitable NRF, thereby increasing potential for effects to NSO that may be using the suitable NRF. Also, noise disturbance from helicopter landings along outer edge of home range adjacent to suitable NRF will raise noise levels above ambient levels due to topography. Duration will likely be approximately 5 days and possibly within reproductive period.

[13] "Likely to adversely affect" determination is appropriate when the biological assessment finds any "adverse effect to listed species that may occur as a direct or indirect result of the proposed activities or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or wholly beneficial.

Determinations for Activity Centers in the Happy Camp and Whites fire areas		
0322	MANLAA	FMZ treatment proposed would affect 1 ac of NRF along outer edge of home range along southwest facing slope and ridgeline; remaining acres of FMZ treatment not within suitable NRF.
0365	MANLAA	FMZ treatment along ridgeline, small WUI treatment, Complete roadside fuels treatment and a portion of a prescribed burn would downgrade or maintain a small amount of NRF in a home range with adequate levels of suitable NRF; therefore no meaningful impacts are anticipated. No appreciable increase in the level of noise disturbance.
0567	MANLAA	AC located on outer edge of project area with very small amount of habitat (2 ac) affected by WUI treatment on the outer edge of home range, opposite side of Klamath River, along a high use road.
1027	LAA	Degrading habitat in a deficit core and removal of PFF and FANR in a home range that is below threshold, in addition to the disturbance caused by hauling through a core area and hazard tree removal along a major ingress/egress road that crisscrosses the core and home range. Helicopter landings in core and home range will likely increase noise disturbance in the area. All combined to result in a LAA.
1028	MANLAA	FMZ treatment along ridgeline road would downgrade 22 ac of foraging habitat in an AC that contains above recommended minimum levels of suitable habitat. Habitat located along a prominent ridgeline is less likely to be used by NSO. Therefore, the downgrading of this amount of foraging habitat along a ridgeline in the outer edge of a home range that contains adequate levels of NRF is not expected to cause appreciable impacts NSO that may occupy this AC. Ingress/Egress road along outer edge of home range only and occurs along a prominent ridgeline that may require hazard tree removal during reproductive season; but NSO are unlikely to be nesting along a ridgeline and most of treatment would occur around 6,000 feet elevation.
1029	LAA	FMZ and roadside hazard, would downgrade and degrade NRF as well as remove PFF in home range; potentially abundant roadside hazard in core area, some of which occurs along an ingress/egress road in the home range; resulted in LAA.
1030b	MANLAA	FMZ proposed along ridgeline would downgrade a small amount (17 ac) of foraging habitat in an area that NSO are unlikely to use due topography and marginal quality of habitat affected. Roadside hazard would only impact a few small pockets of moderate and high severity (totaling 14 ac of PFF and FANR) generally outside the core area. Underburning will maintain and promote habitat and is therefore not considered to have negative impacts to NSO. Site prep is planned for a few areas within the home range but habitat will not be affected. Timing was an important factor in the determination of effects from these activities because they are highly unlikely to occur at the same time and will not occur in the same place and therefore no overlap in time and space for each action. The minimal effects from each action will be spread across a period of approximately 10 years, further reducing effects to NSO.
1039	LAA	Modified roadside fuels (NRF degraded) in core, and downgraded and degraded in home range as well as roadside hazard along ingress/egress road in both core and home range. Combined effects to habitat as well as disturbance resulted in LAA.

Determinations for Activity Centers in the Happy Camp and Whites fire areas		
1040	LAA	NRF removed (3ac) in home range, and substantial amounts downgraded and degraded in home range. Roadside hazard along two ingress/egress roads in home range. Salvage in home range with PFF removal. Roadside hazard, fuels treatments, and SPP in core area (not ingress/egress). Combined effects to habitat as well as disturbance resulted in LAA.
1041*	LAA	PFF, FANR and NRF removed and degraded in home range. Roadside hazard along ingress/egress road in an Active AC. Core would have LOP, but not all of home range would. Combined effects to habitat as well as disturbance resulted in LAA.
1047b*	LAA	Roadside hazard along main county road that crosses the core and home range that would remove hazard trees in small pockets of fire-killed trees within otherwise suitable high quality NRF; treatment will degrade a small amount of habitat, but is not insignificant or discountable due to its location in the core of an active AC. No other activities proposed that would negatively affect NSO or habitat.
1100	LAA	Disturbance from salvage and helicopter landings added to the removal of PFF and FANR from an AC that is already well below recommended habitat minimums caused this to be a LAA determination.
1101	MANLAA	Relative level of habitat was factored into this determination. This AC is well above recommended levels of habitat (2,576 ac NRF). One salvage unit occurs in outer portion of home range would remove 39 ac of PFF1. Although 27 ac of roadside hazard occurs home range, suitable habitat would not be affected. A negligible level of disturbance would be expected from the harvest of one unit in the outer portion of the home range on the opposite side of a drainage amongst unsuitable habitat, when abundant NRF occurs well away from the salvage unit on the other end of the home range and is likely the area of NSO use in this AC.
1110*	LAA	Degrading a small amount NRF and removing a small amount of PFF in an AC that is already below habitat minimums (less than 20%). In addition, potential for disturbance from a major haul route and ingress/egress road through core and home range.
1111	MANLAA	AC is unlikely to persist in this location due to extremely low levels and patchily distributed habitat in both the core and home range (much less than 20%) ,with only 29ac of foraging habitat remaining in the core and minimal opportunity to shift (very limited habitat) within the home range. FMZ and roadside complete fuels treatment generally occur above 6,000 ft. elevation and on opposite side (from core) of a prominent ridgeline. Treatments may affect this AC but are unlikely to have adverse impacts particularly due to the very low likelihood that NSO occur in this location.
1116	LAA	NRF downgraded and substantial PFF removed in home range. Potential disturbance from haul route and landings in home range. Combined effects to habitat as well as disturbance resulted in LAA.
1117	NE	Very small amount of site prep and plant on outer edge of the home range within less than 1 ac of suitable habitat affected. No other treatment or disturbance is anticipated; therefore, no effects are expected to NSO habitat or to NSO that may occupy this AC.

Determinations for Activity Centers in the Happy Camp and Whites fire areas		
1119	MANLAA	Small amount of FMZ on outer edge of the home range, with 2 ac. of foraging habitat affected along a very prominent ridgeline (Grider Ridge). No other treatment or disturbance is anticipated; therefore, no meaningfully measurable negative effects are expected to NSO habitat or to NSO that may occupy this AC.
1164	NE	Activity center is located on outer edge of analysis area; with only less than 1 acre of habitat downgraded from roadside fuels on very outer edge of home range and remaining AC is outside of fire perimeter. No other treatment or disturbance is anticipated; therefore, no effects are expected to NSO habitat or to NSO that may occupy this AC.
1202	LAA	Core and home range highly impacted by moderate and high severity fire and is not expected to have persisted at this site as positioned. AC is likely to have shifted to suitable habitat within and outside home range. However, substantial removal of PFF and FANR through salvage in core and home range, as well as NRF downgraded in home range. Multiple landings adjacent to habitat that did not burn at high severity as well as roadside hazard and concentrated haul routes will increase disturbance in the area. Disturbance will also come from the salvage harvest of units where no LOPs will be applied. Harvest will occur in high severity burned areas where no suitable habitat occurs, so no habitat modification will occur but disturbance to NRF within 0.25 miles may occur. No expectation of direct harm, but possible noise disturbance during implementation. Combined effects to habitat as well as disturbance resulted in LAA.
2124	MANLAA	AC is below recommended levels of habitat. WUI treatment would downgrade 14 ac of foraging habitat along outer edge of home range. But, treatment occurs in habitat that occurs adjacent to Highway 96 and this habitat is less likely to be used by NSO due to increased levels of noise disturbance from traffic. Therefore, treatment to this habitat is less likely to have meaningful impacts to NSO that may occupy this site.
4026	MANLAA	FMZ treatment occurs along outer edge of home range in small amount of habitat (3 ac downgraded); very minimal roadside hazard would occur due to low fire effects in the area and would not impact suitable habitat. No other treatment or disturbance is anticipated; therefore, no meaningfully measurable negative effects are expected to NSO habitat or to NSO that may occupy this AC.
4133	LAA	Core and home range highly impacted by moderate and high severity fire and is not expected to have persisted at this site as positioned. AC is likely to have shifted to suitable habitat within and outside home range. However, substantial removal of PFF through salvage in core and home range, as well as NRF downgraded in core and home range. Multiple landings located near habitat that did not burn at high severity. Roadside hazard and concentrated haul routes through core and home range and salvage in units without the July 9 LOP will increase disturbance in the area (see Project Design Features for list of units that do not have LOPs). Roadside hazard along ingress/egress road through core and home range. Combined effects to habitat as well as disturbance resulted in LAA.

Determinations for Activity Centers in the Happy Camp and Whites fire areas		
9990	LAA	Core and home range highly impacted by moderate and high severity fire and is well below recommended habitat minimums. AC is not expected to have persisted at this site as positioned and is likely to have shifted away from currently delineated position. However, salvage units, landings and roadside hazard are juxtaposed amongst foraging habitat that did not burn with high severity and may therefore cause disturbance if habitat is used. Roadside hazard in core and home range as well as along ingress/egress road. Combined effects to habitat as well as potential for disturbance resulted in LAA.
999314	MANLAA	FMZ is proposed for an existing road and dozerline used during the 2014 fires that follows a ridgeline within the home range and would be maintained with fuels treatment extended off the dozerline using understory treatments. FMZ treatment would downgrade a minor amount of habitat in the home range to dispersal habitat, but would not preclude use of the habitat. Treatment occurs along a mid-level topographic feature between patches of suitable NRF but would not result in a condition where NSO would no longer be able to disperse across it to other areas within the home range.
9995	LAA	Moderate amount of PFF removed and NRF downgraded and degraded in home range that is slightly below minimum habitat levels. Potential disturbance from roadside hazard along ingress/egress roads in home range with no LOP.
9999	MANLAA	No suitable NRF would be affected in the core or home range. Salvage (~50 ac) occurs in contiguous patch of high severity in the outer home range, with only 1 acre of PFF1 removed. Site prep and plant occurs in the home range but would not affect suitable habitat. No other treatment or disturbance is anticipated; therefore, no meaningfully measurable negative effects are expected to NSO habitat or to NSO that may occupy this AC.
99910	LAA	Moderate amount of PFF removed and NRF downgraded and degraded in a home range that is above minimum habitat levels. Potential disturbance from roadside hazard along ingress/egress road in home range that has treatment of moderate and high severity juxtaposed amongst suitable NRF.
99912	LAA	Moderate amount of PFF removed and NRF downgraded and degraded in a home range that is above minimum habitat levels. Potential disturbance from roadside hazard in home range along ingress/egress road that has treatment of moderate and high severity juxtaposed amongst suitable NRF in core area and home range. One landing in home range may also contribute to disturbance.

[14] Patches of suitable NRF in the home range of this AC overlap the core areas of three other ACs; these patches of NRF are less likely to be used by the NSO associated with 9993 because they comprise the core areas of these three other ACs. FMZ treatments are more likely to affect the ACs where treatment crosses their core areas rather than this AC where treatment crosses the parts of the home range that are less likely to be used by the NSO associated with 9993. NSO in this AC are unlikely to shift away from their core areas because the remaining habitat in their home range is not available to them if these other ACs are occupied and defending their territory. This AC is below the recommended levels of habitat (less than 20%) and is categorized as Low Fitness Potential, and is therefore unlikely to persist and contribute to demographics as currently positioned. The currently small amount of habitat in this AC is not a result of the 2014 fires, but is a result of having burned three times in the last 30 years

Determinations for Activity Centers in the Happy Camp and Whites fire areas		
0096A	NE	Very small piece of site prep and plant unit on outer portion of home range that does not occur in suitable habitat. No increase in noise disturbance is anticipated from project activities due to AC's location on outer edge of project area. No effects are anticipated.
0278A	MANLAA	FMZ is proposed for an existing road (ML2) and dozerline used during the 2014 fires that follows a ridgeline within the core area and home range, and would be maintained with fuels treatment extended off the dozerline using understory treatments. FMZ treatment would downgrade some habitat to dispersal habitat, but would not preclude use of the habitat. Treatment occurs along a mid-level topographic feature adjacent to suitable NRF and would downgrade 26 acres but would not result in a condition where NSO would no longer be able to disperse across the treated areas to other areas within the home range. No other activities are proposed and no increase in noise disturbance is anticipated from project activities due to AC's location on outer edge of project area.
0278B*	MANLAA	Effects to this AC are the same as described above for 0278A, except that additional treatments would occur in this home range in suitable NRF with WUI and Modified roadside fuels treatment. So that FMZ and WUI treatments described in the AC Effects Table are not expected to appreciably affect this AC because the vast majority of these treatments have already been completed with 2014 fire suppression actions and these treatments would maintain desired fuels condition already present in the treatment units. Therefore, only the Modified roadside fuels treatment would have the potential for effects to NSO in this AC by degrading 35 acres of NRF in the home range but ultimately benefitting the habitat in the AC by reducing the risk of habitat loss from high severity fire. No treatments (other than FMZ described above) are proposed for the core area. No noise disturbance is anticipated; surveys will be completed prior to implementation and an LOP will be applied if the AC is determined to be active.

Determinations for the Beaver Fire Area

The Beaver Fire area experienced extensive amounts of high and moderate fire severity followed by a large proportion of salvage harvest on private land. As described in an earlier section ("evaluation of activity centers specifically in the Beaver Fire area"), multiple ACs were highly impacted by the fire and salvage harvest on private land and subsequently have very low levels of habitat remaining in the core and home range. Given the extremely low levels of available habitat due to high severity fire in combination with patchwork land ownership and associated salvage harvest, it would be very difficult for NSO to shift (described in the earlier section called "methods of assessing habitat fitness potential of fire affected activity centers") their location and still find sufficient resources to reproduce. There are eight ACs that are currently in this situation (0239, 0283, 0346, 4144, 4145, 4146, 99913, and 99914) in the Beaver fire area. These eight ACs may contain only between 106 to 485 acres of suitable habitat in home range and core areas combined, as a result of salvage harvest and high severity fire on the private land within the AC - far below the recommended habitat minimums (1,336 acres of NRF). Because timber harvest on private land is ongoing, it is difficult to predict exactly where suitable habitat will be removed and where it may remain unharvested. Private land harvest in the Beaver fire area does not appear to be based on effects from high fire severity, so that green trees (i.e. suitable NRF) and fire affected trees are being removed. Because of the uncertainty in the location and extent of private land harvest, we estimated a range of acres of habitat that may be present in ACs where suitable habitat on private land may or may not be harvested within the core and/or home range.

Given the uncertainty of the NSO habitat use patterns in this area after such large scale disturbances, we were unable to establish whether these ACs would be able to persist in this landscape with such low levels of suitable habitat remaining. For the purposes of this analysis, we made the assumption that the ACs that existed in the Beaver fire area prior to the 2014 fires would still be present, until we are able to establish a lack of occupancy with more certainty, even though we suspect that suitable habitat is so limited that it is highly unlikely that many of these ACs are currently occupied or will become occupied in the foreseeable future.

Surveys of the area in 2015 have had only one NSO observation (a single male in KL0283) in the entire Beaver fire area after 6 survey efforts. During the 2015 NSO surveys a single male in AC 0283 was detected in a nighttime survey and daytime follow up; this male was detected early in the survey effort during implementation of harvest on private land and was not detected in any subsequent visits. Given the current condition of AC 0283 (about 342 acres of suitable habitat in entire AC) and no nearby habitat to provide for a shift, this AC is even less likely to persist than other ACs that have more habitat or nearby habitat that would allow for an AC shift.

Any actions within this AC were deemed as adverse, since the AC was already extremely limited on habitat, though it is acknowledged that this AC is already highly unlikely to persist regardless of the proposed activities on national forest land.

Table G-20: Comparison of activity centers affected by the Beaver Fire[1] within the analysis area that contain potential salvage harvest on private land[1].

AC Number[2]	NSO habitat within core and home range prior to salvage harvest on private lands within Beaver Fire area			NSO habitat within core and home range with the habitat on private land REMOVED within the Beaver Fire area		
	NRF (acres)	FANR (acres)	PFF1 (acres)	NRF (acres)	FANR (acres)	PFF1 (acres)
0239[3]	535	0	0	485	0	0
0254	406	0	4	380	0	0
0283	606	11	301	342	9	189
0284	868	0	0	861	0	0
0315	1,868	0	32	1,804	0	3
0346	257	11	194	106	6	84
0499	1,522	0	1	1,519	0	0
4128[3]	742	0	0	742	0	0
4129[3]	449	0	0	449	0	0
4143	1,308	19	171	709	7	33
4144	313	8	48	247	6	22
4145	750	34	207	285	15	65
4146	438	11	292	216	6	140
99913	872	8	133	410	3	43
99914	387	10	55	259	7	27
99915	1,197	7	86	783	1	10

[1]At the time of writing this document we received an estimated portion of private land harvested in the Beaver fire, but we have not confirmed the exact distribution completed on-the-ground thus we are assuming these data are correct.

[2]There are two ACs (0322 and 2124) analyzed in this project that are adjacent to the Beaver Fire perimeter and don't overlap any portion of the fire thus these ACs are not included in this table.

Table G-21: Determinations of Effect specific to the Beaver Fire area; separated from other ACs due to extenuating circumstances resulting from combined effects of wildfire and salvage harvest on private industrial timber lands in the area.

Determinations for Activity Centers in the Beaver Fire area

Determinations for Activity Centers in the Beaver Fire area		
Activity Center	Determination	Rationale for Determination
02393	LAA	FMZ treatment in core and WUI, SPP and roadside hazard in home range; activities would downgrade a small amount of NRF in an AC that is already substantially below habitat minimums.
0254	MANLAA	FMZ treatment occurs in core, but within unsuitable habitat along south facing slope; and in home range in foraging habitat (13 ac.) directly along ridgeline.
0283	LAA	AC has extremely low levels of habitat; WUI, SPP and roadside hazard in the home range and roadside hazard in core, in some of the last remaining habitat on national forest land in the Beaver fire area. WUI and SPP may have shorter term effects but may provide long term benefit if this AC were to persist. This AC is likely combined with 99913, or 0346 and/or 4146 due to limited amounts of patchily distributed habitat.
0284	MANLAA	Roadside hazard treatment is indicated to maintain 12 ac of NRF but this area is unlikely to be targeted for hazard removal due to a lack of fire effects.
0315	MANLAA	Roadside hazard treatment is indicated but this area is unlikely to be targeted for hazard removal due to a lack of fire effects. Fuels treatment is proposed to downgrade 3 ac of NRF along outer edge of home range that contains adequate levels of NRF. No appreciable increase in the level of noise disturbance.
0346	LAA	AC has extremely low levels of habitat. Small amount of FMZ proposed, but any activities proposed are deemed adverse; though it is acknowledged that this AC is highly unlikely to persist due to a lack of habitat, regardless of activities proposed on national forest land. This AC is likely combined with 4146 and/or 0283 due to limited amounts of patchily distributed habitat.
0499	MANLAA	FMZ treatment along ridgeline affecting 1 ac of NRF in an AC with adequate levels of suitable habitat, effects are expected to be very minimal, but may not be insignificant or discountable. No appreciable increase in the level of noise disturbance.
41283	NE	No suitable habitat is affected. FMZ occurs within home range but does not overlap suitable habitat and no suitable habitat is nearby. No other treatment or disturbance is anticipated; therefore, no meaningfully measurable negative effects are expected to NSO habitat or to NSO that may occupy this AC.
41293	MANLAA	FMZ treatment occurs along outer edge of home range in small amount of foraging habitat (3 ac downgraded) along south facing slope; habitat is not likely to be favored by any NSO that may occupy the area. No other treatment or disturbance is anticipated.
4143	LAA	Analyzed using the Intensity Factors analysis above.
4144	LAA	FMZ, roadside hazard and WUI proposed in home range, but AC has extremely low levels of habitat. Small amount of FMZ and WUI proposed, but any activities proposed are deemed adverse; though it is acknowledged that this AC is highly unlikely to persist due to a lack of habitat, regardless of activities proposed on national forest land.
4145	LAA	Modified fuels treatment, SPP, and roadside hazard in core. FMZ, WUI and Complete fuels treatment in home range; treatment in suitable NRF in an AC that is well below habitat minimums.

Determinations for Activity Centers in the Beaver Fire area		
4146	LAA	AC has extremely low levels of habitat. FMZ and roadside hazard is proposed in NRF; any activities proposed in NRF are deemed adverse due to currently low levels of habitat; though it is acknowledged that this AC is highly unlikely to persist due to a lack of habitat, regardless of activities proposed on national forest land. This AC is likely combined with 0346 and/or 0283.
99913	LAA	AC has extremely low levels of habitat; FMZ and roadside hazard is proposed in the outer portion of the home range in a small amount of NRF; any activities proposed in NRF are deemed adverse due to currently low levels of habitat; though it is acknowledged that this AC is highly unlikely to persist due to a lack of habitat, regardless of activities proposed on national forest land. This AC is likely combined with 4145 and/or 0283 since current levels of habitat in this AC are too low to support an AC.
99914	LAA	Prescribed burning, WUI, FMZ and roadside hazard in the home range affect a small amount of NRF, but AC has extremely low levels of habitat and is likely combined with 4144, since levels of habitat are too low to support an AC.
99915	MANLAA	Treatments would occur within the outer portion of the home range, AC may become isolated and highly fragmented as a result of salvage harvest occurring on private land within the home range. If harvest occurs, NSO use patterns within this AC would be altered. Habitat on national forest land where treatments are proposed would become too isolated, and NSO would need to cross the large openings created by private land salvage in order to access this habitat. Given that this is unlikely, particularly due to the available habitat in the opposite direction (away from proposed treatment areas), proposed treatments are not expected to result in negative effects to the NSO.

[3]Three home ranges (0239, 4128, and 4129) overlap private land in the Beaver Fire perimeter but no known salvage harvest is scheduled for this portion of private land.

Summary of Effects to Individual Activity Centers

In summary, of the 85 ACs in the analysis area, there are 55 'LAA' determinations, 26 'MANLAA' determinations, and 4 'NE' determinations. On the west side of the Forest[15], there is a total of about 306 activity centers (from NRIS database and CNDDB combined with overlapping cores counted only once). Overall, 18 % of all activity centers on the west side of the KNF will be adversely affected by the proposed activities.

[15] Happy Camp/Oak Knoll and Salmon/Scott River Ranger Districts, excluding the Ukonom Ranger District

Table G-22: Summary of NSO habitat within the core and home range and the effects to habitat resulting from the proposed treatments - acres cannot be totaled at the bottom of columns due to overlapping activity centers (AC)

AC#	Pre-Implementation Habitat within Core			Pre-Implementation Habitat within Home Range			Acres Removed						Acres Downgraded		Acres Degraded		Acres Maintained		Post-Implementation Habitat within Core			Post-Implementation Habitat within Home Range		
	0 - 0.5 mile			0.5 - 1.3 mile			0 - 0.5 mile			0.5-1.3 mile			0 - 0.5 mile	0.5 - 1.3 mile	0 - 0.5 mile	0.5 - 1.3 mile	0 - 0.5 mile	0.5 - 1.3 mile	0 - 0.5 mile			0.5 - 1.3 mile		
	NRF	FANR1	PFF11	NRF	FANR	PFF1	NRF*	FANR	PFF1	NRF*	FANR	PFF1	NRF	NRF	NRF	NRF	NRF	NRF	NRF	FANR	PFF1	NRF	FANR	PFF1
0229	181	0	0	714	0	0	0	0	0	0	0	0	0	0	0	0	0	0	181	0	0	714	0	0
02393	138	0	0	347	0	0	0	0	0	0	0	0	3	4	0	0	0	3	136	0	0	342	0	0
02412	270	3	64	1,001	21	137	0	1	16	4	5	80	42	65	13	62	59	136	227	2	48	932	15	57
0245	48	0	0	679	6	13	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0	679	6	13
02472	299	0	0	678	0	40	0	0	0	0	0	0	0	0	0	0	0	11	299	0	0	678	0	40
0252	67	0	0	347	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	0	0	347	0	0
02543	214	0	0	166	0	0	0	0	0	0	0	0	0	13	0	0	0	0	214	0	0	153	0	0
02552	110	0	0	861	0	0	0	0	0	0	0	0	0	0	0	0	0	0	110	0	0	861	0	0
0257	445	0	0	1,407	0	57	0	0	0	0	0	10	0	31	0	0	0	43	445	0	0	1,376	0	47
02722	202	32	159	1,176	81	535	0	0	0	2	0	36	0	0	0	0	0	0	202	32	159	1,173	81	499
0277	261	0	0	857	0	0	0	0	0	0	0	0	0	24	0	14	0	0	261	0	0	833	0	0
02833	143	3	109	199	6	80	0	0	13	0	4	28	0	53	0	0	49	42	143	3	96	147	2	52
02843	76	0	0	785	0	0	0	0	0	0	0	0	0	0	0	0	0	12	76	0	0	785	0	0
02932	138	0	0	983	0	5	0	0	0	0	0	0	0	26	0	19	0	72	138	0	0	957	0	5
03153	327	0	0	1,477	0	3	0	0	0	0	0	3	0	3	0	0	0	35	327	0	0	1,475	0	0
0322	356	0	0	1,190	0	0	0	0	0	0	0	0	0	1	0	0	0	0	356	0	0	1,189	0	0
03463	73	4	54	33	2	30	0	0	1	0	1	7	0	4	0	0	17	11	73	4	53	29	1	23
0365	151	0	0	1,145	0	0	0	0	0	0	0	0	0	4	0	0	0	12	151	0	0	1,140	0	0
0380	306	3	38	826	21	47	0	0	0	0	0	0	0	65	0	11	1	5	306	3	38	760	21	47
03812	175	4	11	820	4	45	0	0	1	0	0	2	5	9	25	43	6	6	169	4	9	811	4	43
03835	193	9	29	863	19	126	0	0	0	2	4	35	21	54	0	8	0	13	172	9	29	807	15	91
04993	340	0	0	1,179	0	0	0	0	0	0	0	0	0	1	0	0	0	0	340	0	0	1,178	0	0
0567	241	0	0	735	0	0	0	0	0	0	0	0	0	2	0	0	0	0	241	0	0	733	0	0
10272	117	2	6	1,300	33	173	0	0	2	1	7	55	0	41	15	89	102	874	117	2	5	1,259	27	118
1028	247	0	0	1,269	0	1	0	0	0	0	0	1	0	22	0	3	0	17	247	0	0	1,247	0	0
1029	286	3	36	1,649	21	280	0	1	6	0	0	13	0	49	0	5	94	583	286	2	30	1,600	21	267
1030B4	385	3	18	1,003	26	361	0	0	0	0	1	13	0	17	0	0	15	293	385	3	18	986	25	347
1039	243	19	66	1,481	44	226	0	0	1	3	6	28	0	76	0	60	10	49	243	19	65	1,401	38	198
10402	278	3	30	1,096	7	243	0	1	4	2	4	47	0	0	0	52	42	73	278	2	26	1,094	4	196
10412	229	8	36	924	18	200	0	0	0	3	7	11	0	25	37	125	27	134	229	8	36	897	11	189
10462	181	0	0	714	0	0	0	0	0	0	0	0	0	0	0	0	0	0	181	0	0	714	0	0
1047B2, 4	331	0	0	1,123	7	49	0	0	0	0	0	0	0	0	85	153	182	258	331	0	0	1,123	6	48
1100	199	3	23	634	3	88	0	0	0	0	1	27	0	0	0	0	0	93	199	3	23	634	1	60
1101	458	6	8	2,118	25	245	0	0	0	2	0	39	0	0	0	0	0	27	458	6	8	2,116	25	206
1109	282	0	2	898	2	82	0	0	0	0	1	43	0	20	0	0	46	116	282	0	2	878	1	40
1110	200	0	14	664	4	26	0	0	4	0	0	2	0	14	0	0	29	76	200	0	10	650	4	25
1111	29	0	9	368	5	25	0	0	0	0	0	3	0	15	0	21	0	29	29	0	9	353	4	22
1112B4	189	2	5	698	41	274	0	0	0	1	11	105	0	27	0	0	15	68	189	1	5	670	30	169
1116	401	18	64	2,168	50	342	0	0	0	3	9	124	0	22	0	0	1	220	401	18	64	2,142	40	218
11172	145	18	113	490	79	367	0	0	0	0	0	0	0	0	0	0	0	0	145	18	113	490	79	367
11192	220	33	123	552	98	457	0	0	0	0	0	0	0	2	0	0	0	0	220	33	123	550	98	457
1121	193	22	177	670	72	439	0	0	4	2	8	112	3	31	0	0	0	11	191	22	174	637	65	327
1122	117	0	69	1,014	28	214	0	0	2	0	0	13	4	41	2	76	2	34	113	0	67	973	27	200
1130	208	13	69	1,006	72	370	0	2	21	2	16	185	0	103	16	32	39	95	208	11	48	901	56	185
1164	283	0	0	1,309	0	0	0	0	0	0	0	0	0	1	0	0	0	0	283	0	0	1,308	0	0
1202	14	1	23	639	8	210	0	0	20	4	2	69	0	16	0	0	6	62	13	1	3	619	7	141
12122	197	0	9	1,059	0	102	0	0	0	0	0	20	0	4	0	9	5	128	197	0	9	1,055	0	82
1213	233	0	4	816	10	210	0	0	0	0	0	14	12	35	35	54	13	56	221	0	4	781	10	196
12142	271	0	12	1,019	0	80	0	0	1	1	0	39	0	5	6	52	82	169	271	0	11	1,013	0	41
1258	211	17	100	1,045	66	263	0	2	11	2	10	46	0	44	0	15	5	146	211	16	89	998	56	216
1265	50	12	115	1,025	87	502	2	6	75	3	12	174	0	31	0	0	12	40	48	5	39	991	75	328
1266	243	35	105	729	109	496	0	0	0	14	42	260	0	30	0	3	0	43	243	35	105	685	67	236
2124	113	0	0	735	0	0	0	0	0	0	0	0	0	14	0	0	0	0	113	0	0	721	0	0

AC#	Pre-Implementation Habitat within Core			Pre-Implementation Habitat within Home Range			Acres Removed						Acres Downgraded		Acres Degraded		Acres Maintained		Post-Implementation Habitat within Core			Post-Implementation Habitat within Home Range		
	0 - 0.5 mile			0.5 - 1.3 mile			0 - 0.5 mile			0.5-1.3 mile			0 - 0.5 mile	0.5 - 1.3 mile	0 - 0.5 mile	0.5 - 1.3 mile	0 - 0.5 mile	0.5 - 1.3 mile	0 - 0.5 mile			0.5 - 1.3 mile		
	NRF	FANR1	PFF11	NRF	FANR	PFF1	NRF*	FANR	PFF1	NRF*	FANR	PFF1	NRF	NRF	NRF	NRF	NRF	NRF	NRF	FANR	PFF1	NRF	FANR	PFF1
4026	150	0	0	1,294	0	0	0	0	0	0	0	0	0	3	0	0	0	13	150	0	0	1,291	0	0
4099	283	0	37	842	12	279	0	0	1	3	2	54	0	7	0	0	50	39	283	0	36	832	11	225
41283	205	0	0	536	0	0	0	0	0	0	0	0	0	0	0	0	0	0	205	0	0	536	0	0
41293	69	0	0	380	0	0	0	0	0	0	0	0	0	3	0	0	0	0	69	0	0	377	0	0
41332	24	12	53	563	81	263	1	5	30	3	28	152	4	32	0	48	1	0	20	7	23	528	52	110
41433	121	3	19	588	4	16	0	1	12	0	0	6	20	23	0	0	24	56	101	2	7	565	3	9
41443	74	0	1	173	6	21	0	0	0	0	0	1	0	17	0	0	0	0	74	0	1	156	6	20
41453	102	11	51	184	4	15	0	1	7	0	1	2	6	15	10	21	0	1	96	10	44	168	3	12
41463	33	2	22	182	4	118	0	1	3	0	0	18	0	15	0	0	9	39	33	1	18	167	4	101
9990	151	0	80	415	2	208	0	0	19	1	0	78	0	3	0	0	37	45	151	0	60	411	2	130
9991	239	0	77	1,110	6	77	0	0	12	0	0	12	0	20	0	79	59	86	239	0	65	1,090	5	64
99922	240	0	5	539	1	11	0	0	2	0	1	4	69	121	0	20	140	123	171	0	3	418	0	7
9993	169	0	0	431	1	3	0	0	0	0	0	0	0	23	0	0	0	0	169	0	0	407	1	3
9994	174	1	6	504	5	27	0	0	0	0	0	0	10	19	0	0	0	0	164	1	6	485	5	27
99952	196	0	42	1,225	1	82	0	0	15	1	0	21	0	7	0	47	56	207	196	0	27	1,217	1	61
9996	160	0	4	795	1	64	0	0	1	1	1	31	0	78	12	11	119	94	160	0	3	716	0	33
9998	269	8	27	737	12	101	0	0	0	0	1	20	5	15	54	135	0	36	264	8	27	722	12	82
9999	100	31	76	1,169	43	363	0	0	0	0	0	1	0	0	0	0	0	6	100	31	76	1,169	43	362
99910	328	0	68	1,337	6	113	0	0	0	0	0	1	0	23	0	49	0	61	328	0	68	1,314	6	112
999122	278	5	53	1,562	10	110	0	1	15	2	5	62	5	89	47	48	227	740	274	4	38	1,471	5	48
999133	33	1	4	377	2	39	0	0	2	0	1	10	0	54	0	0	5	36	33	0	3	323	1	29
999143	17	1	4	242	7	23	0	0	0	0	0	1	0	25	0	0	0	1	17	1	4	217	7	22
999153	119	0	0	664	1	11	0	0	0	0	0	7	0	5	0	0	0	9	119	0	0	659	1	4
0096A	279	0	0	1,077	3	50	0	0	0	0	0	0	0	0	0	0	0	0	279	0	0	1,077	3	50
0276A2	203	0	0	745	1	0	0	0	0	0	0	0	24	31	5	36	0	0	180	0	0	714	1	0
0276B2	120	0	0	864	1	5	0	0	0	0	0	0	18	51	18	36	0	0	102	0	0	814	1	5
0278A	282	1	13	552	5	32	0	0	0	0	0	0	11	15	0	0	0	0	271	1	13	537	5	32
0278B2	219	0	0	556	4	32	0	0	0	0	0	0	20	24	11	24	0	0	199	0	0	532	4	32
NEW3A	55	13	34	551	109	409	0	4	7	4	41	182	2	37	15	37	9	60	53	8	27	510	68	227
NEW3B	31	20	47	402	67	311	0	3	5	4	41	223	0	45	2	31	12	60	31	17	42	353	25	89
NEW7A2	139	0	0	944	0	12	0	0	0	0	0	0	1	38	33	48	0	101	138	0	0	906	0	12
NEW7B	97	0	0	1,122	8	128	0	0	0	4	5	74	3	95	12	76	1	161	94	0	0	1,023	3	54

*Although salvage harvest is not planned to occur within NRF and dispersal habitat, a combination of implementation and natural effects (e.g. wind) may degrade habitat features to the point where the habitat may not retain its' function. To account for these potential effects, 10% of the NRF and dispersal habitat occurring in the salvage treatment units (outside of riparian reserves) is reported here as a loss of habitat but this is likely an overestimate.

[1]FANR or fire-affected nesting/roosting is pre-fire nesting/roosting habitat that burned at moderate severity. PFF1 or post-fire foraging is pre-fire foraging habitat that burned at moderate and high severity and also includes nesting/roosting habitat that burned at high severity.

[2]Assumption: private land that burned at moderate and high severity may be harvested in the Whites and Happy Camp fire areas and these areas were removed from the existing acres of PFF and FANR.

[3]Most of the private land that occurs in the Beaver Fire area is owned by commercial timber companies and is currently being harvested. We assumed that all the FANR and PFF on private land will be removed and all NRFD on private land has been reduced in quality to the point that this NRFD will not likely function as habitat.

[4]NSO surveys in 2015 have detected a pair in close proximity (overlapping cores) to a known activity center. Although this pair may or may not be from the adjacent activity center, it is represented here as a possible "shift" and will be analyzed in its "shifted" location.

[5]NSO pair and single was detected on multiple occasions in the same drainage thus this analysis will analyze this as a new activity center.

Interdependent and Interrelated Actions

Roads

There will be no roads added to the National Forest Transportation System as a result of this project; about 3.3 miles of new temporary roads will be constructed and about 4.6 miles of temporary roads on existing roadbeds will be used for project access. Of those roads, 4.8 miles of previously decommissioned roads are proposed for reopening.

Landings

Existing landings will be used where possible. Landing size will be commensurate with operational safety. There will be 59 new helicopter landings and 25 existing helicopter landings used for the project, up to 2 acres in size. There will be 26 new skyline landings. New skyline landings off the road system and ground-based landings will average one acre in size but will not exceed 1.5 acres in size and will use roads wherever possible. There will be 15 new and 15 existing landings used for ground based operations. Both new and existing landings will be hydrologically stabilized after use. All landings will be implemented according to the project design features in chapter 2 of the EIS.

Activity Generated Fuels Treatments

Treatment of fuels generated by project activities will be necessary in areas where the proposed activities create hazardous fuels conditions. Where activity-created fuels exceed targeted levels of fuels, hand piling with or without burning, burning of concentrations, mastication, and/or chipping to reduce flashy fuel loads may occur. All treatments within suitable NSO habitat will be subject to limited operating periods. Treatment of concentrations of small-diameter surface fuels is not expected to have negative effects to the NSO or their habitat.

Traffic

As a result of the increased level of activity associated with project implementation, a subsequent increase in the amount of traffic on Forest System roads is anticipated across the project area. Higher than normal level of traffic and the associated noise has the potential to disrupt the normal behaviors of wildlife in the analysis area, including NSO. Where roads occur near or adjacent to areas used by NSO, there is also an increased chance for a vehicle to collide with an NSO (logging truck, heavy equipment transport, water tenders, personnel vehicles, etc.) likely resulting in mortality. The chance of this occurring is somewhat reduced, though not eliminated, by the generally nocturnal behavior of NSO and the typically diurnal nature of project implementation.

Effects on Prey, Competitors or Predators

Prey Species

Habitat that supports prey for NSO is an important component for the survival of owls and their offspring. Woodrats are one of the two more important prey species for NSO on the Forest, the other being northern flying squirrels. Snags are an important habitat component for flying squirrels. High quality woodrat habitat includes the shrubby vegetation that is essential for providing cover and food in forest habitat. In addition to brushy vegetation, components associated with NSO habitat such as downed logs, hardwoods and other woody material appear to be important components of woodrat habitat (Sakai and Noon 1993).

Fire consumes, alters, and creates snags used by nesting spotted owls and coarse woody debris used by spotted owl prey (USDI 2014). Because the proposed salvage is in post fire forest that is

likely no longer functioning in any meaningful way as flying squirrel habitat, it is not expected to further reduce flying squirrels or their habitat. However, fire increases the abundance of shrubby vegetation used by woodrats, and other prey species such as mice and vole species. Edge ecotones created from fire can be areas of increased woodrat abundance and exposure to foraging spotted owls (Zabel 1995). Research suggests that diffuse edges created by fire may be good habitat for woodrats (Sakai and Noon 1997), which are more likely to occur at high densities in areas with a mix of early seral conifer stands and late-successional forest habitat (Sakai and Noon 1993).

Salvage harvest removes some of the potential large woody debris that may have become habitat for prey species in the future as the stand canopy develops and cover from above becomes more readily available. In areas where salvage and roadside hazard tree removal is occurring, these areas will have reduced quality of habitat for prey species that rely on abundant large downed wood. However, snag retention areas and riparian reserves will contribute to an overall mosaic of areas with variable amounts of large woody debris, such that some areas will contain more large woody debris for use by NSO prey than others.

Site prep and planting will have a somewhat reduced amount of brush directly around conifer seedlings where up vegetation up to 5 feet around the planted seedling will be scraped away (grubbed) in order to allow the seedling to receive as much of the available nutrients and sunlight as possible when it is first established (see discussion above on Site Prep and Planting). This is a temporary loss of brush in small patches within planted areas but the remaining areas of the unit will contain regenerating brush throughout the unit. These areas are not expected to be limited on brush, and cover for NSO prey. However, site prep and plant units may not contain large amounts of large woody debris because many are located in previous plantations where the pre-fire stand contained only mid to early seral conifers and very little size and age class diversity.

The proposed project may have localized impacts to flying squirrels, woodrats, or other prey species in the analysis area due to the removal of potential large woody debris across an extensive area and a loss of connectivity and concealment cover in affected areas. Salvage harvest targets standing fire-killed trees which would have provided future potential large woody debris, though in areas outside the salvage harvest areas where there will be abundant large woody debris. Areas that sustained high severity fire provide more open conditions which can accelerate the development of the brush and hardwood understory and thus provide more palatable/nutritious forage and cover for prey species. Shrubs will quickly re-sprout (e.g., the following spring) and provide forage and habitat.

Barred Owl / Spotted Owl Interactions

Many studies have found negative correlations between NSOs and barred owls where they co-occur but the effect of forest management on barred and spotted owl interactions is not well documented. Limited habitat availability combined with negative influences of barred owls may compound effects to NSO (Dugger 2005, Dugger 2011, Kelly and Forsman 2003, Wiens 2014). The analysis area contains NSO habitat that is well distributed with most occurring on the lower 2/3 of slopes except the drainages that contain a large portion of high severity fire such as Walker Creek, Lower Grider Creek, Rancheria Creek, Tom Martin Creek, Buckhorn Gulch, and Kohl Creek.

Barred owls are known to occur within portions of the action area within the Horse Creek drainage. Available evidence suggests that the presence and distribution of barred owls may affect habitat quality for spotted owls (Wiens 2014, Yackulic et al. 2012). Additionally, many studies suggest that the two species compete for resources and maintaining older, high quality forest habitat may help spotted owls persist, at least in the short-term (USDI 2014).

To date, there are no known forest conditions, including post-fire landscapes, where spotted owls have a competitive advantage over barred owls. It is also not known if forest habitat removal directly results in a local range expansion of barred owls (USDI 2014).

In the absence of information on barred owl use of post-fire landscapes and because best available information indicates that barred owls are a forest habitat generalist but select pre-fire spotted owl NRF habitat similar to spotted owls (Hamer et al. 2007 and Wiens et al. 2014), it can reasonably be assumed that barred owls could also make use of PFF habitat (USDI 2014).

If there is similar use of this type of habitat, the competitive interactions between the two species may not be exacerbated. However, because there is relatively less overall habitat on the landscape, post-fire, and barred owls are generally the dominant species, it is possible that competitive interactions between the two species may occur where they overlap in post fire habitat.

The long-term trend of barred owl and spotted owl interactions in this area is not known. The proposed treatments are intended to aid in the re-establishment of suitable NSO habitat and reduce fuels accumulations that would put high quality NSO habitat at risk during another high severity wildfire.

Cumulative Effects

Under the Endangered Species Act, cumulative effects on the environment are “those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation” (50 CFR 402.02). Cumulative effects on the environment result from the anticipated additive effects of future State and private actions that are reasonably certain to occur along with the likely effects of the proposed Federal action. This should be distinguished from effects that may accumulate when small, incremental amounts of habitat are lost over time through a variety of management activities and natural events that occur across a landscape. These kinds of effects are addressed in the environmental baseline.

The analysis area includes Federal lands administrated by the Klamath National Forest. There is also private land within the project area, predominantly industrial timber lands.

Temporal bounding for this analysis is defined by the timeframe for actions that are proposed and may occur in the reasonably foreseeable future. To determine future forest management actions on private lands within the analysis area, the timber harvest plan database was reviewed to determine if there were any proposed projects within the analysis area that have been submitted for approval.

There are no State lands within the analysis area; consequently no future actions will occur on State lands.

Private lands within the analysis area are predominately industrial timber lands. Future actions on private lands are likely to involve active forest management. In order to evaluate future actions on private lands within the analysis area, the Timber Harvest Plan database was accessed to determine if future forest management actions were planned within the analysis area (Table G-23).

The Beaver project area is comprised of checkerboard ownership, with the majority of the private land held by industrial timber companies. The private land was also burned during the Beaver fire and is currently undergoing salvage harvest operations on at least 75% of the land burned during the fire. Fire severity does not appear to influence the areas chosen for salvage. For the purposes of this analysis, we are assuming that harvest operations that have not yet happened will continue in the same manner as those that have already occurred. Therefore, the land will be cleared of the vast majority of the trees with very few snags retained; consequently the current and future condition is not considered as suitable habitat for NSO. See Table G-30of Appendix A for a list of the future foreseeable or ongoing projects on national forest lands in the analysis area.

The Whites and Happy Camp project areas are more contiguous ownership, with the vast majority comprised of national forest system lands. The private lands in these project areas were also affected by the 2014 fires in varying amounts and may be harvested, but currently do not have any timber harvest plans filed.

Table G-23: Current and future projects proposed within the analysis area on private lands

Project Name	Acres of Activity in Analysis Area	Current or Future Projects
Timber Harvest Plan No. 17	70	Unknown
Timber Harvest Plan No. 27	550	Unknown
Timber Harvest Plan No. 41	1,290	Unknown
Timber Harvest Plan No. 85	130	Unknown
Timber Harvest Plan No. 87	200	Unknown

IX. Effects on Designated Critical Habitat

The USFWS revised previous designations of NSO critical habitat in 2012. The final rule was published on December 4, 2012 and went into effect on January 3, 2013.

Physical or Biological Features

For the northern spotted owl, the physical or biological features (PBFs) essential to the conservation of the species are forested areas that are used or likely to be used for nesting, roosting, foraging, or dispersing. PBFs are made up of primary constituent elements that provide one or more of the following life-history requirements:

- 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, or rearing (or development) of offspring; and

Habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.

The 2012 ruling addressed several influences on these PBFs, including:

- climate;
- elevation;
- topography;
- disturbance regimes;
- the pattern and distribution of habitat;
- forest community type (composition); and
- population spatial requirements.

Generally, typical Forest Service management actions such as the one proposed cannot alter the first three influences: climate, elevation and topography. These are hard features of the landscape or global system that are not modified by the relatively small scale of single management actions. However, the following four influences addressed in the Revised Recovery Plan may be modified, at least locally, by management actions.

Disturbance Regimes

Generally management actions do not affect the larger influences of disturbance regimes such as climate and climate patterns but may affect the severity or frequency of events on the local landscape. For example, the overall fire regime of an area is not modified by a single management action but the likely results of an event may be modified by management.

Excess hazardous fuels that are generated by project activities will be treated through a variety of methods including hand piling with/without burning, burning of concentrations, mastication, and/or chipping to reduce fuel loads. The goal of these treatments is to reduce surface fuels to levels that would allow any future fires in the project area to burn within the historic range of fire severity and intensity. In other words, these treatments would attempt to maintain conditions that allow for historic levels of fire severity.

The Pattern and Distribution of Habitat

Suitable forest types in the drier parts of the range (interior northern California, Klamath region, interior southern Oregon, and east of the Cascade crest in Oregon and Washington) occur in a mosaic pattern interspersed with infrequently used vegetation types such as open forests, shrubby areas, and grasslands. As described in the final ruling, natural disturbance processes in these drier regions likely contributed to a pattern in which patches of habitat in various stages of suitability shifted positions on the landscape through time. In the Klamath Mountains Provinces of Oregon and California, and to a lesser extent in the Coast and Cascade Provinces of California, large areas of serpentine soils exist that are typically not capable of supporting northern spotted owl habitat.

The proposed project is not expected to affect the larger scale mosaic pattern of habitat within the analysis area.

Forest Community Type (Composition)

Landscape-level patterns in tree species composition and topography influence the distribution and density of northern spotted owls. Even when different forest types have similar structural attributes, these differences in northern spotted owl distribution occur. This suggests that northern spotted owls may prefer specific plant associations or tree species. NSO infrequently use some forest types, such as pine-dominated and subalpine forests, regardless of their structural attributes. NSO select forests with high proportions of Douglas-fir trees in areas east of the Cascade Crest.

The effects of tree species composition on habitat selection also extend to hardwoods within conifer-dominated forests. For example, the USFWS habitat modeling showed that the proportion of hardwoods present negatively affected the habitat value in the central Western Cascades. At the home range and core area scales, locations occupied by northern spotted owls consistently have greater amounts of mature and old-growth forest compared to random locations or unused areas. The proportion of older or structurally complex forest within the home range varies greatly by geographical region but typically falls between 30 and 78 percent (Blakesley et al. 2004). Differences between northern spotted owl sites and random locations diminished as circles of increasing size were evaluated suggesting habitat selection is stronger at the core area scale than at the home range and landscape scales. The proposed project is not expected to influence landscape level patterns of forest community type or tree composition.

Population Spatial Requirements
Areas that contain the physical or biological features described in the Final Ruling must provide habitat in an amount and distribution sufficient to support persistent populations. This includes metapopulations of reproductive pairs, and opportunities for nonbreeding and dispersing owls to move among populations are considered essential to the conservation of the northern spotted owl.

Northern spotted owls maintain large home ranges that vary in size across nearly an order of magnitude across the species range, from about 1,400 to 14,000 acres (570 to 5,700 hectares), depending on geographic latitude and prey resources. Overlap occurs among adjoining territories, but the large size of territories nonetheless means that populations of northern spotted owls require landscapes with large areas of habitat suitable for nesting, roosting, and foraging. For example, in the northern parts of the subspecies 'range where territories are largest, a population of 20 resident pairs would require at least 100,000 acres (about 40,500 hectares) of habitat that is relatively densely distributed and of high quality.

When the northern spotted owl was listed as threatened in 1990 (55 FR 26114; June 26, 1990), habitat loss and fragmentation of old-growth forest were identified as major factors contributing to declines in northern spotted owl populations. As older forests were reduced to smaller and more isolated patches, the ability of northern spotted owls to successfully disperse and establish territories was likely reduced. The effects of the proposed project will not alter the spatial requirements required for population viability.

Primary Constituent Elements

Primary constituent elements are those specific elements of the physical or biological features that provide for a species' life-history processes and are essential to the conservation of the species.

In the critical habitat rule the Primary Constituent Elements (PCEs) focus on four components, the first of which must be included along with one of the last three. The four elements are:

- Forest types that may be in early-, mid-, or late-seral stages and that support the northern spotted owl across its geographical range,
- Nesting and roosting habitat,
- Foraging habitat (subdivided into four ecological zones, two of which apply to the Klamath NF) , and
- Dispersal habitat (subdivided into transience and colonization phases of dispersal).

These PCEs are quoted from the critical habitat rule. In the following analysis, we will refer to these PCE categories as PCEs 1, 2, 3 and 4 with subdivisions discussed as appropriate. This document only evaluates project effects in relation to the 2012 critical habitat ruling and supersedes as appropriate any previous analysis of critical habitat effects.

PCE 1, Forest Type:

These activities can occur in early-, mid-, or late-seral forest types identified in the PCEs in the final rule. On the Forest, this includes the mixed conifer and mixed evergreen type, the Douglas-fir type, the Shasta red fir type and a small amount of the moist end of the ponderosa pine, coniferous forest zones.

PCE 2, Nesting and Roosting habitat:

Sufficient foraging habitat to meet the home range needs of territorial pairs of northern spotted owls throughout the year.

Stands for nesting and roosting that are generally characterized by:

- Moderate to high canopy closure (60 to over 80 percent):
- Multilayered, multispecies canopies with large (20 to 30 inches or greater dbh) overstory trees;
- High basal area (greater than 240 square feet/acre);
- High diversity of different diameters of trees;
- High incidence of large live trees with various deformities (e.g., large cavities, broken tops, mistletoe infections, and other evidence of decadence);
- Large snags and large accumulations of fallen trees and other woody debris on the ground; and
- Sufficient open space below the canopy for northern spotted owls to fly.

PCE 3, Foraging habitat in the Klamath/Northern California Interior Coast Ranges Ecological Zones [West Cascades and Redwood sections not considered].

(b) Klamath and Northern California Interior Coast Ranges

(i) Stands of nesting and roosting habitat; in addition, other forest types with mature and old-forest characteristics;

(ii) Presence of the conifer species, incense-cedar, sugar pine, Douglas-fir, and hardwood species such as bigleaf maple, black oak, live oaks, and madrone, as well as shrubs;

(iii) Forest patches within riparian zones of low-order streams and edges between conifer and hardwood forest stands;

(iv) Brushy openings and dense young stands or low-density forest patches within a mosaic of mature and older forest habitat;

(v) High canopy cover (87 percent at frequently used sites);

(vi) Multiple canopy layers;

(vii) Mean stand diameter greater than 21 inches;

(viii) Increasing mean stand diameter and densities of trees greater than 26 inches increases foraging habitat quality;

(ix) Large accumulations of fallen trees and other woody debris on the ground; and

(x) Sufficient open space below the canopy for northern spotted owls to fly.

PCE 4, Habitat supporting the transience and colonization phases of dispersal:

(a) Habitat supporting the transience phase of dispersal, which includes:

(i) Stands with adequate tree size and canopy cover to provide protection from avian predators and minimal foraging opportunities; in general this may include, but is not limited to, trees with at least 11 inches dbh and a minimum 40 percent canopy cover; and

(ii) Younger and less diverse forest stands than foraging habitat, such as even-aged, pole-sized stands, if such stands contain some roosting structures and foraging habitat to allow for temporary resting and feeding during the transience phase.

(b) Habitat supporting the colonization phase of dispersal, which is generally equivalent to nesting, roosting, and foraging habitat as described in PCEs (2) and (3), but may be smaller in area than that needed to support nesting pairs.

Threats to Critical Habitat

One of the primary threats to NSO is identified as past and current habitat loss. While loss due to timber harvest has slowed considerably since the time of listing, loss due to high severity fires in some portions of the range remains high. Recent information pertaining to habitat lost to wildfire in the relatively dry East Cascades and Klamath Provinces suggests that fire may be more of a threat than was previously thought. Specific to the California Klamath Province, approximately 40,000 acres of NSO nesting and roosting habitat has been lost to fires between 1996 and 2006, most of which is in reserved land allocations (Davis et al. 2011).

Effects to PCE's

The proposed project will affect PCEs 2, 3, and 4. Nesting/roosting, foraging and dispersal habitat types will be both removed and degraded by proposed activities. The scope and scale of the project causes increased and additive impacts to critical habitat, particularly where treatments overlap each other. Hazard tree removal and salvage harvest will remove large snags and future downed logs across a wide expanse of the landscape; where salvage occurs in concentrated areas it will create large openings with little structure or cover. High severity fire created openings in many of these areas. Salvage harvest and hazard tree removal will remove many of the snags that would provide for future stand development, though snag retention areas and riparian reserves will alleviate this effect. **Effects expected to occur from each treatment type are described above in the Effects to NSO Habitat discussion.**

The analysis area is located within four subunits; KLW7, KLW8, KLE6, and KLE7. These subunits were established to function as NSO demographic support (USDI 2012 page 71933); resource agencies are encouraged to work toward maintaining or enhancing the characteristics of older forest and providing large habitat blocks and associated forest conditions. Regional

variations should be taken into account; in the Klamath Province this means providing mosaics of interior habitats and edges to provide for the diversity of prey. Management activities that contribute to recovery goals through risk reduction such as the removal of ground and ladder fuels, and the restoration of ecosystem processes that lead to the development or replacement of spotted owl habitat, are recommended. The current number of acres for PCE 2, 3, and 4 are presented in the following tables. The proportion of habitat within each subunit that is affected by the proposed activities is described in the following tables.

The following tables describe the effects from each treatment type to the critical habitat subunit in which the treatment occurs and summarizes the habitats affected. As described above, the analysis area for critical habitat is the suitable habitat (NRFD) within a subunit that falls within a 1.3 mile buffer around all treatment types. For this analysis, FANR, PFF1 and PFF2 are components of future habitat and are presented separately to display the same categories across analyses.

Table G-24: Acres of Pre- and Post-Fire NSO Critical Habitat in the critical habitat analysis area

NSO Critical Habitat Subunit	Acres of CH subunit in analysis area	Pre-Fire Critical Habitat			Post-Fire Critical Habitat and FANR and PFF					
		Nesting/ roosting (acres)	Foraging (acres)	Dispersal (acres)	Nesting/ roosting (acres)	Foraging (acres)	Dispersal (acres)	Fire Affected Nesting/ Roosting	PFF1	PFF2
KLE6	4,918	952	972	1,293	887	808	1,097	12	118	99
KLE7	34,860	10,636	9,088	8,637	6,884	5,887	5,656	656	3,552	2,744
KLW7	26,754	2,341	8,304	7,255	2,220	7,593	6,655	66	643	123
KLW8	27,601	7,300	7,687	7,241	6,324	6,447	5,656	215	1,598	402
Total	94,133	21,229	26,050	24,426	16,315	20,735	19,065	950	5,911	3,368

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Table G-25: Treatment effects in the portion of the critical habitat subunits that overlap the critical habitat analysis area - each subunit has a separate table

Critical Habitat Subunit Klamath East 6														
NSO habitat within Critical Habitat Analysis Area	Nesting/Roosting (PCE 2) (acres)				Foraging (PCE 3) (acres)				Dispersal (PCE 4) (acres)			Fire Affected Nesting/ Roosting (acres)	Post-Fire Foraging 1 (acres)	Post-Fire Foraging 2 (acres)
	887				808				1,097			12	118	99
Habitat Type and Effect	Nest/Roost Removed (acres)	Nest/Roost Downgraded (acres)	Nest/Roost Degraded (acres)	Nest/Roost Maintained (acres)	Foraging Removed (acres)	Foraging Downgraded (acres)	Foraging Degraded (acres)	Foraging Maintained (acres)	Dispersal Removed (acres)	Dispersal Degrade (acres)	Dispersal Maintained (acres)	Fire Affected Nesting/ Roosting Removed 1 (acres)	Post-Fire Foraging 1 Removed (acres)	Post-Fire Foraging 2 Removed (acres)
Salvage Harvest	0*	0	0	0	0*	0	0	0	0	0	0	0	0	0
Roadside Hazard	0	0	3	101	0	0	7	63	0	6	62	2	30	15
Wildland Urban Interface	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fuel Management Zone	0	67 (downgrade to dispersal)	0	0	0	59 (downgrade to dispersal)	0	0	0	0	0	1	22	16
Roadside Hazard overlap with complete fuels	0	0	0	0	0	1 (downgrade to dispersal)	0	0	0	0	0	0	0	0
Roadside Hazard overlap with modified fuels	0	0	0	0	0	0	17	0	0	22	0	0	0	0
Underburn only	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Site/prep and plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Roadside hazard overlap with underburn	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Roadside Complete – Fuels Only	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Roadside Modified – Fuels Only	0	0	0	0	0	0	5	0	0	0	0	0	0	0
Landings2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary Roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acres (% Change in PCEs within Critical Habitat Analysis Area)	0 (0%)	67 (8%)	3 (0.3%)	101 (11%)	0 (0%)	60 (7%)	29 (4%)	63 (8%)	0 (0%)	28 (26%)	62 (6%)	3 (25%)	52 (44%)	31 (31%)
Critical Habitat Subunit Klamath East 7														
NSO habitat within Critical Habitat Analysis Area	Nesting/Roosting (PCE 2) (acres)				Foraging (PCE 3) (acres)				Dispersal (PCE 4) (acres)			Fire Affected Nesting/ Roosting (acres)	Post-Fire Foraging 1 (acres)	Post-Fire Foraging 2 (acres)
	6,884				5,887				5,656			656	3,552	2,744
Habitat Type and Effect	Nest/Roost Removed (acres)	Nest/Roost Downgraded (acres)	Nest/Roost Degraded (acres)	Nest/Roost Maintained (acres)	Foraging Removed (acres)	Foraging Downgraded (acres)	Foraging Degraded (acres)	Foraging Maintained (acres)	Dispersal Removed (acres)	Dispersal Degrade (acres)	Dispersal Maintained (acres)	Fire Affected Nesting/ Roosting Removed 1 (acres)	Post-Fire Foraging 1 Removed (acres)	Post-Fire Foraging 2 Removed (acres)
Salvage Harvest	8*	0	0	0	12*	0	0	0	5*	0	0	49	478	604
Roadside Hazard	0	0	24	126	0	0	40	380	0	29	239	18	233	232
Wildland Urban Interface	0	42 (downgrade to dispersal)	0	0	0	24 (downgrade to dispersal)	0	0	40	0	0	0	0	0
Fuel Management Zone	0	35 (downgrade to dispersal)	0	0	0	125 (downgrade to dispersal)	0	0	54	0	0	4	32	7
Roadside Hazard overlap with complete fuels	0	14 (downgrade to dispersal)	0	0	0	45 (downgrade to dispersal)	0	0	20	0	0	12	66	48
Roadside Hazard overlap with modified fuels	0	0	46	0	0	0	41	0	0	43	0	4	8	1
Underburn only	0	0	0	25	0	0	0	82	0	0	74	0	0	0
Site/prep and plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Roadside hazard overlap with underburn	0	0	6	0	0	0	11	0	0	26	0	0	2	0
Roadside Complete – Fuels Only	0	4 (downgrade to dispersal)	0	0	0	9 (downgrade to dispersal)	0	0	9	0	0	0	3	3
Roadside Modified – Fuels Only	0	0	26	0	0	0	31	0	0	16	0	1	4	1
Landings2	3	0	0	0	5	0	0	0	5	0	0	0	3	3
Temporary Roads	0	0	0	0	0	0	0	0	0	0	0	6	6	0
Acres (% Change in PCEs within Critical Habitat Analysis Area)	11 (0.2%)	95 (1%)	102 (2%)	151 (2%)	17 (0.3%)	203 (3%)	123 (2%)	462 (8%)	133 (2%)	114 (2%)	313 (6%)	94 (14%)	835 (24%)	899 (33%)

Critical Habitat Subunit Klamath West 7														
NSO habitat within Critical Habitat Analysis Area	Nesting/Roosting (PCE 2) (acres)				Foraging (PCE 3) (acres)				Dispersal (PCE 4) (acres)			Fire Affected Nesting/ Roosting (acres)	Post-Fire Foraging 1 (acres)	Post-Fire Foraging 2 (acres)
	2,220				7,593				6,655			66	643	123
Habitat Type and Effect	Nest/Roost Removed (acres)	Nest/Roost Downgraded (acres)	Nest/Roost Degraded (acres)	Nest/Roost Maintained (acres)	Foraging Removed (acres)	Foraging Downgraded (acres)	Foraging Degraded (acres)	Foraging Maintained (acres)	Dispersal Removed (acres)	Dispersal Degrade (acres)	Dispersal Maintained (acres)	Fire Affected Nesting/ Roosting Removed 1 (acres)	Post-Fire Foraging 1 Removed (acres)	Post-Fire Foraging 2 Removed (acres)
Salvage Harvest	1*	0	0	0	3*	0	0	0	1*	0	0	8	61	39
Roadside Hazard	0	0	2	46	0	0	43	469	0	22	237	0	57	10
Wildland Urban Interface	0	6 (downgrade to dispersal)	0	0	0	39 (downgrade to dispersal)	0	0	58	0	0	0	0	0
Fuel Management Zone	0	47 (downgrade to dispersal)	0	0	0	155 (downgrade to dispersal)	0	0	174	0	0	0	4	0
Roadside Hazard overlap with complete fuels	0	8	0	0	0	86 (downgrade to dispersal)	0	0	144	0	0	0	0	2
Roadside Hazard overlap with modified fuels	0	0	83	0	0	0	180	0	0	103	0	1	4	1
Underburn only	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Site/prep and plant	0	0	0	0	0	0	0	0	0	0	0	11	96	11
Roadside hazard overlap with underburn	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Roadside Complete – Fuels Only	0	5	0	0	0	41	0	0	32	0	0	0	0	1
Roadside Modified – Fuels Only	0	0	37	0	0	0	181	0	0	121	0	1	1	0
Landings2	3	0	0	0	5	0	0	0	5	0	0	0	3	0
Temporary Roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acres (% Change in PCEs within Critical Habitat Analysis Area)	4 (0.2%)	66 (3%)	122 (5%)	46 (2%)	8 (0.1%)	321 (4%)	404 (5%)	470 (7%)	414 (6%)	246 (4%)	237 (4%)	21 (32%)	226 (35%)	64 (52%)
Critical Habitat Subunit Klamath West 8														
NSO habitat within Critical Habitat Analysis Area	Nesting/Roosting (PCE 2) (acres)				Foraging (PCE 3) (acres)				Dispersal (PCE 4) (acres)			Fire Affected Nesting/ Roosting (acres)	Post-Fire Foraging 1 (acres)	Post-Fire Foraging 2 (acres)
	6,324				6,447				5,656			215	1,598	402
Habitat Type and Effect	Nest/Roost Removed (acres)	Nest/Roost Downgraded (acres)	Nest/Roost Degraded (acres)	Nest/Roost Maintained (acres)	Foraging Removed (acres)	Foraging Downgraded (acres)	Foraging Degraded (acres)	Foraging Maintained (acres)	Dispersal Removed (acres)	Dispersal Degrade (acres)	Dispersal Maintained (acres)	Fire Affected Nesting/ Roosting Removed 1 (acres)	Post-Fire Foraging 1 Removed (acres)	Post-Fire Foraging 2 Removed (acres)
Salvage Harvest	7*	0	0	0	2*	0	0	0	2*	0	0	19	74	44
Roadside Hazard	0	0	7	131	0	0	8	106	0	6	64	5	25	3
Wildland Urban Interface	0	24 (downgrade to dispersal)	0	0	0	61 (downgrade to dispersal)	0	0	125	0	0	0	11	0
Fuel Management Zone	0	71 (downgrade to dispersal)	0	0	0	90 (downgrade to dispersal)	0	0	177	0	0	0	0	0
Roadside Hazard overlap with complete fuels	0	25 (downgrade to dispersal)	0	0	0	35 (downgrade to dispersal)	0	0	115	0	0	0	8	0
Roadside Hazard overlap with modified fuels	0	0	193	0	0	0	102	0	0	59	0	0	1	0
Underburn only	0	0	0	1,327	0	0	0	1,140	0	0	1,391	0	0	0
Site/prep and plant	0	0	0	0	0	0	0	0	0	0	0	0	8	0
Roadside hazard overlap with underburn	0	0	53	0	0	0	72	0	0	146	0	4	37	22
Roadside Complete – Fuels Only	0	6	0	0	0	5	0	0	8	9	0	0	1	0
Roadside Modified – Fuels Only	0	0	48	0	0	0	16	0	0	16	0	0	0	0
Landings2	3	0	0	0	5	0	0	0	5	0	0	0	3	0
Temporary Roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acres (% Change in PCEs within Critical Habitat Analysis Area)	10 (<0.01)	126 (2%)	301 (5%)	1,458 (23%)	7 (0.1%)	191 (3%)	198 (3%)	1,246 (20%)	432 (8%)	236 (4%)	1,455 (26%)	28 (13%)	168 (10%)	69 (17%)

[1] Fire affected critical habitat is defined as PFF1, PFF2, and FANR, but for clarity, FANR is separated from PFF1 and PFF2. * Represents 10% of NRF in salvage units. [2] Habitat affected by landing construction is an overestimate of effects.

For PCE 2 Nesting and Roosting Habitat, the project will affect the habitat components: *Large snags and large accumulations of fallen trees and other woody debris on the ground*. The felling of hazard trees will reduce potential nest and roost sites from nesting and roosting habitat, though in general this activity would not occur within currently suitable nesting/roosting habitat. Salvage harvest may affect the future development of the stand by removing the large snags that would fall and become large downed logs.

The "*large snags"* element of PCE 2 would be affected, and potential nest, roost and perch sites would be reduced, the impacts would affect the function of the fire-affected habitat, and the suitable nesting/roosting habitat where it occurs within hazard tree removal areas.

The element of PCE 2 that includes *"large accumulations of fallen trees and other woody debris on the ground"* will also be affected by the proposed project. For the portion of critical habitat that will have salvage activities, fire-killed trees that are over 14" dbh will be removed. In addition, fuel treatments will remove or re-arrange concentrations of woody debris. However, the salvage units will not be void of trees, snags, or woody debris. Between the low fire severity affected areas, additional snag retention, legacy tree retention, and retention of pre-fire existing snags, plus snags left within the units that could not be harvested do to implementation constraints, most, if not all, of the salvage units will have trees and/or snags retained in the unit.

For PCE 3 Foraging Habitat, the project will affect the habitat component: *large accumulations of fallen trees and other woody debris on the ground.* For the portion of critical habitat that will have salvage activities and hazard tree removal, salvage harvest and felling of hazard trees will affect the future development of the stand by removing the large snags that would fall and become large downed logs. In addition, fuel treatments targeting small diameter project-generated fuels will remove or re-arrange some concentrations of woody debris.

Areas of fire impacted habitat that will remain untreated, will provide an alternative supply of woody debris in some areas.

For PCE 4 Dispersal Habitat, the project will affect the habitat components *some roosting structures and foraging habitat to allow for temporary resting and feeding during the transience phase*. Felling of fire-killed trees will reduce potential perch sites from within foraging and dispersal habitat. In addition, it will reduce these habitat features from within non-suitable NSO habitat, making them unavailable as future stands develop.

Future Beneficial Effects for NSO and its Habitat

Since the mid-1980s, the frequency and intensity high severity wildfire in the range of the NSO has increased (Miller et al. 2009, Schwind 2008, Westerling et al, 2006 cited in Davis et al. 2011). Moeur (2011) noted similar findings related to the loss of late-successional and old-growth forests favored by northern spotted owls.

The fifteen year monitoring report for the Northwest Forest Plan (Davis et al. 2011) noted that:

Although the relationship between wildfire frequency and severity on owl demography is not fully understood, habitat loss is the primary reason for the owl's decline and subsequent listing as "threatened" under the Endangered Species Act (USDI 1990). The habitat monitoring results presented in chapter 3 (this report) identified wildfire as the leading cause of current spotted owl nesting and roosting habitat loss (3.4 percent) and its future recruitment on federal lands. This was also the finding in the 10-yearmonitoring report (Davis and Lint 2005), and since completion of that report, several more large wildfires have occurred within the owl's range and more nesting/roosting habitat has been lost. Thus, loss of habitat to wildfire remains a significant concern for the management and conservation of the spotted owl.

The 2011 Recovery Plan for the northern spotted owl also noted habitat loss or degradation from stand-replacing wildfire as one of the most important range-wide threats to the northern spotted owl (USFWS 2011). Davis et al. (2012) mapped areas prone to future large stand-replacing fires, noting the Klamath Province as one of the geographic areas most likely to experience large (>1,000 acres) stand-replacing fires in the future. Verifying this trend, in the wildfires that occurred in the 2014 Westside Fire Recovery Project area (Beaver, Whites, and Happy Camp fires) over 7,000 acres of functioning nesting-roosting habitat and 9,600 acres of foraging habitat were lost to stand-replacement fire. Thus, it is well established that stand-replacing, high intensity wildfire negatively affects NSO habitat within the Klamath Province and that the potential for future habitat losses in the Klamath Province is high. Given probable climate change scenarios, the rate of habitat loss from stand-replacement fire is likely to increase.

Recovery Action 10 in the NSO Recovery Plan directs agencies to consider both the short-term adverse impacts of fuels treatments and other activities, and long-term benefits (USFWS 2011). Long-term benefits include reducing the risk of future habitat loss from stand-replacing fire and actions that accelerate the development of regenerating habitat.

Although the previous sections of this document identify the more clearly discernible effects of the project on NSO and its habitat, there are several other potential beneficial effects that are difficult to estimate given the unpredictable nature of fire. The following project activities may have long-term benefits to NSO habitat because these treatments can reduce fire intensity and severity and enhance future fire management activities, including fire suppression, managing unplanned ignitions, and implementation of prescribed fire.

Salvage Harvest: This action reduces heavy fuel loading that contributes to future resistance to control, and increased fire severity (Peterson 2014). The lack of salvage can increase the amount of fuels in areas of high severity fire, especially after the dead trees fall to the ground. These accumulated fuels could contribute to the intensity of fire and promote the spread of the fire into adjacent habitat.

Fuel Management Zones (FMZ): This action reduces the probability of large stand replacement fire spreading from one drainage to another by providing pre-constructed zones in strategic locations. These pre-constructed zones provide locations for rapid fire-line construction and burnout operations that would otherwise consume limited fire management resources and time during a fire. FMZs play a critical role in contributing to fire suppression success.

Roadside Fuels Reduction: In combination with FMZs which typically occur on the ridgeline, roadside fuels reduction can provide fuel breaks at multiple slope positions before fire reaches the ridgeline. This action reduces the spread of large stand replacement fires by providing wide fuel-breaks associated with roads. In addition, roadside fuels reduction helps maintain ingress and egress for suppression efforts and, similar to Fuels Management Zones, provides pre-treated areas where fuels have been reduced. This contributes to reduced fire intensity along the treated roads and increases the probability of successful suppression.

Understory Prescribed Fire: Underburning consumes surface fuels and reduces fuel-ladders that contribute to crown fires. Crown fires are typically responsible for removing the upper canopy, thus resulting in a loss of NSO habitat. Future fires are less likely to become high-intensity, stand-replacing events where surface and ladder fuels have been reduced, thus avoiding the loss of suitable NSO habitat.

Roadside Hazard Removal: Maintaining access is a key element of effective fire suppression. Roadside hazard removal on strategic roads reduces hazards along roads for ingress and egress for fire suppression access, which benefits NSO habitat through more effective and timely suppression of high severity, stand replacing fire.

Site Preparation and Planting: This action provides additional seed source for areas with large patches of high severity burn. It is possible for conifer forests that experience high severity fire to provide seedlings, however, this isn't necessarily a guarantee. Likewise, planting isn't necessarily a guarantee, but the combination of reducing fuels and planting seedlings of a variety of species will likely increase the chance that planted seedlings and natural regeneration may reach maturity.

X. Determinations of Effects

Species Not Affected by the Proposed Project

As stated in the Introduction, the following species were considered and found to either not occur within the project area (no available suitable habitat) or not be affected because their habitat lays outside the affected units or the project will not occur within the range of the species. The following species will not be affected by the proposed project (Table G-26) for the reasons listed:

Table G-26: Species Not Affected by the Proposed Project

Species	**Reason for** No Effect **Determination**
Gray wolf (*Canis lupus*)	Based on the best available scientific and commercial information, this species is not known to occur on the analysis area.
Shasta crayfish (Pacifastacus fortis)	Based on the best available scientific and commercial information, this species' range is outside of the analysis area.
Oregon spotted frog (*Rana pretiosa)*	Based on the best available scientific and commercial information, this species' range is outside of the analysis area.
Marbled Murrelet **(***Brachyramphus marmoratus)*	Based on the best available scientific and commercial information, this species' range is outside of the analysis area.

Northern Spotted Owl

The proposed activities are ***likely to adversely affect*** the northern spotted owl for the following reasons:

The analysis area contains 85 activity centers, or 28 % of the ACs on the west side of the Forest. Of these 85 ACs, 55 of these have "Likely to Adversely Affect" determinations. Therefore, a total of about 65% of the ACs in the analysis area, and 18 % of all activity centers on the west side of the KNF[16,] will be adversely affected by the proposed activities.

There are 26 activity centers with "*May Affect, Not Likely to Adversely Affect*", or 31% of the ACs in the analysis area, and 4 activity centers with "*No Effect*" determinations.

Northern Spotted Owl Critical Habitat

The PCEs of northern spotted owl critical habitat are ***Likely to be Adversely Affected*** by the proposed project. The removal of large snags across a widely affected area of critical habitat, impacting four subunits, of a magnitude and scale that is not insignificant or discountable.

[16] On the west side of the Forest there are about 306 activity centers (from NRIS database and CNDDB combined with overlapping cores counted only once), excluding the Ukonom district.

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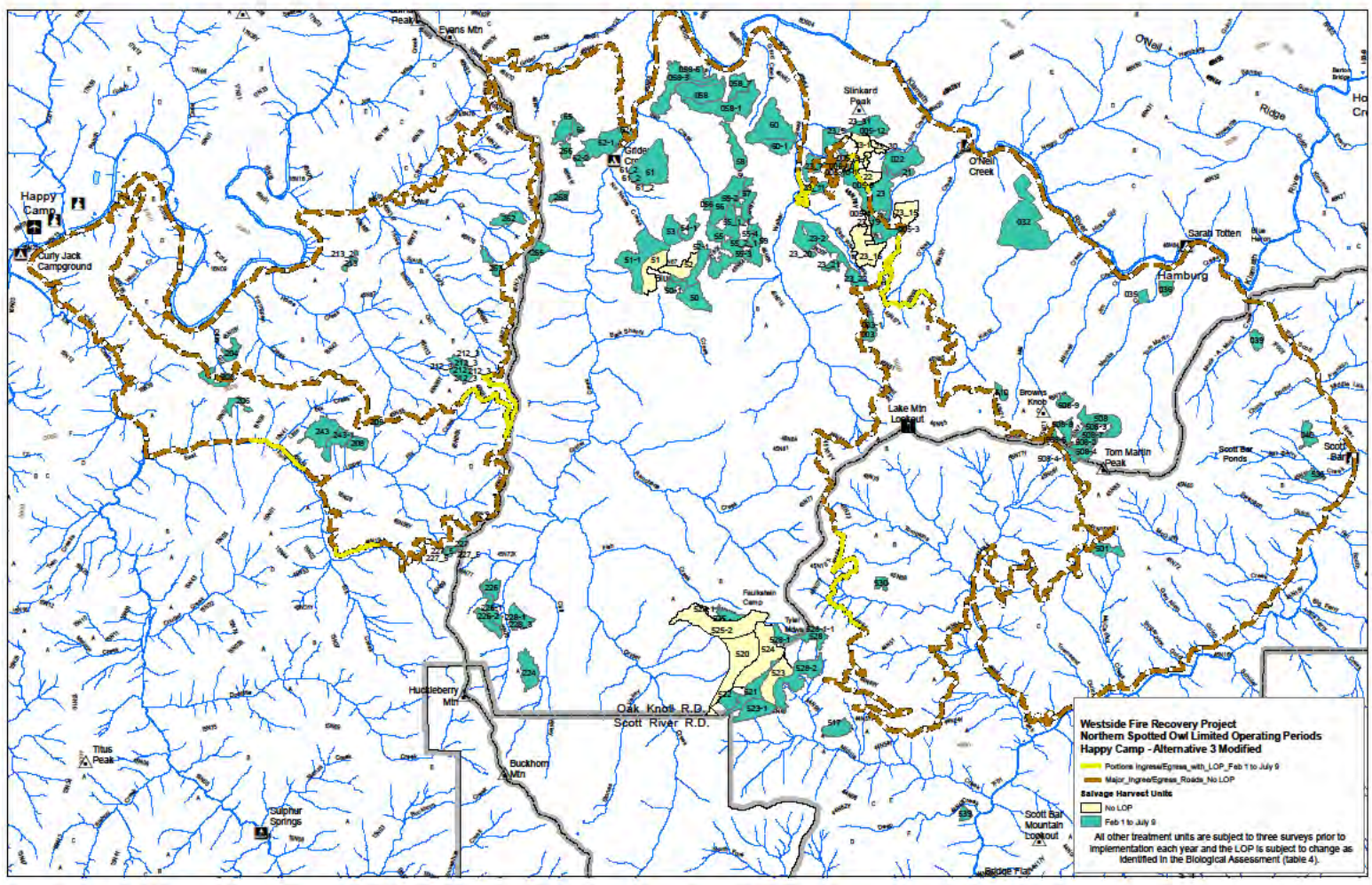
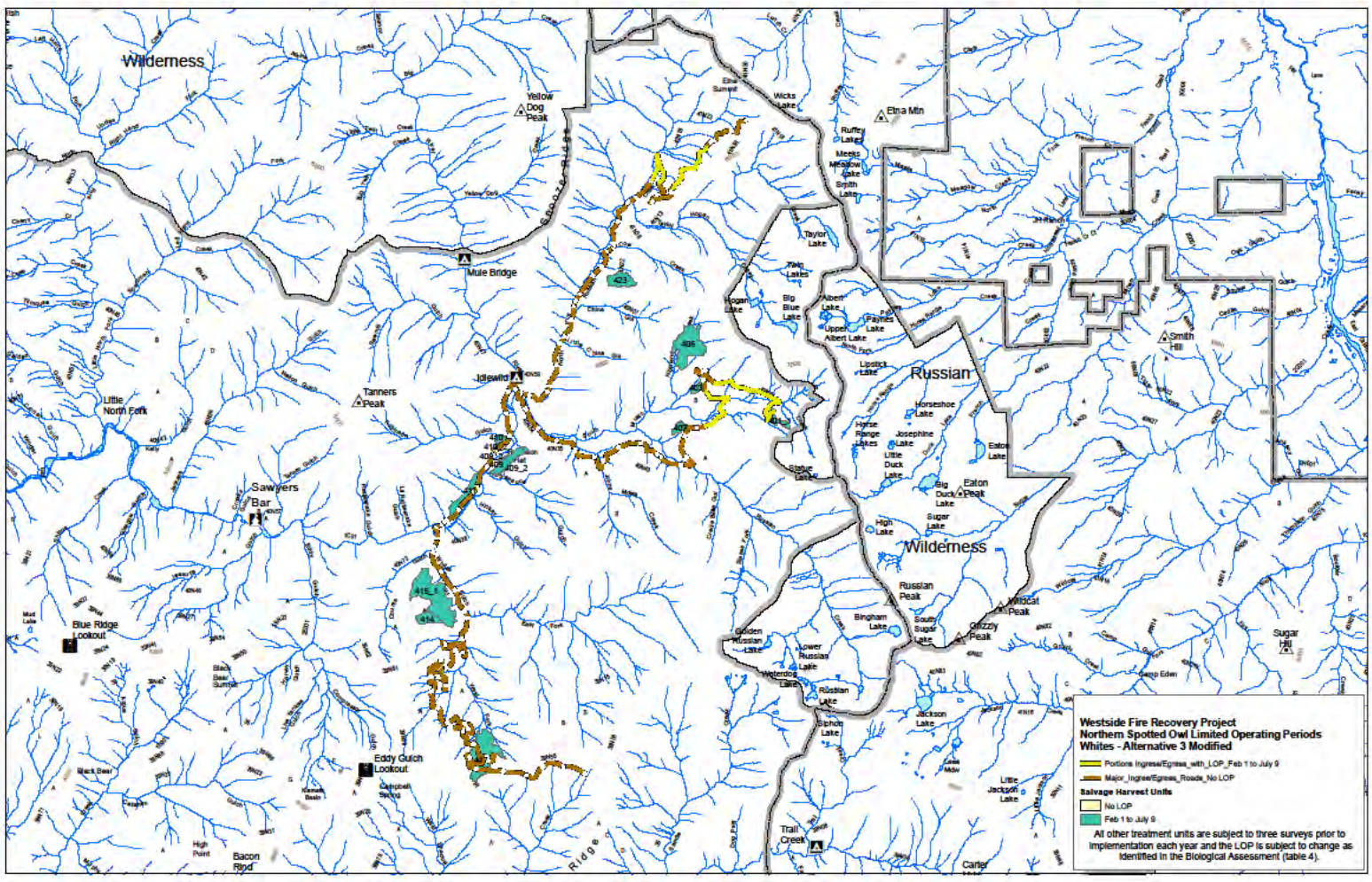

Happy Camp
Curly Jack Campground
Evans Mtn
Stinkard Peak
O'Neil Creek
Ridge
Sarah Totten
Hamburg
Lake Mtn Lookout
Browns Knob
Tom Martin Peak
Scott Bar Ponds
Scott Bar
Huckleberry Mtn
Oak Knoll R.D.
Scott River R.D.
Buckhorn Mtn
Titus Peak
Sulphur Springs
Scott Bar Mountain Lookout
Bridge Flat
Westside Fire Recovery Project
Northern Spotted Owl Limited Operating Periods
Happy Camp - Alternative 3 Modified
Portions Ingress/Egress_with_LOP_Feb 1 to July 9
Major_Ingree/Egress_Roads_No LOP
Salvage Harvest Units
No LOP
Feb 1 to July 9
All other treatment units are subject to three surveys prior to implementation each year and the LOP is subject to change as identified in the Biological Assessment (table 4).


Wilderness
Yellow Dog Peak
Mule Bridge
Idlewild
Tanners Peak
Little North Fork
Sawyers Bar
Blue Ridge Lookout
Eddy Gulch Lookout
Bacon Ridge
Elna Mtn
Wicks Lake
Ruffey Lake
Meeks Meadow Lake
Smith Lake
Taylor Lake
Hogan Lake
Big Blue Lake
Albert Lake
Upper Albert Lake
Fayhee Lake
Lipstick Lake
Smith Hill
Russian
Horseshoe Lake
Horse Range Lakes
Josephine Lake
Little Duck Lake
Eaton Lake
Big Duck Lake
Eaton Peak
Sugar Lake
High Lake
Wilderness
Russian Peak
Bingham Lakes
South Sugar Lake
Grizzly Peak
Wildcat Peak
Sugar Hill
Golden Russian Lake
Lower Russian Lake
Waterdog Lake
Russian Lake
Siphon Lake
Jackson Lake
Little Jackson Lake
Trail Creek
Carter
Camp Eden
Westside Fire Recovery Project
Northern Spotted Owl Limited Operating Periods
Whites - Alternative 3 Modified
Portions Ingress/Egress_with_LOP_Feb 1 to July 9
Major_Ingree/Egress_Roads_No LOP
Salvage Harvest Units
No LOP
Feb 1 to July 9
All other treatment units are subject to three surveys prior to implementation each year and the LOP is subject to change as identified in the Biological Assessment (table 4).

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Appendix A

Table G-27: Pre-fire NSO habitat within the core and home range (Originally Table A-1 in the Wildlife BA)

Activity Center Number	0 - 0.5 mi Radius		0.5- 1.3 mi Radius Total		Total NRF (0 - 1.3 mile)
	NRF	D	NRF	D	
0229	181	86	714	514	895
0239	138	123	399	470	537
0241	348	112	1,222	1,105	1,570
0245	48	14	699	239	747
0247	299	106	722	992	1,021
0252	67	275	347	1,525	414
0254	214	79	197	738	411
0255	110	222	865	1,172	975
0257	445	19	1,470	540	1,914
0272	450	32	2,076	696	2,526
0277	261	180	857	953	1,118
0283	372	57	781	791	1,153
0284	76	249	793	1,026	868
0293	138	100	988	1,000	1,126
0315	327	93	1,580	528	1,907
0322	356	24	1,190	504	1,546
0346	144	203	574	948	719
0365	151	210	1,145	1,177	1,296
0380	348	102	904	658	1,251
0381	189	190	878	733	1,067
0383	239	109	1,064	755	1,302
0499	340	62	1,185	494	1,525
0567	241	132	735	689	976
1027	129	193	1,561	935	1,690
1028	247	207	1,271	1,355	1,517
1029	324	35	1,999	437	2,323
1030B	406	80	1,493	827	1,899
1039	411	31	1,775	610	2,186
1040	329	114	1,776	730	2,105
1041	311	43	1,657	429	1,968
1046	274	131	1,202	875	1,475
1047B	331	88	1,195	849	1,525
1100	225	131	771	1,148	996
1101	473	9	2,401	170	2,874
1109	284	120	1,032	1,017	1,315
1110	215	201	698	1,121	912
1111	38	174	402	1,111	440
1112B	196	158	1,314	992	1,510
1116	491	6	2,589	180	3,080
1117	349	122	2,026	607	2,375
1119	422	56	1,813	787	2,236
1121	395	77	1,602	761	1,997
1122	194	160	1,336	902	1,530
1130	331	71	1,892	611	2,223
1164	283	58	1,309	657	1,592
1202	344	82	1,439	729	1,783
1212	207	136	1,174	803	1,380
1213	238	74	1,216	816	1,454
1214	284	44	1,112	848	1,396

Activity Center Number	0 - 0.5 mi Radius		0.5- 1.3 mi Radius Total		Total NRF
1258	334	84	1,461	1,084	1,795
1265	337	91	1,852	870	2,189
1266	387	112	1,644	1,050	2,031
2124	113	169	735	1,184	849
4026	150	300	1,294	1,452	1,443
4099	320	65	1,310	682	1,630
4128	205	203	536	1,131	742
4129	69	42	380	776	449
4133	229	204	1,282	1,064	1,511
4143	303	106	1,240	888	1,542
4144	100	76	301	688	401
4145	262	90	827	697	1,089
4146	257	122	770	1,005	1,028
9990	231	74	771	712	1,002
9991	319	29	1,203	611	1,522
9992	244	109	552	1,010	796
9993	169	103	435	417	604
9994	181	94	539	360	720
9995	246	73	1,315	523	1,560
9996	164	149	864	1,104	1,028
9998	303	103	874	764	1,177
9999	333	151	2,073	483	2,406
99910	396	27	1,540	755	1,936
99912	339	68	1,710	711	2,049
99913	214	105	924	1,001	1,138
99914	105	135	394	830	499
99915	160	283	1,143	958	1,303
0096A	279	127	1,130	961	1,409
0276A	203	217	746	1,199	949
0276B	120	222	870	1,243	990
0278A	295	139	593	764	888
0278B	219	82	593	926	812
NEW3A	139	272	1,598	1,061	1,737
NEW3B	326	49	1,309	983	1,636
NEW7A	139	226	962	832	1,101
NEW7B	97	75	1,279	715	1,376

Table G-28: Post-fire NSO habitat within the core and home range of activity centers in the analysis area (Originally Table A-2 from the Wildlife BA)

Activity Center Number	0 - 0.5 mile Radius					0.5- 1.3 mile Radius				
	NRF (acres)	D (acres)	FANR (acres)	PFF 1 (acres)	PFF 2 (acres)	NRF (acres)	D (acres)	FANR (acres)	PFF 1 (acres)	PFF 2 (acres)
0229	181	86	0	0	0	714	428	0	0	0
0239	138	123	0	0	0	347	236	0	0	0
0241	270	67	3	64	11	1,001	694	21	137	63
0245	48	14	0	0	0	679	214	6	13	0
0247	299	106	0	0	0	678	847	0	40	4
0252	67	275	0	0	0	347	1,250	0	0	0
0254	214	79	0	0	0	166	514	0	0	0
0255	110	222	0	0	0	861	940	0	0	0
0257	445	19	0	0	0	1,407	483	0	57	6
0272	202	30	32	159	58	1,176	343	81	535	283
0277	261	180	0	0	0	857	773	0	0	0
0283	143	15	3	109	35	199	50	6	80	47

Activity	0 - 0.5 mile Radius					0.5- 1.3 mile Radius				
0284	76	249	0	0	0	785	776	0	0	0
0293	138	100	0	0	0	983	899	0	5	0
0315	327	93	0	0	0	1,477	419	0	3	2
0322	356	24	0	0	0	1,190	481	0	0	0
0346	73	91	4	54	5	33	39	2	30	84
0365	151	210	0	0	0	1,145	967	0	0	0
0380	306	92	3	38	0	826	480	21	47	10
0381	175	184	4	11	0	820	482	4	45	9
0383	193	97	9	29	8	863	480	19	126	55
0499	340	62	0	0	0	1,179	430	0	0	0
0567	241	132	0	0	0	735	557	0	0	0
1027	117	183	2	6	3	1,300	582	33	173	54
1028	247	207	0	0	0	1,269	1,144	0	1	0
1029	286	32	3	36	0	1,649	296	21	280	49
1030B	385	72	3	18	0	1,387	512	28	379	103
1039	400	26	0	12	0	1,514	371	7	215	39
1040	243	63	19	66	2	1,481	461	44	226	25
1041	278	31	3	30	0	1,096	262	7	243	283
1046	229	62	8	36	0	924	512	18	200	30
1047B	331	88	0	0	0	1,123	645	7	49	15
1100	199	118	3	23	0	634	868	3	88	46
1101	458	9	6	8	0	2,118	121	25	245	12
1109	282	109	0	2	0	898	789	2	82	49
1110	200	189	0	14	0	664	835	4	26	3
1111	29	123	0	9	1	368	823	5	25	4
1112B	185	166	1	5	0	717	563	39	283	282
1116	401	3	18	64	9	2,168	140	50	342	29
1117	145	61	18	113	72	490	104	79	366	1,081
1119	220	11	33	123	37	552	239	98	457	706
1121	193	54	22	177	2	670	375	72	439	421
1122	117	113	0	69	9	1,014	441	28	214	80
1130	208	38	13	69	40	1,006	320	72	370	444
1164	283	58	0	0	0	1,309	599	0	0	0
1202	14	15	1	23	306	639	394	8	210	582
1212	197	117	0	9	0	1,059	583	0	102	13
1213	233	54	0	4	1	816	402	10	210	180
1214	271	40	0	12	1	1,019	766	0	80	7
1258	211	68	17	100	6	1,045	504	66	263	88
1265	50	16	12	115	161	1,025	402	87	502	238
1266	243	86	35	105	4	729	377	109	496	311
2124	113	169	0	0	0	735	1,015	0	0	0
4026	150	300	0	0	0	1,294	1,152	0	0	0
4099	283	47	0	37	0	842	334	12	279	177
4128	205	203	0	0	0	536	928	0	0	0
4129	69	42	0	0	0	380	708	0	0	0
4133	24	36	12	53	139	563	557	81	263	375
4143	121	28	3	19	0	588	384	4	16	0
4144	74	29	0	1	0	173	325	6	21	4
4145	102	29	11	51	8	184	76	4	15	19
4146	33	8	2	22	8	182	188	4	118	44
9990	151	50	0	80	1	415	324	2	208	146
9991	239	26	0	77	3	1,110	471	6	77	11
9992	240	99	0	5	0	539	880	1	11	0
9993	169	103	0	0	0	431	314	1	3	0

Activity	0 - 0.5 mile Radius					0.5- 1.3 mile Radius				
9994	174	91	1	6	0	504	246	5	27	4
9995	196	67	0	42	8	1,225	398	1	82	1
9996	160	144	0	4	0	795	910	1	64	4
9998	269	99	8	27	0	737	462	12	101	23
9999	100	29	31	76	127	1,169	156	43	363	499
99910	328	22	0	68	0	1,337	457	6	113	84
99912	278	49	5	53	3	1,562	623	10	110	28
99913	33	16	1	4	0	377	360	2	39	26
99914	17	16	1	4	0	242	355	7	23	12
99915	119	207	0	0	0	664	379	1	11	0
0096A	279	127	0	0	0	1,077	821	3	50	0
0276A	203	217	0	0	0	745	976	1	0	0
0276B	120	220	0	0	0	864	1,016	1	5	0
0278A	282	135	1	13	0	552	554	5	32	4
0278B	219	82	0	0	0	556	821	4	32	1
NEW3A	55	105	13	34	38	551	344	109	409	530
NEW3B	31	4	20	47	228	402	445	67	311	530
NEW7A	139	226	0	0	0	944	597	0	12	0
NEW7B	97	75	0	0	0	1,122	545	8	128	15

Table G-29: List of future foreseeable or ongoing actions on national forest lands in the analysis area (Originally Table A-4 from Appendix of the Wildlife BA

Project Name	Acres of Activity in Analysis Area	Current or Future Projects
Klamath National Forest Projects		
Eddy LSR	14,160	Current
Elk Thin	700	Current
Glassups	440	Current
Goff Fuels Reduction	125	Current
Happy Camp Fire Protection Phase 2	4,680	Current
Jess	570	Future
Lovers Canyon	1,400	Future
McCollins	1,160	Future
Sawyers Bar Fuels Reduction	2,550	Current
Scott Bar Mountain underburn	1,670	Current
Thom Seider	18,700	Current

Appendix B: Consistency of Project with NSO Recovery Plan

WESTSIDE FIRE RECOVERY PROJECT COMPLIANCE WITH RECOVERY ACTIONS IN THE *2011 REVISED RECOVERY PLAN FOR THE NORTHERN SPOTTED OWL*

Recovery Action 1: For each State, the FWS will designate offices that will coordinate implementation of the spotted owl recovery plan. These offices will work with local and regional partners to best ensure actions taken within that management jurisdiction are meeting the intention of the recovery plan while taking local context and variation into account. The Oregon Fish and Wildlife Office will remain the overall lead for the species and provide technical assistance and oversight to the other FWS offices as needed. We have established and lead an interagency and interorganizational Northern Spotted Owl Implementation Team (NSOIT) designed to help coordinate implementation of this Revised Recovery Plan throughout the range of the species.

- This RA is not applicable at the project analysis level.

Recovery Action 2: Continue annual monitoring of the population trend of spotted owls to determine if the population is decreasing, stationary or increasing. Monitoring in demographic study areas is currently the primary method to assess the status of populations of spotted owls. Other statistically valid monitoring methods (*i.e.*, analytically robust and representative of the entire province and range) may be possible and could potentially fulfill this recovery action.

- This RA is not applicable at the project analysis level.

Recovery Action 3: Conduct occupancy inventory or predictive modeling needed to determine if Recovery Criteria 1 and 2 have been met. It is expected this inventory will begin when it appears the spotted owl is close to meeting Recovery Criterion 1. Modeling techniques have improved recently, so predictive modeling may be part of the methodology for estimating spotted owl occupancy across the range.

- This RA is not applicable at the project analysis level because it refers primarily to the demographic monitoring areas.

Recovery Action 4: Use the habitat modeling process described above and in Appendix C to identify and implement recovery actions and conservation measures that would contribute to spotted owl recovery, including testing the efficacy of various habitat conservation network scenarios at conserving spotted owl habitat. Use the results from this effort to inform decisions concerning the possible development of habitat conservation networks.

- This RA is not applicable at the project analysis level.

Recovery Action 5: – Consistent with Executive Order 3226, as amended, the Service will consider, analyze and incorporate as appropriate potential climate change impacts in long-range planning, setting priorities for scientific research and investigations, and/or when making major decisions affecting the spotted owl.

- This RA is not applicable at the project analysis level.

Recovery Action 6: In moist forests managed for spotted owl habitat, land managers should implement silvicultural techniques in plantations, overstocked stands and modified younger stands to accelerate the development of structural complexity and biological diversity that will benefit spotted owl recovery.

- This RA is not applicable because the project lies outside Regions that the Recovery Plan considers as including "moist forests".

Recovery Action 7: Create an interagency Dry Cascades Work Group that is available to assist land managers in developing and evaluating landscape-level recovery strategies for the Eastern Washington, Eastern Oregon, and California Cascades Provinces, including monitoring and adaptive management actions.

- This RA is not applicable at the project analysis level.

Recovery Action 8: In Eastern Washington, Eastern Oregon and California Cascades Provinces, analyze existing data on spotted owl occupancy pre- and post-fire and establish a consistent database to track owl occupancy response to fires across the dry Cascades provinces.

- This RA is not applicable at the project analysis level.

Recovery Action 9: Create an interagency Klamath Province Work Group that is available to assist land managers in developing and evaluating landscape-level recovery strategies for the

Oregon and California Klamath physiographic province, which include monitoring and adaptive management actions.

- This RA is not applicable at the project analysis level.

Recovery Action 10: - Conserve spotted owl sites and high value spotted owl habitat to provide additional demographic support to the spotted owl population.

- This addressed in the body of the document above in Table G-2.

Recovery Action 11: When vegetation management treatments are proposed to restore or enhance habitat for spotted owls (e.g., thinnings, restoration projects, prescribed fire, etc.), consider designing and conducting experiments to better understand how these different actions influence the development of spotted owl habitat, spotted owl prey abundance and distribution, and spotted owl demographic performance at local and regional scales.

- The Westside Fire Recovery project addresses this RA by proposing treatments such as planting conifer species in areas burned at high severity in order to accelerate the development of the overstory. In addition, fuels treatments are designed to protect the surrounding unburned habitat by providing breaks in the fuels where suppression actions can be undertaken more quickly and effectively during the next fire event. Removing hazard trees along roads that are the main ingress and egress during suppression actions also serves to accelerate the response time and increase the safety for fire fighters. Salvage harvest removes high fuel loading in order to allow the forest to regenerate as conifer rather than reverting to a brush stand with each fire that occurs in the area.

Recovery Action 12: In lands where management is focused on development of spotted owl habitat, post-fire silvicultural activities should concentrate on conserving and restoring habitat elements that take a long time to develop (e.g., large trees, medium and large snags, downed wood). Examples of areas where we believe this recovery action would greatly benefit future spotted owl habitat development include such fire-affected areas as the Biscuit fire, the Davis fire and the B&B complex.

- This RA is addressed in the body of the document above in Table G-2.

Recovery Action 13: Standardize province-specific habitat definitions across the range of the spotted owl using a collaborative process.

- This RA is not applicable at the project analysis level. However, the KNF is eager to cooperate in establishing habitat definitions for provinces that occur on the Forest.

Recovery Action 14: Encourage applicants to develop Habitat Conservation Plans and Safe Harbor Agreements that are consistent with the recovery objectives.

- This RA is not applicable because it applies to Private Property owners and the U.S. Fish and Wildlife Service.

Recovery Action 15: The Service will solicit individual recommendations from stakeholders to develop a comprehensive set of tools and business and economic incentives that facilitate creative opportunities for nonfederal landowners to engage in management strategies consistent with the recovery objectives.

- This RA is not applicable because it applies to Private Property owners and the U.S. Fish and Wildlife Service.

Recovery Action 16: Federal, State, and local managers should consider long-term maintenance of local forest management infrastructure as a priority in planning and land management decisions.

- This RA is not applicable because it applies to Private Property owners and the U.S. Fish and Wildlife Service.

Recovery Action 17: Monitor for sudden oak death and avian diseases (e.g., WNV, avian flu, Plasmodium spp.) and address as necessary.

- This RA is not applicable at the project analysis level. Nonetheless, the KNF is eager to cooperate in monitoring sudden oak death and avian diseases as related to the spotted owl.

Recovery Action 18: The Washington State Forest Practices Board (Board) should use the final recovery plan and the habitat modeling tool to inform the process currently underway to identify areas on non-federal lands in Washington that can make strategic contributions to spotted owl conservation over time. The Service encourages timely completion of the Board's efforts and will be available to assist as necessary.

- This RA is not applicable because it applies to Private Property owners, the Washington State Forest Practices Board, and the U.S. Fish and Wildlife Service.

Recovery Action 19: The Service will request the cooperation of Oregon Department of Forestry in a scientific evaluation of: (1) the potential role of State and private lands in Oregon to contribute to spotted owl recovery; and (2) the effectiveness of current Oregon Forest Practices in conserving spotted owl habitat and meeting the recovery goals identified in this Revised Recovery Plan. Based on this scientific evaluation, the Service will work with the Oregon Department of Forestry and other individual stakeholders to provide specific recommendations for how best to address spotted owl conservation needs on Oregon's non-federal lands.

- This RA is not applicable because it applies to the Oregon Department of Forestry, Private Property owners, and the U.S. Fish and Wildlife Service.

Recovery Action 20: The Service will request the cooperation of CAL FIRE and individual stakeholders in an evaluation of: (1) the potential recovery role of spotted owl sites and high-quality habitat on nonfederal lands in California, and (2) evaluation and implementation of appropriate conservation tools (e.g., carbon sequestration, Habitat Conservation Plans, Safe Harbor Agreements) to assist with supporting spotted owl recovery actions outlined in this Recovery Plan.

- This RA is not applicable because it applies to CAL FIRE and the U.S. Fish and Wildlife Service.

Recovery Action 21: The Service will provide technical assistance to the California Board of Forestry and Fire Protection and CAL FIRE to develop scientifically based and contemporary Forest Practice Rules to provide for the breeding, feeding and sheltering of spotted owls.

- This RA is not applicable because it applies to the California Board of Forestry and Fire Protection, CAL FIRE, and the U.S. Fish and Wildlife Service.

Recovery Action 22: If barred owl removal is determined to be effective, work with the State of California to explore options for managing barred owls using lethal means.

- This RA is not applicable because it applies to the State of California and the U.S. Fish and Wildlife Service.

Recovery Action 23: Analyze existing data sets from the demographic study areas relative to the effects of barred owls on spotted owl site occupancy, reproduction, and survival.

- This RA is not applicable at the project analysis level. Nonetheless, the KNF is eager to cooperate with any analyses of existing data sets.

Recovery Action 24: Establish protocols to detect barred owls and document barred owl site status and reproduction.

- This RA is not applicable at the project analysis level. Nonetheless, the KNF is eager to cooperate in barred owl detection protocols.

Recovery Action 25: Ensure that protocols adequately detect spotted owls in areas with barred owls.

- This RA is not applicable at the project analysis level.

Recovery Action 26: Analyze resource partitioning of sympatric barred owls and spotted owls.

- This RA is not applicable at the project analysis level. Nonetheless, the KNF is eager to cooperate in the study of spotted owl and barred owl resource partitioning.

Recovery Action 27: Create and implement an outreach strategy to educate the public about the threat of barred owls to spotted owls.

- This RA is not applicable at the project analysis level. Nonetheless, the KNF is eager to cooperate in outreach to the public concerning all forest management issues.

Recovery Action 28: Expedite permitting of experimental removal of barred owls.

- This RA is not applicable at the project analysis level. The removal of barred owls is an issue between the U.S. Fish and Wildlife Service and the State of California.

Recovery Action 29: Design and implement large-scale control experiments to assess the effects of barred owl removal on spotted owl site occupancy, reproduction, and survival.

- This RA is not applicable at the project analysis level. Nonetheless, the KNF is eager to cooperate in experiments to assess the effects of barred owl removal on spotted owl site occupancy, reproduction, and survival.

Recovery Action 30: Manage to reduce the negative effects of barred owls on spotted owls so that Recovery Criterion 1 can be met.

- The Project is consistent with this RA because habitat features that benefit the spotted owl will be maintained. Actions that influence the barred owl are not a part of this project.

Recovery Action 31: Develop mechanisms for landowners and land managers to support barred owl management using a collaborative process.

- The Project is consistent with this RA because, during the consultation process related to the Endangered Species Act, the KNF collaborates with the U.S. Fish and Wildlife Service on all projects that could potentially impact the spotted owl.

Recovery Action 32: Because spotted owl recovery requires well distributed, older and more structurally complex multi-layered conifer forests on Federal and non-federal lands across its range, land managers should work with the Service as described below to maintain and restore such habitat while allowing for other threats, such as fire and insects, to be addressed by restoration management actions. These high-quality spotted owl habitat stands are characterized as having large diameter trees, high amounts of canopy cover, and decadence components such as broken-topped live trees, mistletoe, cavities, large snags, and fallen trees.

- This RA is addressed in the body of the document above in Table G-2.

Recovery Action 33: Develop a post-delisting monitoring plan ready for implementation with the States of Washington, Oregon, and California (ESA 4(g)(1)). Such a plan is necessary to meet the requirements of the ESA.

- This RA is not applicable at the project analysis level. Nonetheless, the KNF is eager to cooperate in the development of a post-delisting monitoring plan.

Appendix C: Summary of Survey Data for the Westside Fire Recovery Project Analysis Area

Table G-30: Summary Table of Survey Data for the Westside Fire Recovery Project Analysis Area

Site Name	AC number	Basis for AC Creation	Last Year of Detection	Best Status for Site	Last Nest	Status in 2013 or 2014	Barred Owl Detected 17	NRIS Data	CNDDB Data
Lower South Fork Kelsey Creek	0096	Pair 1991	1997	Pair 1997	Unknown	Not Surveyed	No	Yes	Yes
Buckhorn Creek	0239	Repro 1991	1991	Repro 1991	1991	Not Surveyed	No	Yes	Yes
Grider Campground	0241	Pair 1988	1991	Repro 1991	1991	Not Surveyed	No	Yes	Yes
Bear Creek	0245	Pair 1991	1996	Repro 1992	1992	Not Surveyed	No	Yes	Yes
Kelsey Creek	0247	Repro 1991	2012	Repro 1995	1995	Not Surveyed	No	Yes	Yes
Negro Creek	0252	Single 1983	2003	Pair 2003	Unknown	Not Surveyed	No	Yes	Yes
Woodchopper Gulch	0254	Pair 1991	1998	Repro 1994	1994	Not Surveyed	No	Yes	Yes
Pat Ford Creek	0255	Single 1981	2001	Single 2001	Unknown	Not Surveyed	Yes	Yes	Yes
Upper West Fork Sixmile Creek	0257	Single 1990	2008	Repro 1991	1991	Not Surveyed	No	Yes	Yes
Tom Martin	0272	Pair 1992	1992	Pair 1992	Unknown	Not Surveyed	No	Yes	Yes
Malone Creek 1	0276A	Pair 1992	1999	Pair 1999	Unknown	Not Surveyed	No	Yes	Yes
Malone Creek 2	0276B	Pair 1992	1992	Pair 1992	Unknown	Not Surveyed	No	No	Yes
Bishop Creek/Titus Peak	0277	Single 1992	2003	Repro 1999	1999	Not Surveyed	No	Yes	Yes
Doolittle Elk 1	0278A	Pair 1981	2002	Pair 1996	Unknown	Not Surveyed	No	Yes	Yes
Doolittle Elk 2	0278B	Pair 1992	1992	Pair 1992	Unknown	Not Surveyed	No	Yes	Yes
Wesf Fork Doggett Creek	0283	Single 1989	2010	Repro 2002	2002	Not Surveyed	No	Yes	Yes
Bear Creek	0284	Pair 1990	2009	Repro 1991	1991	Not Surveyed	No	Yes	Yes
Stanza Creek	0293	Single 1981	2003	Pair 1992	Unknown	Not Surveyed	No	No	Yes
West Fork Beaver	0315	Pair 1993	1998	Repro 1997	1997	Not Surveyed	No	Yes	Yes
Windy Camp	0322	Pair 1997	1997	Pair 1997	Unknown	Not Surveyed	No	No	Yes
Kohl Creek (Lower)	0346	Single 1974	2010	Pair 1995	Unknown	Not Surveyed	No	Yes	Yes
Trail Gulch	0350	Pair 1994	1996	Repro 1996	1996	Not Surveyed	No	Yes	Yes
Cougar Creek	0381	Single 1981	2007	Repro 2003	2003	Not Surveyed.	Yes	Yes	Yes
Dead Cow Creek	0499	Pair 1997	1997	Pair 1997	Unknown	Not Surveyed	No	No	Yes

[17] Barred owls surveys were not conducted in the project area, but during NSO surveys, barred owls may be incidentally detected. This column represents the incidental detections of barred owls.

Site Name	AC number	Basis for AC Creation	Last Year of Detection	Best Status for Site	Last Nest	Status in 2013 or 2014	Barred Owl Detected 17	NRIS Data	CNDDB Data
Cade Creek	0567	Single 1996	2006	Single 2006	Unknown	No Response	Yes	Yes	Yes
West Whites	1027	Single 2007	2010	Single 2010	Unknown	Not Surveyed	No	Yes	Yes
Shadow Creek	1028	Single 1987	2008	Pair 1991	Unknown	Not Surveyed	No	Yes	Yes
Lower East Fork Whites Gulch	1029	Single 1989	1992	Single 1992	Unknown	Not Surveyed	No	No	Yes
Upper East Fork Whites Gulch	1030	Single 1981	2007	Repro 1986	2007	Not Surveyed	No	Yes	Yes
Russian Creek	1039	Pair 1989	1995	Repro 1991	1995	No Response	No	Yes	Yes
Applesauce Gulch	1040	Pair 1981	1999	Pair 1988	1999	No Response	No	Yes.	Yes
Music Creek	1041	Pair 1983	2014	Repro 2013	2013	Repro 2013. Pair 2014	No	Yes.	Yes
Cow Creek	1046	Repro 1985	2009	Repro 1985	1985	No Response	No	Yes	Yes
Etna Summit	1047	Pair 1986	2013	Repro 20013	2013	Repro 2013. Active 2014	No	Yes	Yes
Lower West Fork Tomkins Creek	1100	Single 1980	1997	Repro 1996	1996	Not Surveyed	No	Yes	Yes
Cliff Valley	1101	Single 1980	1994	Repro 1990	1990	Not Surveyed	No	Yes	Yes
West Fork Tomkins Creek	1109	Pair 1985	1997	Pair 1997	Unknown	Not Surveyed	No	Yes	Yes
Tomkins Creek	1110	Single 1980	1991	Repro 1988	1988	Not Surveyed	No	Yes	Yes
East Fork Tomkins Creek	1111	Repro Pair 1980	1989	Repro 1985	1985	Not Surveyed	No	Yes	Yes
Walker Creek	1112	Pair 1986	2008	Repro 1988	1988	Not Surveyed	No	Yes	Yes
Fish Creek (Grider)	1116	Single 1988	1990	Pair 1990	Unknown	Not Surveyed	No	Yes	Yes
Rancheria Creek	1117	Single 1980	1990	Repro 1989	1989	Not Surveyed	No	No	Yes
North Fork Rancheria Creek	1119	Pair 1989	1989	Pair 1989	Unknown	Not Surveyed	No	Yes	No
Bark Shanty	1121	Single 1981	1992	Repro 1992	1992	Not Surveyed	No	Yes	Yes
Limestone Bluffs	1122	Pair 1985	1989	Pair 1989	Unknown	Not Surveyed	No	Yes	Yes
O'Neil Creek	1130	Single 1988	2012	Repro 2012	2012	Not Surveyed	No	Yes	Yes
Tyler Meadows	1202	Single 1980	1996	Pair 1996	Unknown	Not Surveyed	No	Yes	Yes
Happy Horse	1212	Single 1982	2014	Repro 2007	2007	Single	Yes	Yes	Yes
Upper Elk Creek	1213	Single 1980	1995	Repro 1990	1990	Not Surveyed	No	Yes	Yes

Site Name	AC number	Basis for AC Creation	Last Year of Detection	Best Status for Site	Last Nest	Status in 2013 or 2014	Barred Owl Detected 17	NRIS Data	CNDDB Data
Lower Three Biscuit	1214	Pair 2007	2014	Repro 2009	2009	Single	No	Yes	Yes
Hickey Gulch	1258	Single 1981	1991	Pair 1991	Unknown	No Response	No	Yes	Yes
No Name Creek	1265	Pair 1992	2007	Pair 1992	Unknown	Not Surveyed	No	Yes	Yes
Salt Creek Grider	1266	Single 1992	2012	Repro 2012	2012	Not Surveyed	No	Yes	Yes
Dona Creek	2124	Repro 1990	2003	Repro 1991	1991	No Response	No	Yes	Yes
Lower West Fork Sixmile Creek	4026	Pair 1990	1991	Pair 1990	Unknown	Not Surveyed	No	Yes	Yes
Middle Creek (Scott)	4099	Pair 1985	2001	Pair 2001	Unknown	Not Surveyed	No	Yes	Yes
Lime Gulch	4128	Single 1980	2011	Pair 1991	Unknown	Surveyed but not to six visit protocol due to illegal activity in area; however ACS and four SC yielded No Response	No	Yes	Yes
Cherry Flat	4129	Pair 1991	1991	Pair 1991	Unknown	No Response	No	Yes	Yes
Louie Creek	4133	Pair 1980	2007	Repro 1980	Unknown	Not Surveyed	No	Yes	Yes
Fish Trap Creek	4143	Pair 1990	1995	Repro 1991	1991	Not Surveyed	No	Yes	Yes
Miller Gulch	4144	Pair 1992	1995	Repro 1994	1995	Not Surveyed	No	Yes	Yes
Doggett Creek	4145	Pair 1993	2004	Repro 1999	1999	Not Surveyed	No	Yes	Yes
Kohl Creek 1 (Upper)	4146	Pair 1986 CNDDB Data.	2010	Repro 2010	2010	Not Surveyed	No	Yes	Yes
McGuffy Creek	9990	Single 1990	1990	Single 1990	Unknown	Not Surveyed	No	Yes	Yes
Horse Creek	9991	Repro 2013	2013	Repro 2013	2013	Repro	Yes	Yes	No
Wood Creek	9992	2002 Single	2002	Single 2002	Unknown	No Response	No	Yes	Yes
Stanza Creek	9993	1981 Single	1991	Single 1991	Unknown	Not Surveyed	No	Yes	Yes
Huckleberry	9994	Pair 1992	1992	Pair 1992	Unknown	Not Surveyed	No	Yes	Yes
Upper Three Biscuit	9995	Repro 2011	2013	Repro 2013	2013	Repro	No	Yes	Yes
Elk Creek	9996	Single 1990	2003	Single 2003	Unknown	Not Surveyed	No	Yes	Yes
East Fork Elk	9998	Pair 1980	2002	Single 2002	Unknown	Not Surveyed	No	Yes	Yes

Site Name	AC number	Basis for AC Creation	Last Year of Detection	Best Status for Site	Last Nest	Status in 2013 or 2014	Barred Owl Detected 17	NRIS Data	CNDDB Data
Fish Creek	9999	Pair 1989	1990	Pair 1990	Unknown	Not Surveyed	No	Yes	Yes
Johns Meadows Creek	99910	Single 1991	1991	Single 1991	Unknown	Not Surveyed	No	No	Yes
Eddy Lookout	99912	Pair 1989	2009	Pair 1989	Unknown	No Response	Yes	Yes	Yes
Deer Camp Meadows	99913	Pair 1992	1999	Pair 1998	1994	Not Surveyed	No	Yes	Yes
Buckhorn	99914	Pair 1992	2003	Repro 1998	1998	Not Surveyed	No	No	Yes
Lumgrey Creek	99915	Pair 1994	1994	Pair 1994	1994	Not Surveyed	No	No	Yes
Walker 1	New 3A	Single 1992	2014	Repro 2013	2013	Repro 2013, Single 2014	No	Yes	Yes
Walker 2	New 3B	Pair 1988	2009	Pair 2009	Unknown	No Response	No	Yes	Yes
China Creek 1	New 7A	Pair 2009	2011	Pair 2009	Unknown	No Response	Yes	Yes	Yes
China Creek 2	New 7B	Single 2008	2011	Single 2011	Unknown	No Response	No	Yes	No