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Forest Service
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File Code: 2670
Date: April 3, 2015

Erin Williams
Feild Supervisor
1829 S. Oregon St.
Yreka, CA 96097

Dear Ms. Williams:

The Klamath National Forest has determined through the enclosed Biological Assessment and streamlined consultation process that the proposed Westside Fire Recovery Project on the Salmon/Scott and Happy Camp/Oak Knoll Ranger Districts is ***likely adversely affect*** northern spotted owls and critical habitat. The project is outside the range for marbled murrelets and therefore will have *no effect* on marbled murrelets or critical habitat. Although the project does occur within the range of the yellow-billed cuckoo, no direct or indirect effects to this species are expected to occur. This project will have *no effect* on yellow-billed cuckoo or critical habitat.

This project proposes to salvage harvest within units covering over 9,500 acres within the about 218,580 acre project area. The stands proposed for salvage burned at high severity, but treatment will not occur on all acres within the treatment units. Riparian reserves and low fire severity affected areas will not be harvested. In addition to salvage harvest, the project proposes roadside hazard, hazardous fuels, and site preparation/planting treatments. In total, 92 northern spotted owl activity centers contain proposed treatment. The level of effects vary among these activity centers, but the potential effects of these proposed activities has been reduced through recommendations of the streamline consultation process and project design.

I am requesting formal consultation pursuant of Section 7 of the Endangered Species Act, as amended, regarding the effects of this project. Please call Chad Bell, Forest Biologist, at (530) 841-4416, if you have any questions.

Sincerely,

Claudia Schumway

for PATRICIA GRANTHAM
Forest Supervisor

Enclosure

United States
Department of
Agriculture

Forest
Service

April 2015

Wildlife Biological Assessment

Westside Fire Recovery Project

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

SUBMITTED BIOLOGICAL ASSESSMENT

16 April, 2015

Submitted

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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 are a sub-set .

The project area comprises 218,600 total acres, including 187,100 acres of National Forest System land and 31,500 acres of private land. It 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 consider:

- only those organisms that appear on the official species list as seen in Table 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 action 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 action. 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 actions.

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 collaboration with the USFWS as agreed upon under the Consultation Streamlining MOU (USDI USFWS 2013).

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, from the United States Fish and Wildlife Service (USFWS), Arcata Field Office of Proposed, Endangered, and Threatened species, of species which may occur in or be affected by projects within Siskiyou County (#611463646-123213*)*, was accessed on March 8, 2015 (Table A-5 Appendix A).

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Table 1. Federally listed species derived from the species portal lookup on the USFWS website on March 8, 2015 for Siskiyou County.

	Common Name	Scientific Name	Status	Critical Habitat
Invertebrates	Vernal pool fairy shrimp	*Branchinechta lynchi*	T	Y
	Vernal pool tadpole shrimp	*Lepidurus packardi*	E	N
	Shasta crayfish	*Pacifastacus fortis*	E	N
Birds	Western yellow-billed cuckoo	*Coccyzus americanus*	T	N
	Northern spotted owl	*Strix occidentalis caurina*	T	Y
Mammals	gray wolf	*Canis lupus*	E	Y
	Fisher	*Pekania pennanti*	PT	P
Amphibians	California red-legged frog	*Rana draytonii*	T	Y

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 single individual is currently hundreds of 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.

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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.

California red-legged frog (*Rana draytonii*) - The areas proposed for treatment are well outside the known or expected range of the California red-legged frog (USDI USFWS 2002). A small portion on the south eastern section of Siskiyou County, well outside of the analysis area, is indicated as part of a recovery unit in the 2002 Recovery Plan, but the current range is restricted to lower elevation areas in the Sacramento Valley.

There are no known populations of the red-legged frog on the Forest and the analysis area is well outside of the current range of this species. 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 very limited in distribution to small areas along the Klamath River. The Forest has no record of a cuckoo detection on the Forest 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.

Pacific Fisher (*Pekania pennanti*) – The fisher will be addressed through the conferencing process 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

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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 National 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 must 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 Fish and Wildlife Service 2011a). 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 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.

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Table 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 (Table 6). 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 population in the area. Activity Centers identified as having high and moderate potential to contribute to demographic support resulted in reducing the predicted 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 habitat now or in the future). Consequently, 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, large downed wood for the benefit of future stand development. *Project design features (PDF) have been incorporated into the project (Table 6) to retain legacy component trees and snags that provide important habitat component in a developing stand of future suitable habitat (see Project Design Feature Wildlife-4) and will contribute to future large woody debris. In addition, the project will retain an average of 2 to 8 snags per acre of the largest size class within treatment units >100 acres or aggregations of treatment units totaling >100 acres in size. These snags will complement the legacy retention to further increase the amount of vertical structure in the stand.*
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 not occur in stands that currently provide RA-32 characteristics. Fuels treatments will contribute to the overall prevention of stand replacing fire within areas of high quality habitat through the strategic placement of fuel breaks and prescribed fire. Hazard tree removal is occurring in all habitat types but is necessary for human health and safety.*

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Recovery Action	Description	Applicable Recommendations

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.

Actions Occurring During Revision of the BA:

Salvage units were deferred due to size criteria or operational constraints, but did not become final until after this analysis was complete.

The following salvage units were dropped: **200, 241, 037, 038, 1138**, and **63** totaling approximately 94 acres.

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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. Quantities described in this section are for the entire project and include actions that are not in northern spotted owl habitat. In the remainder of the BA, quantities will refer only to the areas where treatment occurs in northern spotted owl habitat. The quantities described for the Proposed Action with modifications will not match the acres described for those activities in the remainder of the BA because there are activities described in this section that occur outside of northern spotted owl habitat.

Acres listed for each treatment describe the habitat affected by that treatment, rather than the total acres of treatment. For a complete description of acres by treatment see the EIS.

Table 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 Action As Described in the DEIS

The Westside Fire Recovery project, as described in the scoping notice for the project issued in September 2014, included five overlapping types of treatment: (1) salvage; (2) roadside hazard treatments; (3) hazardous fuel treatments; (4) site preparation, planting, and release; and (5) connected actions (e.g. landing construction).

See project website http://www.fs.fed.us/nepa/nepa_project_exp.php?project=45579 for a description of the proposed action as scoped.

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The following modifications or clarifications were made following scoping:

- Alternative 2 includes four overlapping treatments: (1) 11,700 acres of salvage units[1]; (2) 650 miles of roadside hazard reduction; (3) 22,900 acres of hazardous fuel treatments; and (4) 7,900 acres of site preparation, planting, and release in existing plantations and seedling/sapling natural stands that burned. All salvage harvest units (11,700 acres) will also be site prepped and replanted with appropriate species. In addition to the above treatments, Alternative 2 would use 562 miles of National Forest System, state, and county roads, reopen 9.0 miles of previously decommissioned roads, use 9.9 miles of existing temporary roadbeds and construct 3.6 miles of new temporary roads within the project area.

- Consideration for treatment for the salvage harvest treatment units used the following criteria:
  1. Areas of moderate to high severity vegetation mortality with more than ten contiguous acres of medium to high severity vegetation mortality and less than 40 percent crown closure;
  2. Areas determined to be feasible in terms of logging systems, accessibility, and economics; and
  3. Units outside of northern spotted owl activity center core areas where the home range contained a minimum threshold of 700 acres of nesting/roosting and foraging habitat and more than 50% nesting, roosting and foraging habitat in the core area was intact.

- 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 green 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.

- Roadside hazard reduction (removal of fire-killed trees) is proposed within 250 feet on either side of selected roads to address hazards. A hazard, or danger, tree is defined as a standing tree that presents a hazard to people due to conditions such as deterioration of or damage to the root system, trunk, stem, or limbs or the direction or lean of the tree (29 CFR 1910.266(c); FSH 6709.11, glossary). Because of slope, a few fire-killed trees farther than 250 feet from a road may still present a hazard to the road and thus need to be treated, but the majority of hazard trees will be within the 250-foot buffer. Roadside hazard treatments will include the use of ground-based, skyline, and helicopter logging systems. Acres used for analysis were calculated using all fire severity classes within a 200 foot buffer on either side of affected roads[2]. GIS was used to narrow

[1] Salvage harvest units include Riparian Reserves and RAVG Grid Code 1 and 2 stands. These areas are part of the salvage unit, but will not be harvested.

[2] Hazard tree removal is proposed within 250 feet on either side of selected roads. Topographic breaks and unstocked areas without hazard trees will reduce the actual treated acres. For the purposes of this analysis, a 200 foot buffer was used to estimate the acres where treatment may occur.

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down the amount of acres of roadside hazard considered for hazard tree removal. Approximately 20,500 acres would be considered for roadside hazard reduction on 650 miles of roads. Of those 20,500 acres, approximately 16,600 acres are coniferous forest; 660 acres are hardwood forest and about 3,250 are shrubs and brush or are not vegetated. For conifer and mixed conifer forests, diameter ranges were broken into three categories: (1) up to ten inches (6,200 acres), (2) ten to 20 inches (4,700 acres), and (3) greater than 20 inches in diameter at breast height (5,700 acres). Of the hardwood stands (660 acres) 630 acres were with tree diameters less than 20 inches; approximately 30 acres were with tree diameters greater than 20 inches.

- For roadside hazard removal, fire-damaged green trees with a 60 percent or higher probability of mortality within the next three to five years were included in the salvage harvest proposal. Actual distance of roadside hazard treatments may vary based on the Regional Hazard Tree Guidelines for Forest Service Facilities and Roads in the Pacific Southwest Region (Angwin et al. 2012).

- Hazardous fuel treatment areas were considered based on the following criteria:

  1. 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.
  2. 250 feet on either side of historically-significant ridgelines for fire suppression efforts.
  3. Areas determined feasible in terms of slope, accessibility, existing fuels conditions, and logical holding features (i.e. roads, streams, and ridges).

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

  1. Wildland Urban Interface: combination of mechanical and hand work. Removing standing dead trees 12 inches or less in diameter at breast height and other understory vegetation in order to reduce fire behavior activity, specifically reduced flame length and intensity and reduced potential for crown fire activity.

  2. Fuels Management Zones: 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. Roadside Fuels Treatments: same as above, but along roadsides identified as strategic for fuels reduction and in hazard tree removal areas to decrease the amount of activity-generated fuels.

  4. Prescribed Burn: 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

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equipment, handline construction to mineral soil will occur. Removal of understory vegetation along control lines will include cutting brush and conifer trees less than 12 inches in diameter to facilitate holding operations during prescribed fire implementation.

5. Site-Preparation: this treatment will work in coordination with the site-preparation, planting, and release treatment proposed below and will reduce existing fuels while increasing the likelihood that newly planted vegetation will successfully regenerate. This treatment includes maintenance which will include thinning of understory vegetation and piling of surface fuels to maintain desired fuel conditions.

- The description of criteria considered to determine priority site preparation and planting was modified for clarification.

- 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 yarding, mastication, windrowing, and piling of dead material generally up to 16 inches in diameter. In some areas trees larger than 16 inches will be treated in order to reduce hazards to workers, the public, and reduce fuel loading to achieve flame lengths of less than four feet over the next 20 years. Hand treatments will include the cutting and piling of dead fuels up to ten inches in diameter.

  2. Reforestation will be by hand methods, using either bare root or container stock. 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.

  3. Release includes manually removing all vegetation within a minimum of a five-foot radius from a planted or naturally regenerated conifer seedling.

- Riparian reserves within the plantation site-preparation and planting units in the Whites Fire and Happy Camp Complex will be treated 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.

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- Legacy sediment sites were identified since scoping and will be scheduled for treatment in compliance with the Clean Water Act as a condition of the North Coast Regional Water Quality Control Board waiver of waste discharge requirements (Order No. R1-2010-0029).

Modification of Project Activities resulting from Level I Consultation

Roadside Fuel treatment areas will have two different treatment types depending on slope and aspect for the entire project area.

- Complete Roadside Fuels Treatments - are complete understory treatment where a large portion of the understory will be removed (higher solar radiation, south facing slopes, and on southwest aspects and/or upper slope positions)
- Modified Roadside Fuels Treatments - are modified understory treatment where the removal of the understory is reduced (low solar radiation)

Beaver Fire Project Area

Salvage harvest units were dropped in T47N, R2W, Section 32 and T46N, R2W, Section 4. No activity fuels treatments or site preparation and planting will occur in the units that were dropped from salvage harvest treatment. Limited salvage is still proposed for other areas in the Beaver project area.

Table 4: Salvage units dropped from salvage treatment in the Beaver project area

Activity Center Number	Salvage Units Dropped
0283 (Beaver)	1135, 1129, 1129-1, 1136, 1140, 1151, and 1217

Fuel Management Zones (Fuel Breaks) have been modified as follows.

- In T47N, R2W fuel breaks have been added on the south and west sides of Section 32 along the property boundary in areas that were previously in salvage units 1129 and 1140.
- Fuel management treatment will occur at various locations adjacent to private industrial timber lands as described in Alternative 5 in the DEIS.

Happy Camp Project Area

Salvage harvest units were dropped as displayed in table 5. No activity fuels treatments or site preparation and planting will occur in the units. These units were dropped from salvage harvest treatment to lessen effects to potentially occupied NSO core areas categorized as having moderate fitness potential.

Table 5: Salvage units dropped from salvage treatment in the Happy Camp project area

Activity Center Number	Salvage Units in Moderate Potential ACs
9996	240 and 239
9995	unnumbered tractor unit
1212	214, 218, and portion of 267
9991	215, 217, and 212-1

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1213	211-1
1110	531
1100	533
1112	0003-2
4133*	005-11**
New3A*	23-3**, 23-6**, and part of 57-1
1265*	54**
*The Core Area in these Activity Centers experienced nearly 100% loss of habitat. **Some units or portions of units were dropped in the home range portion of the Activity Center to capture the potential for the owls to shift.	

Fuel treatments remain the same as described in Alternative 2 with the exception of salvage units dropped from treatment (fuels treatments will not occur in non-harvested salvage units per safety concerns).

Temporary Roads: The decommissioned section of Forest road 46N62 also referred to as the Caroline Creek road will remain closed. Salvage units in the Caroline Creek tributary area will be helicopter yarded. Temporary roads associated with dropped units will also be dropped. Otherwise, temporary roads remain as identified in Alternative 2.

Whites Project Area

The helicopter landing at Whites Gulch L072 was moved to a location with fewer resource concerns off of the 40N61 road.

Salvage harvest unit 413-1 was dropped in a moderate potential NSO core area. Activity fuels will not be treated, and the dropped unit will not be site prepared or planted.

Project Design Features

The project design features listed in table 6 are the design features pertinent to NSO; this is 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 Draft Environmental Impact Statement.

Table 6: Project design features related to NSO

PDF Number	Description of Project Design Feature	Units Applied
Wildlife - 1	A survey strategy will be developed in coordination with Fish and Wildlife Service for NSO surveys prior to project implementation (see NSO Survey Strategy section below). No project activities will occur within unsurveyed nesting/roosting and foraging habitat[3] (NRF). Where unsurveyed suitable NRF occurs, a Limited Operating Period will apply from February 1 to September 15. If surveys result in a known or	All units where applicable

[3] Foraging habitat is included in this Limited Operating Period design feature due to the uncertainty in NSO habitat typing given the dependence on remotely sensed vegetation data (EVEG) for this analysis. The EVEG NSO Habitat layer may not consistently identify differences between nesting/roosting and foraging habitat and may require further field validation.

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	suspected nest (such as a daytime pair detection or multiple nighttime pair detections) then no project activities will occur within 0.25 miles of the known nest or suspected nest stand. Exceptions to the LOP from Feb. 1 to Sept. 15 may occur for the removal of hazards along major ingress and egress roads that are required for emergency access.	
Wildlife – 2	No more than 50 percent of the suitable nesting/roosting, and foraging habitat within an NSO core area will be underburned annually.	All units where applicable
Wildlife - 3	Retain an average of 2 to 8 snags per acre of the largest size class within treatment units >100 acres or aggregations of treatment units totaling >100 acres in size. If riparian reserves, inclusions of RAVG grid code1 and 2, and legacy tree retention do not provide an average of 2 to 8 snags per acre in a 100 acre polygon, additional snags may be designated for retention. See Appendix A for more details on these areas. Where practicable, these snags will be clumped and distributed throughout the treatment unit and situated with large, live trees. 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. Snags left by operational constraints will count towards the snag retention. The number of retained snags will depend on slope and aspect. - On the lower 2/3 of north and east facing slopes, 5-8 snags per acre averaged across the unit will be retained. - On the upper 1/3 of north and east facing slopes, an average of 2-5 snags / acre averaged across the unit will be retained. - On all south and west facing slopes, regardless of slope position, 2-5 snags / acre will be retained Retain all large hardwood snags or live trees where practicable, particularly those with cavities, broken or split tops, or large broken branches.	Units over 100 acres include: 005, 21, 22, 022, 23, 032, 50, 51, 52, 53, 54, 55, 56, 056, 57, 058, 59, 60, 61, 62, 208, 226, 243, 245, 406, 414, 415, 417, 501, 505, 506, 508, 515, 520, 521, 522, 523, 524, 525, 528, 1109, and 1110
Wildlife - 4	Retain legacy component trees and snags in all treatment units where they occur. 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 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, the log will be retained whole in the unit.	All units
Wildlife - 5	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 units. If any pre-existing snags must be felled for safety reasons, these pre-existing snags will be	All units

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	left on landscape whole as coarse wood.	

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, 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 will subsequently be analyzed as such.

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 actions.

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. The activity center analysis area included the core and home range for the ACs where the centroid of the activity center overlapped the habitat analysis area.

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 will be completed in the first two years, though hazard tree removal, 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) and 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 within 0.5 mile from the center point of the activity center 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'.

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

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

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

RAVG*:* RAVG data are 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. RVAG 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.

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, as well as where an increased potential exists for differing interpretations of the project design.

- 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 in Table 7).
- 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 used the more pertinent and applicable observation data within NRIS and CNDDB databases to establish the location of the activity center.
- 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

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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 was used to develop a contiguous GIS layer derived from the EVEG 2007 data (a remote sensing product), 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 and winter 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 (USFWS 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. For this analysis, suitable habitat is defined as stated above in this paragraph. Determination of NSO habitat suitability also considers many factors including size of stand and adjacency to other habitat types which owls may use.

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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. Given this level of uncertainty, 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 resulted in an reasonably accurate assessment of the habitat layer depicting NRF habitat even though there was some error in accurately splitting NR and F over the entire analysis area. 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, fire severity data (RAVG) and percent basal area loss in the RAVG classes described below was applied to the project area, the EVEG NSO habitat layer, and 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. 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 were 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.

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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 by the, as well as the determination of effects proposed by 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 the 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 delineated as; 1) "**post-fire foraging**" areas and 2) "**fire-affected nesting/roosting"** areas. More detail on how these habitats were affected by the proposed project is described in the Indirect and Direct Effects section below.

1) **"Post-fire foraging"** (PFF) habitat was delineated in order to capture the potential for continued use by NSO of previously suitable NRF, at least in the short term until the ultimate deterioration of the burned habitat and loss of standing trees. Even with the loss of canopy cover and key habitat components typically found in 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 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 (USFWS 2011).

   As described above, the EVEG NSO Habitat Layer provided the baseline of suitable NRF prior to the fire. 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. Then a 500-foot buffer was applied to areas of currently suitable NR or F (areas greater than 5 acres in size) and when these areas of high-severity, previously suitable NRF occurred within this buffer, it was delineated as PFF.

   A large proportion of PFF is habitat that burned at the highest severity and therefore contains minimal amounts of structure or cover. Because of this, it was assumed that NSO are not likely to use PFF when it occurred too far from existing cover – estimated to be approximately 500 feet. This distance was derived from a review of recent literature on the use of edge habitat

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(Comfort 2013; Eyes 2014) and in consultation with Level 1 USFWS biologists, and professional judgment.

2) "**Fire-affected nesting/roosting**" (FANR) habitat was 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. Because stands of habitat that burn at grid code 3 can result in between 50 to 75% of the 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 less tree mortality than a stand that received moderate fire severity 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.

   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 general, some of the fire-damaged trees will have needles and leaves and these trees may provide some cover for foraging NSO.

   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.

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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 7: 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 – (PFF)** when occurring within 500' of *currently* suitable NRF*
Foraging	Foraging	Foraging	**Post-Fire Foraging (PFF)** when occurring within 500' of *currently* suitable NRF*	**Post-Fire Foraging - (PFF)** when occurring within 500' of *currently* suitable NRF*
Dispersal	Dispersal	Dispersal	Non-habitat	Non-habitat

*In patches greater than 5 acres.

**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 action 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 actions.

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, 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. Downgrade means the habitat has been affected to the point where the habitat 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 N/R or F receives treatments that remove enough

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canopy closure of the previous cover and structure to lose function as N/R 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 nesting 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 actions were analyzed.

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). Current 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).

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

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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 percent 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 must be comprised of at least 50% (~250 acres) NRF habitat and the total acres within the core area and home range must 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 and reproductive status.

There are 94 activity centers within the Westside Fire Recovery project analysis area, but not all these activity centers are affected by proposed treatments. Due to the large number of activity centers, 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 area 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 (RRP) 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.

Because only about 40% of the activity centers in the project area have 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 One biologists made the assumption that as the amount of remaining habitat increased 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.

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. Activity centers containing at least 50% suitable NRF 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.

Activity centers containing less than 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

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classified as having "**moderate potential**" for the owls associated with that site to remain on site, reproduce, and contribute to the demographics of the population in the area. The Level One consultation team acknowledged uncertainty in site location but 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 2012), NSO that have experienced high severity fire in a large portion of habitat within the core or home range have an increased likelihood of dispersal (Clark et al. 2012, 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 20% (<700 acres) suitable habitat remaining within the core and home range combined. These sites were assumed highly unlikely 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. 2012, 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, 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 fire-affected previously suitable habitat. Therefore, 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 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 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 (AC). 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. This spatial configuration of analysis or circle analysis was developed from a large amount of research and is a common analysis approach even though the size of the core and home range are different based on the geographic portion of the NSO range (reviewed in USDI FWS 2009). The home range is generally defined as an area traversed by NSO to gather food, mating, and caring for young. The core area which is contained within the home range, receives concentrated use, typically is 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 a NSO pair and offspring. There are several approaches to evaluating the quality, distribution, and amount of habitat and the relationship to reproduction (for example: Franklin et al., 2000, Zabel et al. 2003, Olson et al. 2004, 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 but foraging habitat is still 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 area of 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. Even

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though NSO have been detected on all slope positions[4] that contain habitat, an NSO, though capable, is not likely to expend the energy to travel over a ridgeline from its nest to forage in an adjacent drainage. Ridgeline, as used here, is not to be confused with a nose-ridge or some other smaller topographic feature that creates minor divisions in a drainage that may be commonly used by an owl.

Overall, the research suggests that NSO reproductive success is closely tied to the amount, distribution, and quality of habitat within the core and, to a lesser degree yet still important, in the home range. The USFWS has reviewed the vast amount of NSO literature to suggest a minimum level of habitat within the core and home range (USDI FWS 2009) which is reflected in the determination analysis for this project within the "intensity factors". The AC analysis used specific, measurable characteristics related to the amount (acres of habitat), quality (habitat type), and distribution (core and home range) of habitat. However, some of the ACs didn't meet the level of effects described as "intensity factors" (factors used to identify ACs that are anticipated to be affected by the proposed activity to the point where the treatments are "likely to adversely affect" (LAA) the AC) and these ACs were evaluated on site-specific information.

Each of the activity centers were evaluated using a filter process that incorporates a series of biologically relevant factors: 1) "intensity factors" (represent important biological minimum recommendations) and 2) site-specific evaluation. Each of the "intensity factors" relates to NSO reproduction and fitness in the form of habitat quantity, quality, and distribution to meet the needs of an NSO pair and possible offspring. Using the quality of habitat (nesting/roosting, foraging, or dispersal), quantity (acres of each habitat type), and distribution (core, home range, or both) coupled with relevant research, effects to habitat can be related to potential effects to fitness and reproduction. The ACs that were not given a "LAA" determination based on the "intensity factors" were individually evaluated using site-specific information and a determination was made for these ACs as: 1) "likely to adversely affect" (LAA); 2) "may effect, but not likely to adversely affect" (MANLAA); or 3) "no effect" (NE).

Intensity Factors

Below are a series of "intensity factors" in the form of questions that were used to evaluate each of the activity centers. These questions represent biologically important minimum levels that are called "intensity factors" for this analysis. 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 the sites that were *Likely to Adversely Affected* (LAA) by the proposed activities. The intensity factors basically represent effects that are NOT "discountable, insignificant, or [wholly] beneficial[5]" as defined by USFWS (USDI USFWS 1998)

[4] 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).

[5] "Is 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 action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or beneficial."

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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 does provide 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 evaluated using site-specific information.

***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 doesn't likely 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 'No', then it may be possible to have treatments in the home range and not impact fitness potential. If a core and home range combined contains more than 40% NRF and FANR, then there is likely enough habitat to support reproduction. If treatment occurs in the core or home range but it doesn't 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 NSO site. A site-specific evaluation was completed using the location, type, and extent of the treatment(s) relative to habitat affected and likely NSO use area.
- If 'Yes', then the NSO site likely does not have enough habitat to be able to "absorb" the loss of even a small amount of habitat; the loss of habitat could result in reduced fitness potential. This would result in a LAA.

Intensity Factor C: For core and home range combined with 20% to 40% NRF and FANR, 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. Activity centers with 40% or more NRF and FANR appear to have more successful reproduction than activity centers with less suitable habitat. Therefore, activity centers with less than 40% habitat likely need to retain all NRF and FANR within the core and home range to maintain 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?

- 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

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affecting more than 25% of an activity center will likely affect reproduction from disturbance plus any effects to NRF.

- If 'No', then it may result in a MANLAA, due to the minimal impact to habitat. Regardless, a site specific evaluation was completed using the location, type, and extent of the treatment(s) relative to habitat affected and likely NSO area of use.

Intensity Factor E: Will treatment result in cores 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. 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 is likely sensitive to changes. 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.

Intensity Factor G: Will the proposed underburning occur in >50% of the core area habitat?

- Underburning is considered specifically in this sequence when addressing the proportion of a core area that would be burned; if more than 50% of a core is underburned, it may result in altering enough habitat to affect reproduction in the short-term. 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.

<u>Site Specific Evaluations</u>

Each of the activity centers that wasn't assigned an "LAA" determination in the first assessment ("intensity factors") was evaluated using site-specific information. The location, type, and extent of treatment were assessed at the core and home range scale and the resulting potential effect to habitat. The result of the assessment is described in the effects section.

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, and is maintained by the U.S. Fish and Wildlife Service. The environmental baseline includes:

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"… 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 A-4 of Appendix A to further inform this analysis.

Environmental Baseline

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 effects, 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 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.

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 minor 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 vary size pockets (about 5 to 100 acres) of mid-seral mixed conifer.

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The Happy Camp and Whites Project Area are similar 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[6] 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 was lost (trees were likely killed by the fire) and about half of the pre-fire oak woodland was also lost to the 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 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. These totals do not include the Man and Log fires. For information on the acres of forest burned within each fire area, see the Draft EIS for the project. The Beaver Fire, Happy Camp Fire, and Whites Fire burned a total of approximately183,120 acres, including approximately 162,260 acres of National Forest System lands and approximately 20,860 acres of private land.

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 32,40 acres. The Whites Fires, 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. The overall range that burned at grid code 3 and 4 was 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

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

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 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.

VII. Species Life History and Status

Species Status refers to the known occurrence or likely occurrence 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 that are 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

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canopy closure to provide protection from avian predators and minimal foraging opportunities (USFWS 2008).

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 ≥ 15 Quadratic Mean Diameter (QMD) with ≥ 5 trees per acre of ≥ 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, ≥ 11" QMD and ≥ 40% canopy closure (USDI USFWS 2009, Irwin et al. 2004, Irwin et al. 2007).

In recent years, with 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 but the owls in the area have found patches that provide the basic elements that they require to persist on at the site – though it is currently unknown whether these sites are still active. Surveys of the area will help to inform us about the ability of the spotted owls in the Beaver fire area to persist on a highly fragmented landscape at below habitat minimums.

NSO Prey

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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 a 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 woodrats and flying squirrels are the most likely prey item based on available habitat.

NSO use of the post-fire landscape

Forested areas with reduced habitat quality due to past land management activities or natural occurrences such as wildfire can remove habitat attributes essential to individual owl viability. Wildfire can potentially limit foraging resources by reducing prey abundance and essential cover for protection during 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. 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.

Areas burned with high burn severity are no longer considered suitable habitat for 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, they have been found to be used by owls, at least in the short-term, if the habitat was nesting/roosting or foraging habitat owls used by owls 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).

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). 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 intensity burns (Elliot 1985,

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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, with the strongest selection for high-severity burned forest (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 particularly 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 that 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.

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 NSOs (USFWS 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 usable 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 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 NSO's. This relationship is important because NSO's

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will focus their use of burned areas for foraging in areas with adjacent cover. The distance to cover is a key factor influencing use of burned areas. Because habitat selection by NSO's 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 nest site 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. 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 project area difficult. Most references to "salvage logging" in the literature refer to clear-cut logging, and do not factor in design features 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 in 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 these burned areas is supported in the literature, although nesting in these areas is not.
- NSO using these burned areas may use standing snags and surviving green trees as perch sites for foraging, particularly along edges where sufficient cover is available.
- The likelihood of use of a burned area by NSO may be strongly affected by its distance from suitable forest cover, but a maximum acceptable distance from suitable cover is unknown.
- 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.

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Status of the NSO Habitat within the Analysis Area

Recent evaluation of NSO nesting/roosting and foraging habitat reported approximately 179,800 acres of nesting roosting and 384,097 acres of foraging habitat across the entire Forest (excluding Ukonom Ranger District – not administered by the Klamath NF). See table 8 below for the acres of habitat after the 2014 fires.

Table 8: Pre-fire and post-fire NSO habitat and FANR and PFF within the Analysis Area

Habitat	Pre-fire Acres	Post-fire Acres	Change in Habitat Acres
Nesting/Roosting	36,313	29,030	-7,283
Foraging	66,374	53,766	-12,608
Dispersal	69,749	56,931	-12,818
Fire-Affected Nesting/Roosting(FANR)	-----	1,362	----
Post-Fire Foraging (PFF)*	-----	18,530	----

*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

Table 9: Pre-and Post-fire NSO habitat and fire severity in analysis area and associated fire

Habitat	Pre-fire Habitat (Acres)	RAVG basal area loss resulting from fire*				Post-Fire Habitat (acres)
		Very low (grid code 1)	Low (grid code 2)	Moderate (grid code 3)	High (grid code 4)	
Nesting/Roosting	36,313	15,984	1,942	1,362	5,921	29,030
Foraging	66,374	26,554	3,089	2,246	10,362	53,766
Dispersal	69,749	23,728	3,330	2,432	10,386	56,931
Fire-Affected NR	---	---	---	---	---	1,362

* 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".

Unsurveyed Suitable NRF 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

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the current survey strategy for this project and will receive surveys prior to implementation. If NSO are detected, the FWS will be consulted and the project will be re-assessed for effects to any newly discovered NSO territories.

Status of the NSO Activity Centers within the Analysis Area

Ninety-four NSO Activity Centers (ACs) are included in the analysis area. Of these 94 ACs, 92 of them will have some level of treatment, or will be affected by the proposed project. 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 94 activity centers in the analysis area.

Each activity center was assigned a category that reflected the assessment of post-fire habitat present in the home range and core area, and the subsequent "habitat fitness potential" for that activity center. The "habitat fitness potential" categories assigned to each site are not influenced by 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 10).

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Table 10: 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.

Activity Center Number	Category of Habitat Fitness Potential	Activity Center Number	Category of Habitat Fitness Potential
0210	High	0245	Moderate
0241	High	0255	Moderate
0247	High	0283	Moderate
0257	High	0284	Moderate
0269	High	0293	Moderate
0272	High	0350	Moderate
0277	High	0365	Moderate
0315	High	0381	Moderate
0322	High	1027	Moderate
0352	High	1100	Moderate
0358	High	1110	Moderate
0380	High	1112	Moderate
0499	High	1117	Moderate
0567	High	1122	Moderate
1028	High	1202	Moderate
1029	High	1212	Moderate
1030	High	1213	Moderate
1039	High	1265	Moderate
1040	High	2124	Moderate
1041	High	4026	Moderate
1046	High	4128	Moderate
1047	High	4133	Moderate
1101	High	4145	Moderate
1109	High	9991	Moderate
1116	High	9994	Moderate
1119	High	9995	Moderate
1121	High	9996	Moderate
1130	High	9999	Moderate
1164	High	99913	Moderate
1165	High	99915	Moderate
1214	High	0276A	Moderate
1258	High	0276B	Moderate
1266	High	0278B	Moderate
4095	High	NEW3A	Moderate
4097	High	NEW7A	Moderate
4099	High	NEW7B	Moderate
4143	High	0252	Low
4189	High	0254	Low
9992	High	0346	Low
9998	High	1111	Low
99910	High	4129	Low

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Activity Center Number	Category of Habitat Fitness Potential	Activity Center Number	Category of Habitat Fitness Potential
99912	High	4144	Low
0096A	High	4146	Low
0096B	High	9990	Low
0278A	High	9993	Low
0229	Moderate	99914	Low
0239	Moderate	NEW3B	Low

Without long-term monitoring data, it is 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 project have displayed some of this variation in occupancy and many of these ACs are still considered important for current or future NSO demographics; a few sites have been substantially affected by fire and currently contain habitat 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 (2005 or earlier) covering about 50% of the area past project surveys. Of 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 effects to habitat from fire and surveys of the fire-affected a

NSO Survey Strategy

NSO surveys are planned for six surveys per year for two years. The intent is to survey the project area annually through implementation. Surveys will start in the spring of 2015; and will begin each year after March 15th. For the first year of implementation, at least five surveys are planned by

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mid-July, with the sixth survey conducted concurrently with implementation. For the second year of implementation, three surveys would be conducted prior to implementation and three surveys conducted concurrently.

First year of implementation: 5 surveys prior to implementation, 1 survey concurrently as well as ACS's and stand searches.

Second year of implementation: 3 surveys prior to implementation, 3 surveys concurrently, as well as ACS's and stand searches.

Survey strategy for this project is delineated and mapped according to the locations of proposed treatments units, roads, and known activity centers and (see Map 1). 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 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.

Surveys will cover post fire suitable habitat and areas of pre-fire suitable habitat that were burned by the 2014 fires to determine occupancy across the fire areas. 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 night-time 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.

A survey map has been developed for this analysis (see Map 1); suitable NRF that is not indicated as covered by call routes, ACS's or stand searches is considered unsurveyed suitable habitat. This does not occur within roadside hazard or treatment units, or within 0.25 miles of treatment units, but will occur within the analysis area where no road access exists. Effects to NSO that may occur within 1.3 miles of treatments, but that may go undetected due to a lack of survey coverage, are addressed in the Direct/Indirect Effects Analysis below.

VIII. Effects of the Proposed Action

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 stand or may potentially

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increase the value 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 a 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 Action

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

Limited Operating Period (LOP) is incorporated into the project design from **February 1 and September 15** for project activities occurring within unsurveyed suitable nesting/roosting and foraging habitat – unless otherwise agreed upon after site specific evaluation by Level One biologists. This LOP is 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 for each year of operation. This time frame is generally accepted among the FWS, the USFS and research biologists as the reproductive period for NSO and is

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used by the FWS during consultation (based on review of years of research and professional expertise); so, that after this time, owls would no longer be closely tied to the nest stand and subsequently be disturbed by project implementation.

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 suitable nesting/roosting habitat, they have the potential to affect NSO breeding success by causing loud and continuous noise disturbance and/or smoke disturbance to NSO, if conducted during the NSO breeding season. However, the application of the LOP described above, in addition to the extensive NSO surveys, is intended to alleviate direct effects to NSO from fuels treatments, salvage harvest, site prep and planting.

Roadside Hazard Tree Removal

Roadside hazard trees will be felled adjacent to National Forest System roads that are open to the public as well as roads that are reopened specifically for the project that may have been blocked by downed trees or other obstacles, or gated for administrative use only.

In addition to the application of an LOP, extensive surveys are planned for the analysis area prior to implementation in order to minimize the potential for direct impacts to NSO. 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 all treatments within a 0.25 miles of the known or suspected nest stand. Because surveys are generally conducted from the road, there is an improved chance of detecting NSO where they are using areas along roads that are targeted for hazard tree removal. However, due to the size and scale of the project area, the possibility exists that NSO can go undetected and therefore experience direct effects from project activities.

The exception to the LOP described above may occur for hazard tree removal along major ingress and egress roads that are necessary for emergency access and cannot be blocked by LOPs or an imminent hazard.

It is possible that an NSO may occupy the area within 0.25 miles of the road or be actively using the hazard tree as a roost or nest site, in which case the potential exists for disturbance and/or direct harm if the tree were cut during reproductive season; however, trees along major roads are less desirable sites for NSO due to the higher volume of traffic and noise associated with major roads. In addition, all roads will be surveyed prior to implementation (see Survey Strategy discussion below). Surveying directly along a road increases the chances of detecting NSO that may be using trees deemed hazardous to the road; thereby reducing the chance of having undetected NSO directly harmed by the felling of hazard trees during the reproductive period.

In areas of high- and moderate- burn severity, impacts will be reduced because NSO are not likely to use hazard trees or snags in these areas for nesting or roosting. It is more plausible that NSO could be using the burned areas along these 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 afford cover to the foraging NSO. Hazard tree removal in moderate and high fire severity

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affected areas has the lower overall impact to NSO than removing trees from habitat that burned at low fire severity or not at all.

Roadside hazard treatment in unburned- or low- fire severity differs distinctly from hazard treatment in moderate and high severity burned areas. Hazard tree guidelines[7], rather than mortality guidelines for salvage, will dictate whether a snag or live tree will be removed, based on the risk of it falling and hitting the road, regardless of its predicted mortality. Therefore, trees that may contain defect, decay, or disease or that may be leaning toward the road may be deemed a hazard and would be removed from suitable nesting/roosting or foraging habitat.

In these areas where hazard trees are identified along roads in unburned, suitable habitat, the potential for negative impacts exists. Snags that occur along lower maintenance level roads (ML 1 and some ML 2 roads) may be used by NSO for various types of activities, including nesting or roosting. The very low level of vehicle traffic associated with ML 1 roads that have been closed or rarely used by vehicles would not have discouraged NSO use of the area or possibly the establishment of a nest site. Therefore, hazard trees in these areas could contain nesting/roosting owls and the removal of these hazard trees may cause the disruption of nesting, abandonment of the nest, or possible direct mortality, if NSO are not detected by surveys and avoided. Table 11 displays the acres affected in suitable unburned, or grid code 1 and 2, nesting/roosting and foraging habitat impacted by hazard tree removal. The exact effects are difficult to estimate because there is some uncertainty where, what size, and how many hazard trees will be harvested at this time. Hazard trees are still being evaluated at the time of writing this document.

Table 11: Acres of hazard tree removal occurring within suitable nesting/roosting or foraging habitat along management level 1 roads only, in core areas and throughout the analysis area.

Habitat along ML1 roads	Acres within Core Areas only	Acres throughout the analysis area*
Nesting/Roosting	53	166
Foraging	140	433
Total	**193**	**599**

**Acres are inclusive of the acres within the cores.*

In addition to the ML1 roads, there are potential risks to NSO from ML2 roads as well. There are 80 miles of ML 1 and 2 roads that occur within core areas that have hazard tree removal proposed. These roads may cross through core areas multiple times and the habitat alongside the road will be affected each time the road crisscrosses the area as it contours the hill. In other words, all of the habitat that occurs within the overlapping or adjacent treatment areas within the crisscrossed areas will be affected, extending the width of the treatment because it can be adjacent to another 200-foot treatment area along the road as it contours the hillside. This would compound the effects of the treatment.

[7] Refer to the Regional Hazard Tree Guidelines

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There are a total of 1,249 acres of suitable nesting/roosting and foraging habitat within core areas that will be affected by hazard tree removal along ML 1 and 2 roads (table 12 below).

Table 12: Acres of hazard tree removal occurring within suitable nesting/roosting or foraging habitat along management level 1 and 2 roads in core areas only - habitat acres represent suitable post-fire NRF, and do not include FANR or PFF.

NSO Habitat type within core areas with hazard tree removal along ML1 and 2 roads	Acres in core areas
Foraging	914
Nesting/Roosting	335
Total	1,249

The potential also exists for effects to occur outside of core areas but within suitable NRF, particularly along lower maintenance level roads. Given the large number of sites affected by fire, some of the NSO pairs associated with these sites are likely to move to other areas outside the original core and hazard tree treatment may overlap with these new sites. Therefore, hazard tree removal can negatively affect NSO when it occurs within suitable NRF habitat during the sensitive reproductive period regardless whether the treatment occurs within a core or not, if NSO are not detected during surveys.

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 all types of fuels treatments. Areas proposed for site preparation and planting do not generally contain suitable NR and this treatment is intended to result in beneficial impacts to the recovering forest.

Table 13 displays the crosswalk with which effects 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 fuel treatment and overlapping hazard tree removal. The resulting habitat was either removed or downgraded to dispersal habitat depending on the type of fuels treatment and the burn severity in which it occurs.

Table 13: Crosswalk for establishing the effects of treatments individually and in combination with other treatments when occurring in NSO nesting/roosting, foraging and dispersal habitat (FANR and PFF would be removed where it occurs in treatment units)

Fuels Treatment	No additional Treatment	Roadside Hazard tree removal (low fire severity, RAVG grid code 1 & 2)	Roadside Hazard tree removal (high fire severity, RAVG grid code 3 & 4)	Salvage	Site prep/plant
FMZ	Downgrade to D*	Downgrade to D*	Remove	Remove	Remove
Roadside - Modified	Degrade	Degrade	Remove	Remove	Remove
Roadside - Complete	Downgrade to D*	Downgrade to D*	Remove	Remove	Remove
WUI	Downgrade to D*	Downgrade to D*	Remove	Remove	Remove
Underburn	Degrade	Degrade	Remove	Remove	Remove

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No Fuels Treatment	No Effect	Degrade	Remove	Remove	Remove

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

Where roadside hazard tree removal occurs alone, the treatment is anticipated to degrade habitat when in lower severity (grid code 1 and 2) burned areas and remove PFF and FANR when in high or moderate severity (grid code 3 and 4). This 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; the lower burn severities (or unburned) will have more sporadically occurring hazard trees along the roads that will be identified using the hazard tree guidelines. Effects to NSO habitat are summarized in Table 14 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 & Cluck, 2011). These guidelines were developed using peer-reviewed scientific literature to evaluate tree species in Northern California for mortality. 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. However, areas within salvage units that did not burn at moderate- and high- fire severity (grid code 3 or 4) will be delineated as retention areas and will not be harvested. In addition to these low- fire severity affected areas, trees or snags in the riparian reserves (project design), legacy trees (PDF Wildlife – 4), additional snag retention (PDF Wildlife – 3), and snags that existed prior to the fire (PDF Wildlife – 5) will be retained in units greater than 100 acres (legacy trees/snags or pre-fire existing snag that poses a safety concern may be reduced). In salvage units less than 100 acres in size, tree or snag retention will occur similarly as units greater than 100 acres, but units less than 100 acres will not have additional snag retention (PDF Wildlife – 3). Therefore, the tree and snag retention in the salvage units will reduce the amount of area void of trees or snags, thus providing cover and structure within the stand to contribute to connectivity between patches of habitat.

Salvage units that contain legacy trees and pre-fire existing snags will be retained where they occur regardless of unit size; even though this may equate to only a few trees or snags remaining in a unit, these trees or snags may offset some of the effects to NSO, especially in areas without riparian reserve retention. Any snags or trees may help to provide some cover for an NSO to move from one patch of unburned habitat to the next patch of unburned habitat. For most salvage units, the combination of low-fire severity affected areas (grid code 1 and 2), riparian reserves, legacy tree retention, and additional snag retention will reduce the size of openings (areas void of snags or trees) which may increase the likelihood an owl may cross the opening or use the area for foraging. Table A-3 of Appendix A shows a list of each of these units and the proportion of grid code 1 and 2 that may be present in the stand as retention clumps.

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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 riparian reserve retentions.

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. These highly fire affected areas have very little NSO habitat or patches of green trees that would provide cover for an owl. Generally, most of the remaining habitat in these highly fire-affected areas is located in the riparian reserves on the lower 1/3 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).

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, fire-affected habitat was delineated in areas where NSO could be expected to use it. It is difficult to assess the amount of actual use and determine the quality of severely burned habitat. However, these habitat types have been distinguished from other areas of burned forest due to their anticipated 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 separated from non-fire affected or low fire severity affected nesting/roosting habitat to reflect the lower quality of nesting/roosting habitat burned at moderate severity (grid code 3) and the wide variety of effects to habitat that can result from burning at moderate severity. 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 (PFF) habitat was also delineated based on pre-fire habitat suitability and burn severity, but factored in the distance an owl may travel from cover. PFF is comprised of stands that burned pre-fire foraging habitat at moderate and high fire severity. A large proportion of PFF is pre-fire foraging habitat 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. Because of this, it was assumed that NSO would not use PFF that was

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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 because the research doesn't report this attribute; we are assuming the likelihood of an owl using PFF will decrease as the distance increases from suitable habitat and consequently, the value of PFF for foraging opportunity will decrease with distance from suitable habitat. 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 are assuming that PFF within a 500 foot buffer from existing, currently suitable NRF is the most likely type of PFF used by foraging owls. This doesn't mean that owls will not use areas beyond 500 feet for foraging, rather that the incidence of this is likely uncommon.

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 over. 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.

Salvage harvest will remove post-fire foraging and fire-affected nesting/roosting. Table 14 shows the removal of 1,843 acres of post-fire foraging habitat and 203 acres of fire-affected nesting/roosting through salvage harvest. This is likely to negatively affect the NSO currently occupying the areas where this habitat occurs. This habitat may be providing foraging opportunities in areas where the fire has already reduced the available habitat and the removal of this would further reduce their foraging opportunities. See table 21 for a list of each activity center that is affected by salvage harvest (and other treatments).

The proposed harvest of fire-killed trees will remove future large woody debris. Woody material is important for small mammal reproduction and survival, and therefore important as it benefits NSO prey. Salvage harvest units contain retention of snag clumps situated around riparian reserves, drainages, and groups of pre-existing snags that would offer cover adjacent to open areas for prey species.

In summary, according to the physical characteristics associated with NSO habitat as defined in several 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. Salvage harvest

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will, however, remove substantial amounts of fire-affected habitats, 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 territories. However, given the research, we can anticipate some level of negative effects resulting from the removal of PFF or FANR.

Roadside Hazard Tree Removal

Like the roadside hazard discussion in the direct effects section, indirect effects resulting from roadside hazard treatment is also likely to negatively affect many acres of NSO, particularly where the hazard tree removal occurs in suitable habitat that has not burned at moderate or high severity. Hazard trees are often snags or trees with some kind of defect, decay or mistletoe, and there is a high potential for the removal of potential or active nest trees, especially when the hazard tree removal occurs along low maintenance level roads with little traffic. Since there is no size limit on hazard tree removal, large trees or snags can be removed from suitable habitat, which take a long time to replace. Hazard tree removal along low level roads is likely to have a greater effect on NSO due to the magnitude of the treatment across the entire analysis area and the removal of an estimated large number of snags in suitable NRF habitat.

Felling hazard trees within non-suitable NSO 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. Removal of these hazard trees will reduce potential nest and roost sites from nesting/roosting habitat as well as potential perch sites from within foraging and dispersal habitat.

Hazard tree removal that occurs within areas that burned at moderate- and high- fire severity is expected to have greatly reduced effects on NSO. NSO are not likely to use areas that experienced high fire severity for nesting or roosting, and consequently the removal of the fire-killed trees along roads in high fire severity is not likely to affect nesting habitat. The large snags removed in these areas would have been large downed logs if they were not removed through harvest; removing these large snags has negative impacts to prey species that use downed logs and woody debris during many of their life stages.

Snag density will be largely affected in areas of high- and moderate-severity burns where all commercial-sized hazard trees that have a 60% probability of mortality or greater based on the mortality (salvage tree) 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 loads, understory fuels treatment may occur. Given the uncertainty of the number of trees harvested treatments in moderate- and high-severity burn areas, we are assuming that removing all dead or dying trees (≥60% 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. Therefore, this treatment will result in removing FANR and PFF.

When hazard tree removal occurs in combination with fuels treatments, there is an additive effect to the habitat from treating both the overstory and simplifying the understory structure. The acres where this occurs are tabulated above in the summary of effects tables, and will be described below in the fuels treatment discussion.

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Fuels treatments – WUI, FMZ, 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 faces 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. 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 occur in high quality habitat. However, the "modified understory" prescription has been adjusted to lower the level of negative effects to NSO habitat 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)

These two types of fuels treatments result in very similar effects to NSO habitat. WUI and FMZ 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 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 may simplify the understory but the treatment does not target overstory canopy. Underburning is tied to specific burn prescriptions that typically are related to fuel moisture content among many weather related conditions that allow for a fairly accurate burn result. Typically, 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 habitat, the overall effect will not result in a downgrading of habitat; habitat will still

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remain at the same habitat level after treatment. Most of the negative effects related to the understory vegetation typically degrade habitat by removing some of the vegetation for prey species; however, in one or two growing periods, the result of the treatment can be beneficial in areas that had a low-intensity fire. Underburning can also result in an increased amount of food for NSO prey in the form of new growth in understory herbaceous vegetation.

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Table 14: Acres of habitat affected by treatment type within NSO analysis area

NSO habitat within Analysis Area	NRF			FANR	PFF	Dispersal	
	82,796			1,362	10,772	56,931	
Habitat Type and Effect	NRF Removed (acres)	NRF Downgraded (acres)	NRF Degraded (acres)	FANR Removed (acres)	PFF Removed (acres)	Dispersal Removed (acres)	Dispersal Degrade (acres)
Salvage Harvest	115*	0	0	203	1,843	47*	0
Roadside Hazard	0	0	5,253	39	442	0	3,716
Wildland Urban Interface	0	488 (downgrade to dispersal)	0	0	8	0	585
Fuel Management Zone	0	1,322 (downgrade to dispersal)	0	7	96	0	1,133
Roadside Hazard overlap with complete fuels	0	288 (downgrade to dispersal)	0	2	27	0	478
Roadside Hazard overlap with modified fuels	0	0	1,200	3	22	0	520
Underburn only	0	0	3,451	52	420	0	2,213
Site/prep and plant	406	0	0	28	331	287	0
Roadside hazard overlap with underburn	0	0	499	2	30	0	367
Landings	25	0	0	1	18	18	0
TOTAL							
Acres (% Change in Analysis Area NSO Habitat)	546 (0.6%)	2,098 (2.5%)	10,403 (12.6%)	337 (24.7%)	3,237 (30%)	352 (<0.5%)	9,012 (15.8%)

* 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.

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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." 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. Because of the large number of activity centers affected by the proposed activities, a process was developed to determine the level of effects that are anticipated to occur for each AC.

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 15). Intensity factors were used in determining 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).

Table 15: 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.
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.
G	Underburning is proposed in >50% of the core.

Each activity center (AC) was evaluated using "intensity factors" (Table 15); if the treatment(s) resulted in effects as described in each of the intensity factors, then the AC was identified with a letter ("A", "B", "C", "D", "E", "F", or "G") to match the intensity factor (Table 16). All ACs that were assigned a letter will receive the same determination of a "likely to adversely affect" (LAA). Of the 94 activity centers evaluated for this project, 53 ACs have effects that result in LAA determination. In other words, the proposed treatments are likely to adversely affect 53 activity centers. However, activity centers that didn't receive a LAA determination received further site-specific evaluation, as described below.

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Table 16: 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
0239	C	LAA	1214	C, D, F	LAA
0241	C, D, E	LAA	1258	B, E	LAA
0277	C	LAA	1265	C	LAA
0283	C, F	LAA	1266	C	LAA
0293	C	LAA	2124	C	LAA
0365	C	LAA	4099	C	LAA
0380	C	LAA	4133	A, C	LAA
0381	C, F	LAA	4143	B	LAA
0567	C	LAA	4145	C	LAA
1027	F, G	LAA	9991	B, F	LAA
1030	B, F	LAA	9992	A, C, D, E, G	LAA
1041	F	LAA	9994	A, C	LAA
1046	C, D, E, F	LAA	9995	D, F	LAA
1047	D, F, G	LAA	9996	D, C, G	LAA
1100	C	LAA	9998	C, D, E	LAA
1109	C, F	LAA	9999	B	LAA
1110	C	LAA	99912	D, F, G, C	LAA
1112	C, F	LAA	99913	C	LAA
1116	F	LAA	99915	C	LAA
1117	C	LAA	0276A	C	LAA
1119	C	LAA	0276B	C	LAA
1121	C	LAA	0278A	C	LAA
1122	C	LAA	0278B	C	LAA
1130	C, E, F	LAA	NEW3A	C	LAA
1202	A, C	LAA	NEW7A	C, F	LAA
1212	C, F	LAA	NEW7B	C, F	LAA
1213	C	LAA			

Once these initial LAA determinations above were established, the *remaining* activity centers received a site-specific evaluation to further assess the effects of the proposed treatments. After completing the site specific evaluation, three common factors were found among the ACs assigned a LAA (Table 18). The AC with the associated common factor(s) and LAA determinations are displayed in Table 19.

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Table 17: Common factors found among Activity Centers that received a LAA after a site specific evaluation

Category	Common Factors
X	Treatment occurs in suitable habitat in the core.
Y	Treatment occurs in suitable habitat in core and home range with small amount of existing habitat
Z	*Magnitude* and *intensity* of treatments in core and/or home range.

Table 18: Activity Center determinations based on site specific evaluation using factors X, Y, and Z from the table above

Activity Center Number	Commonality Factor	Determination	Activity Center Number	Commonality Factor	Determination
0245	X, Y	LAA	4097	Y	LAA
0254	X, Y	LAA	4144	Y, Z	LAA
0269	X	LAA	4146	X, Y	LAA
0272	Z	LAA	9990	X, Y, Z	LAA
0346	X	LAA	9993	Y	LAA
1029	X, Z	LAA	99910	X	LAA
1039	X, Z	LAA	99914	Z	LAA
1040	X, Z	LAA	NEW3B	X, Y, Z	LAA
1111	X, Y	LAA			

After completing the site-specific evaluations, an additional 17 activity centers were determined to be "likely to be adversely affected" based on the proposed treatments in their core and home range (Table 18).

The remaining ACs (those without a LAA determination) were assigned either a MANLAA or no effect determination. These determinations were made based on a variety of conditions that extended beyond the previous AC evaluation to incorporate the finer details such as potential noise disturbance from project activities nearby as well as treatments occurring within the core or home range. The determinations and rationale for each determination are shown in the table below.

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Table 19: Activity Center determinations based on site specific evaluation

Activity Center Number	Rationale for Determination	Determination
0210	No treatment is proposed within the core or home range and no anticipated noise disturbance[8.]	No Effect
0229	Small amount (about 1 acre) of habitat degraded on ridgeline (upper 1/3 slope position) and about 1 acre on the middle 1/3 slope position along the outer portion of the home range. No anticipated noise disturbance.	MANLAA
0247	About 20 acres of suitable habitat degraded (2 acres in core and 18 acres in home range) on the lower 1/3 slope position. No anticipated noise disturbance.	MANLAA
0252	About 2 acres of treatment occurs on outer home range, but no treatment within suitable habitat, FANR, or PFF. No anticipated noise disturbance.	No Effect
0255	About 52 acres of treatment in the outer portion of the home range, but no treatment occurs within suitable habitat, FANR, or PFF. No anticipated noise disturbance.	No Effect
0257	Treatment occurs along the ridgeline and on the opposite side of a dominant ridgeline of the core. No anticipated noise disturbance.	MANLAA
0284	About 30 acres of suitable habitat degraded along the outer portion of the home range, but no suitable habitat, FANR, or PFF downgraded or removed. No anticipated noise disturbance.	MANLAA
0315	Treatment occurs on the outer portion of the home range and treatment will downgrade 3 acres and degrade 37 acres of suitable habitat, mostly on the upper third of slope position. The core and home range have habitat levels well above the recommended habitat minimums. No anticipated noise disturbance.	MANLAA
0322	Treatment occurs in home range, but very little habitat will be affected (about 1 acre). Treatment occurs on the upper 1/3 slope position. No anticipated noise disturbance.	MANLAA
0350	No treatment occurs within suitable habitat, FANR, or PFF and the treatment occurs on outer portion of the home range. No anticipated noise disturbance.	No Effect
0352	No treatment is proposed within the core or home range. No anticipated noise disturbance.	No Effect
0358	A small amount (about 5 acres) of suitable habitat will be degraded along the ridgeline. The core and home range have habitat levels well above the recommended habitat minimums. No anticipated noise disturbance.	MANLAA
0499	Treatment occurs in home range, but very little habitat will be affected (about 1 acre). Treatment occurs on the upper 1/3 slope position. No anticipated noise disturbance.	MANLAA
1028	Treatment will downgrade about 25 acres of suitable habitat on the ridgeline along the outer portion of the home range. The home range is well above the recommended habitat minimums. No anticipated noise disturbance.	MANLAA
1101	About 4 acres of suitable habitat and 49 acres of PFF will be removed. About 27 acres of suitable habitat will be degraded. All treatment occurs in outer portion of home range in the adjacent drainage from the location of the core, but only separated by a nose-ridge. The home range is well above the recommended habitat minimums. No anticipated noise disturbance.	MANLAA

[8] Noise disturbance was assessed by evaluating potential noise creating activities (e.g. heavy equipment) above ambient levels within the core; this was used to assume potential noise disturbance. Helicopter noise disturbance was assumed if a landing, helicopter harvest unit or the flight path between the landing and the treatment unit occurred in the core. Helicopter noise was assessed at 0.5 miles.

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1164	Treatment occurs in home range on the opposite side of a dominant ridgeline of the core, but very little habitat will be affected (about 1 acre). No anticipated noise disturbance.	MANLAA
4026	A small amount (about 19 acres) of suitable habitat will be degraded or downgraded along the ridgeline. The home range is above the recommended habitat minimums post-treatment. No anticipated noise disturbance.	MANLAA
1165	No treatment is proposed within the core or home range. No anticipated noise disturbance.	No Effect
4095	Treatment occurs in home range along the upper 1/3 of the slope and very little suitable habitat will be affected (about 2 acres). No anticipated noise disturbance.	MANLAA
4128	Almost all the treatment occurs on the opposite side of the Klamath River from the core in an area with very little habitat (southerly aspect). About 3 acres of suitable habitat will be degraded on the outer portion of the home range on the same side of the Klamath River as the core. No anticipated noise disturbance.	MANLAA
4129	About 6 acres of suitable habitat on the outer portion of the home range along the upper 1/3 slope position will be downgraded (about 3 acres) or degraded (about 3 acres). Treatment occurs on the opposite side of the Klamath River from the core. No anticipated noise disturbance (activity center is within 0.25 mile of Highway 96, but the road is heavily traveled by trucks regardless of this project).	MANLAA
4189	No treatment is proposed within the core or home range. No anticipated noise disturbance.	No Effect
0096A	A small amount (about 15 acres) of suitable habitat will be degraded on the upper 1/3 slope position in the home range. Other treatments occur on the southerly aspect that contains no suitable habitat, FANR, or PFF. No anticipated noise disturbance.	MANLAA
0096B	Treatment occurs on the outer edge of the home range, but very little suitable habitat will be affected (about 1 acre).	MANLAA

In summary, on the west side of the Forest[9], there are about 306 activity centers (from NRIS database and CNDDB combined with overlapping cores counted only once). Of these 94 ACs, 70 of these ACs have a "likely to adversely affect" determination. Overall, about 23% of all activity centers on the west side of the KNF will be adversely affected by the proposed activities.

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

Table 20: 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				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		
	NRF	FANR	PFF	NRF	FANR	PFF	NRF	FANR	PFF	NRF	FANR	PFF	NR	F	NR	F	NR	F	NR	F	NRF	FANR	PFF	NRF	FANR	PFF
0210	212	0	0	1,175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	212	0	0	1,175	0	0
0229	181	0	0	714	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	181	0	0	714	0	0
0239	138	0	0	397	0	0	0	0	0	0	0	0	0	3	0	4	0	3	2	4	135	0	0	393	0	0
0241	270	3	64	1,001	21	137	0	0	0	8	10	109	8	37	14	50	34	67	54	143	225	3	64	929	11	28
0245	48	0	0	679	6	13	0	0	0	0	0	0	0	0	0	0	0	0	5	8	48	0	0	679	6	13
0247	299	0	0	678	0	40	0	0	0	0	0	0	0	0	0	0	1	1	8	10	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	0	0	67	0	0	347	0	0
0254	214	0	0	193	0	4	0	0	0	0	0	0	0	0	0	13	0	0	2	9	214	0	0	180	0	4
0255	110	0	0	861	0	0	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	5	0	0	0	32	0	0	0	52	445	0	0	1,375	0	52
0269	336	0	0	1,832	2	39	0	0	0	0	0	0	0	0	0	0	0	5	10	26	336	0	0	1,832	2	39
0272	202	32	159	1,176	81	536	0	0	0	6	2	44	0	0	0	0	0	0	0	0	202	32	159	1,170	79	492
0277	261	0	0	857	0	0	0	0	0	0	2	9	0	0	1	23	0	0	3	22	261	0	0	833	0	0
0283	181	4	131	425	7	171	0	0	0	1	0	13	0	0	16	33	7	42	23	44	181	4	131	375	5	149
0284	76	0	0	793	0	0	0	0	0	0	0	0	0	0	0	0	7	10	11	0	76	0	0	793	0	0
0293	138	0	0	983	0	5	0	0	0	0	0	0	0	0	3	25	0	0	9	62	138	0	0	955	0	5
0315	327	0	0	1,542	0	32	0	0	0	0	0	3	0	0	3	0	0	0	32	5	327	0	0	1,539	0	29
0322	356	0	0	1,190	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	356	0	0	1,189	0	0
0346	76	5	59	182	6	136	0	2	14	1	1	5	0	0	0	3	0	0	2	10	76	3	45	178	5	131
0350	125	0	0	562	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	125	0	0	562	0	0
0352	333	0	0	1,335	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	333	0	0	1,335	0	0
0358	466	0	0	1,515	0	57	0	0	0	0	0	0	0	0	0	0	1	1	0	3	466	0	0	1,515	0	57
0365	151	0	0	1,145	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	1	151	0	0	1,141	0	0
0380	306	3	38	826	21	47	0	0	10	39	11	18	0	0	8	57	0	15	32	86	306	3	28	722	10	29
0381	175	4	11	820	4	45	11	4	8	4	11	7	7	19	0	9	7	27	30	140	138	0	3	807	0	38
0499	340	0	0	1,182	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	340	0	0	1,181	0	1
0567	241	0	0	735	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	241	0	0	733	0	0
1027	117	2	6	1,300	33	173	0	0	0	1	5	43	0	0	18	24	82	50	53	53	117	2	6	1,257	28	130
1028	247	0	0	1,269	0	1	0	0	0	1	0	1	0	0	3	22	0	0	2	16	247	0	0	1,243	0	0
1029	286	3	36	1,649	21	280	0	0	0	0	0	8	0	0	0	49	16	80	1	101	286	3	36	1,600	21	272
1030	401	0	8	936	20	239	0	0	0	0	0	4	0	0	0	17	0	18	7	61	401	0	8	919	20	235
1039	400	0	12	1,514	7	215	0	0	0	4	0	10	19	10	15	15	18	14	99	91	371	0	12	1,480	7	205
1040	243	19	66	1,481	44	226	0	0	0	3	6	19	0	0	15	64	8	2	84	104	243	19	66	1,399	38	207
1041	278	3	30	1,096	7	250	0	0	1	17	3	54	0	0	0	0	20	22	70	100	278	3	29	1,079	4	196
1046	229	8	36	924	20	227	0	0	0	3	7	11	30	5	21	2	68	22	208	47	194	8	36	898	13	216
1047	352	0	0	1,259	7	88	0	0	0	0	0	1	64	23	0	0	328	107	172	71	265	0	0	1,259	7	87
1100	199	3	23	634	3	88	0	0	0	64	2	53	0	0	0	0	0	0	17	87	199	3	23	570	1	35

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AC#	Pre-Implementation Habitat within Core			Pre-Implementation Habitat within Home Range			Acres Removed						Acres Downgraded				Acres Degraded				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		
	NRF	FANR	PFF	NRF	FANR	PFF	NRF	FANR	PFF	NRF	FANR	PFF	NR	F	NR	F	NR	F	NR	F	NRF	FANR	PFF	NRF	FANR	PFF
1101	458	6	8	2,118	25	245	0	0	0	4	0	49	0	0	0	0	0	0	3	24	458	6	8	2,114	25	196
1109	282	0	2	898	2	82	0	0	0	3	1	37	0	0	0	20	3	43	25	140	282	0	2	875	1	45
1110	200	0	14	664	4	26	0	0	0	0	0	1	0	0	0	14	5	41	22	92	200	0	14	650	4	25
1111	29	0	9	368	5	25	0	0	0	0	0	2	0	0	0	15	0	0	22	74	29	0	9	353	5	23
1112	151	9	30	892	18	165	0	0	0	2	8	94	0	0	2	33	24	15	56	123	151	9	30	855	10	71
1116	401	18	64	2,168	50	342	9	1	10	37	24	148	0	0	1	22	0	1	26	206	392	17	54	2,108	26	194
1117	145	18	113	490	84	371	0	0	0	1	0	5	0	0	0	0	0	0	0	0	145	18	113	489	84	366
1119	220	38	128	552	99	457	0	0	0	0	0	0	0	0	0	2	0	0	0	1	220	38	128	550	99	457
1121	193	22	177	670	72	439	0	0	0	3	8	123	0	0	0	0	0	0	1	33	193	22	177	667	64	316
1122	117	0	69	1,014	28	214	0	0	0	3	0	15	0	6	4	36	0	7	38	167	111	0	69	971	28	199
1130	208	13	69	1,006	72	370	0	1	0	4	9	175	2	12	17	78	19	32	76	158	194	12	69	907	63	195
1164	283	0	0	1,309	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	283	0	0	1,308	0	0
1165	429	0	0	1,864	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	429	0	0	1,864	0	0
1202	14	1	23	639	8	210	0	0	19	22	4	126	0	0	3	13	0	6	3	64	14	1	4	601	4	84
1212	197	0	9	1,059	0	102	0	0	0	40	0	32	0	0	0	4	0	5	20	154	197	0	9	1,015	0	70
1213	233	0	4	816	10	210	0	0	0	16	1	30	15	26	4	31	19	38	51	157	192	0	4	765	9	180
1214	271	0	12	1,019	0	86	0	0	0	6	0	21	0	6	1	5	9	80	18	257	265	0	12	1,007	0	65
1258	211	17	100	1,045	66	263	0	0	0	2	9	46	0	0	17	28	5	0	26	33	211	17	100	998	57	217
1265	50	12	115	1,025	87	502	3	7	110	14	23	219	0	0	0	0	3	8	8	58	47	5	5	1,011	64	283
1266	243	35	105	729	109	496	0	0	0	30	58	370	0	0	0	0	0	0	18	39	243	35	105	699	51	126
2124	113	0	0	735	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	113	0	0	721	0	0
4026	150	0	0	1,294	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	15	150	0	0	1,290	0	0
4095	337	0	0	1,353	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	337	0	0	1,353	0	0
4097	254	9	49	852	8	133	0	0	0	0	0	0	0	0	0	0	0	8	0	8	254	9	49	852	8	133
4099	283	0	37	842	12	279	0	0	0	42	4	98	0	0	3	4	2	48	15	46	283	0	37	793	8	181
4128	205	0	0	536	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	205	0	0	536	0	0
4129	69	0	0	380	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	69	0	0	377	0	0
4133	24	12	53	563	81	263	1	6	41	5	29	145	0	0	0	0	2	3	63	18	23	6	12	558	52	118
4143	264	6	33	1,043	13	139	0	0	0	0	0	2	18	3	17	6	16	14	53	43	243	6	33	1,020	13	137
4144	96	0	4	217	8	43	0	0	0	0	0	1	0	0	1	16	0	0	4	13	96	0	4	200	8	42
4145	174	11	69	576	23	139	12	3	13	9	12	4	5	11	2	13	20	16	19	29	146	8	56	552	11	135
4146	137	6	89	300	5	203	0	1	8	0	2	15	0	0	4	8	6	3	8	36	137	5	81	288	3	188
4189	353	0	0	1,129	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	353	0	0	1,129	0	0
9990	151	0	80	415	2	208	2	0	6	9	3	89	0	0	0	3	0	37	1	65	149	0	74	403	0	119
9991	239	0	77	1,110	6	77	29	0	19	10	29	20	0	0	0	23	2	61	65	218	210	0	58	1,077	0	57
9992	240	0	5	539	1	11	0	0	0	0	0	36	44	23	58	61	107	66	17	65	173	0	5	420	1	10
9993	169	0	0	431	1	3	0	0	0	0	0	0	0	0	10	13	0	0	3	19	169	0	0	408	1	3
9994	174	1	6	504	5	27	0	0	0	0	0	0	0	10	12	7	0	14	3	5	164	1	6	485	5	27

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AC#	Pre-Implementation Habitat within Core			Pre-Implementation Habitat within Home Range			Acres Removed						Acres Downgraded				Acres Degraded				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		
	NRF	FANR	PFF	NRF	FANR	PFF	NRF	FANR	PFF	NRF	FANR	PFF	NR	F	NR	F	NR	F	NR	F	NRF	FANR	PFF	NRF	FANR	PFF
9995	196	0	42	1,225	1	87	0	0	0	7	0	26	0	0	0	7	1	66	20	314	196	0	42	1,211	1	61
9996	160	0	4	795	1	64	0	0	0	11	0	38	0	0	8	57	37	118	8	104	160	0	4	719	1	26
9998	269	8	27	737	12	101	13	4	34	24	20	64	10	44	4	12	7	40	79	234	202	4	0	697	0	37
9999	100	31	76	1,169	43	363	0	0	1	8	0	53	0	0	0	0	0	0	0	6	100	31	75	1,161	43	310
99910	328	0	68	1,337	6	113	0	0	0	0	0	0	0	0	8	15	5	3	97	63	328	0	68	1,314	6	113
99912	278	5	53	1,562	10	110	0	0	0	4	5	55	0	5	12	96	101	221	34	60	273	5	53	1,450	5	55
99913	205	1	8	667	7	125	0	0	0	5	0	11	0	0	21	33	2	3	19	36	205	1	8	608	7	114
99914	55	3	26	331	7	29	0	0	0	0	0	1	0	0	6	19	0	0	4	25	55	3	26	306	7	28
99915	150	1	10	1,047	6	76	0	0	0	0	0	4	0	0	2	4	0	0	7	8	150	1	10	1,041	6	72
0096A	279	0	0	1,077	3	50	0	0	0	0	0	0	0	0	0	0	0	0	0	15	279	0	0	1,077	3	50
0096B	317	0	0	1,938	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	317	0	0	1,938	0	4
0276A	203	0	0	745	1	0	0	0	0	0	0	0	1	28	3	32	1	15	13	74	174	0	0	710	1	-10
0276B	120	0	0	864	1	5	0	0	0	1	0	2	6	30	2	52	4	11	13	84	84	0	0	809	1	3
0278A	282	1	13	552	5	32	0	0	0	0	2	4	10	12	0	15	3	3	23	35	260	1	13	537	3	28
0278B	219	0	0	556	4	32	0	0	0	1	2	20	2	18	10	15	13	41	17	46	199	0	0	530	2	12
NEW3A	55	13	34	551	109	409	1	4	11	13	49	234	0	0	0	0	19	6	89	41	54	9	23	538	60	175
NEW3B	31	20	47	402	67	311	1	14	37	7	37	219	0	0	1	5	13	1	84	47	30	6	10	389	30	92
NEW7A	139	0	0	944	0	17	0	0	0	0	0	0	0	33	0	41	0	9	22	170	106	0	0	903	0	17
NEW7B	97	0	0	1,122		133	0	0	0	8	3	75	0	16	5	91	0	33	28	261	81	0	0	1,018	5	58

*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.

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Green tree retention areas

There are retention areas within salvage harvest units that may contain NSO habitat, but these retention areas will not be salvage harvested. These retention areas are identified as areas that burned at low fire severity (grid codes 1 or 2) and riparian reserves within the salvage unit boundaries. Even though retention areas are not part of the salvage harvest treatment and these retention areas will be avoided during implementation, a portion of the retention areas may be affected along the edges when these areas occur in the unit where salvage harvest operations will occur. Retention areas occur in many different shapes and sizes within the salvage units, but the most common occurrences of retention areas and are most likely to be affected by salvage harvest are inclusions (salvage may occur around all sides of the retention area) or peninsula shaped retention areas within the salvage unit. These areas may pose implementation challenges that may result in damage to trees within the retention areas, especially trees along the edge between the retention area and salvage treatment. However, retention areas, regardless of shape or positon in the unit, may incur tree damage, but retention areas along outer edges (except along the roads where yarding equipment may be operating) of the unit are expected to have a lower likelihood of damage.

In some circumstances it may be necessary to direct skyline operations through retention areas in order to extract harvested trees out of the unit. This is unlikely to occur in all retention areas since many of the retention areas occur along the edge of the salvage units and uncommon for other retention areas and even though the effect is likely not to affect the function of the habitat, the potential for additional effects exist and it is therefore analyzed within this document.

In order to account for these potential effects to habitat within retention areas, 10% of NRF was estimated by a professional forester with experience in salvage harvest operations (T. Coughlin personal communication) may be damaged during implementation. The level of damage (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.

Interdependent and Interrelated Actions

Roads

There will be no roads added to the National Forest Transportation System as a result of this project; about 3.5 miles of new temporary roads will be constructed and about 7.3 miles of temporary roads on existing roadbeds will be used for project access. Of those roads, 5.6 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. Helicopter landings will be up to 2 acres in size. Skyline landings will use roads wherever possible. New skyline landings off the road system and ground-based landings will average one acre

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in size but will not exceed 1.5 acres in size. Both new and existing landings will be hydrologically stabilized after use. All landings will be according to the project design features (Watershed-5 and Watershed-24) in chapter 2 of the draft 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.

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 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).

The proposed project may have localized impacts to flying squirrels, woodrats, or other prey species populations in the analysis area due to the removal of potential large woody debris across an extensive area. Salvage harvest targets standing fire-killed trees which will provide future potential large woody debris, though in areas of retention patches and in riparian reserves and areas outside the salvage harvest areas, 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 woodrats; though in areas with site prep and planting, shrub habitat may be more limited. 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 project contains NSO habitat that is well distributed throughout the analysis area 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.

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The salvage would accelerate the restoration of suitable NSO habitat, and fuels treatments would reduce fuel loadings and risk of stand-replacing fire. The long-term trend of barred owl and spotted owl interactions in this area is not known. The proposed treatments will accelerate the re-establishment of suitable habitat and reduce the fuels accumulations.

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 21).

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. RAVG grid code does not appear to affect 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 A-4 of 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 do not have any timber harvest plans filed for the foreseeable future. Forest Service projects that were planned in

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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.

Table 21: 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
Salvage (estimated size)	10,850	Current

Table 22: NSO habitat possibly affected by potential salvage occurring on private land

Habitat Type	Acres of Potential Salvage in NSO Habitat plus FANR and PFF
Nesting/Roosting	69
Foraging	243
Dispersal	362
FANR	52
PFF	1,523

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

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- 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 flashy fuel loads (≤9") to 3 to 10 tons per acre. 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.

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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.

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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:

1. Forest types that may be in early-, mid-, or late-seral stages and that support the northern spotted owl across its geographical range,
2. nesting and roosting habitat,
3. foraging habitat (subdivided into four ecological zones, two of which apply to the Klamath NF) , and
4. 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:

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

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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.

<u>Threats to Critical Habitat</u>

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

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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. **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 FSW 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. Fire-affected critical habitat is the suitable NRF that burned at RAVG grid code 3 and 4, regardless of distance to suitable habitat.

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Table 23: Acres of Pre- and Post-Fire NSO Critical Habitat in the critical habitat analysis area

NSO Critical Habitat Subunit	Portion of CH subunit in analysis area (acres)	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 Critical Habitat
KLE6	6,879	1,561	1,386	1,547	1,495	1,219	1,344	230
KLE7	37,724	11,310	9,720	9,699	7,339	6,624	6,196	7,430
KLW7	28,063	2,631	6,700	9,331	2,502	7,931	6,771	839
KLW8	27,976	7,427	7,745	7,346	6,445	6,489	5,744	2,217
Total	100,642	22,929	25,551	27,923	17,781	22,263	20,055	10,716

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Table 24: 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 Critical Habitat [1] (acres)
	1,495			1,219			1,344		230
Habitat Type and Effect	Nest/Roost Removed (acres)	Nest/Roost Downgraded (acres)	Nest/Roost Degraded (acres)	Foraging Removed (acres)	Foraging Downgraded (acres)	Foraging Degraded (acres)	Dispersal Removed (acres)	Dispersal Degrade (acres)	Fire Affected Critical Habitat Removed [1] (acres)
Salvage Harvest	0*	0	0	0*	0	0	0	0	33
Roadside Hazard	0	0	110	0	0	86	0	103	47
Wildland Urban Interface	0	0	0	0	0	0	0	0	0
Fuel Management Zone	0	67 (downgrade to dispersal)	0	0	59 (downgrade to dispersal)	0	0	80	41
Roadside Hazard overlap with complete fuels	0	0	0	0	1 (downgrade to dispersal)	0	0	5	0
Roadside Hazard overlap with modified fuels	0	0	0	0	0	21	0	26	0
Underburn only	0	0	0	0	0	0	0	0	0
Site/prep and plant	0	0	0	56	0	0	19	0	68
Roadside hazard overlap with underburn	0	0	0	0	0	0	0	0	0
Landings[2]	1	0	0	1	0	0	1	0	3
TOTAL	1	67	110	57	60	107	20	214	192

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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 Critical Habitat (acres)
	7,339			6,624			6,196		7,430
Habitat Type and Effect	Nest/Roost Removed (acres)	Nest/Roost Downgraded (acres)	Nest/Roost Degraded (acres)	Foraging Removed (acres)	Foraging Downgraded (acres)	Foraging Degraded (acres)	Dispersal Removed (acres)	Dispersal Degrade (acres)	Fire Affected Critical Habitat Removed (acres)
Salvage Harvest	21*	0	0	21*	0	0	15*	0	1,862
Roadside Hazard	0	0	246	0	0	567	0	467	600
Wildland Urban Interface	0	42 (downgrade to dispersal)	0	0	24 (downgrade to dispersal)	0	0	40	0
Fuel Management Zone	0	33 (downgrade to dispersal)	0	0	118 (downgrade to dispersal)	0	0	48	50
Roadside Hazard overlap with complete fuels	0	3 (downgrade to dispersal)	0	0	26 (downgrade to dispersal)	0	0	35	24
Roadside Hazard overlap with modified fuels	0	0	43	0	0	65	0	34	8
Underburn only	0	0	25	0	0	82	0	69	8
Site/prep and plant	0	0	0	46	0	0	37	0	107
Roadside hazard overlap with underburn	0	0	6	0	0	11	0	33	2
Landings[2]	3	0	0	4	0	0	3	0	12
TOTAL	24	78	320	71	168	725	55	726	2,673

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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 Critical Habitat (acres)
	2,502			7,931			6,771		839
Habitat Type and Effect	Nest/Roost Removed (acres)	Nest/Roost Downgraded (acres)	Nest/Roost Degraded (acres)	Foraging Removed (acres)	Foraging Downgraded (acres)	Foraging Degraded (acres)	Dispersal Removed (acres)	Dispersal Degrade (acres)	Fire Affected Critical Habitat Removed (acres)
Salvage Harvest	3*	0	0	11*	0	0	7*	0	187
Roadside Hazard	0	0	98	0	0	763	0	511	100
Wildland Urban Interface	0	6 (downgrade to dispersal)	0	0	48 (downgrade to dispersal)	0	0	58	0
Fuel Management Zone	0	47 (downgrade to dispersal)	0	0	155 (downgrade to dispersal)	0	0	174	2
Roadside Hazard overlap with complete fuels	0	12 (downgrade to dispersal)	0	0	117 (downgrade to dispersal)	0	0	175	2
Roadside Hazard overlap with modified fuels	0	0	120	0	0	344	0	212	7
Underburn only	0	0	0	0	0	0	0	0	0
Site/prep and plant	0	0	0	145	0	0	69	0	162
Roadside hazard overlap with underburn	0	0	0	0	0	1	0	0	0
Landings[2]	1	0	0	5	0	0	5	0	4
TOTAL	4	65	218	161	320	1,108	81	1,130	464

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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 Critical Habitat (acres)
	6,445			6,489			5,744		2,217
Habitat Type and Effect	Nest/Roost Removed (acres)	Nest/Roost Downgraded (acres)	Nest/Roost Degraded (acres)	Foraging Removed (acres)	Foraging Downgraded (acres)	Foraging Degraded (acres)	Dispersal Removed (acres)	Dispersal Degrade (acres)	Fire Affected Critical Habitat Removed (acres)
Salvage Harvest	9*	0	0	2*	0	0	2*	0	184
Roadside Hazard	0	0	152	0	0	130	0	94	71
Wildland Urban Interface		39 (downgrade to dispersal)	0	0	75 (downgrade to dispersal)	0	0	136	7
Fuel Management Zone	0	73 (downgrade to dispersal)	0	0	92 (downgrade to dispersal)	0	0	161	0
Roadside Hazard overlap with complete fuels	0	14 (downgrade to dispersal)	0	0	27 (downgrade to dispersal)	0	0	112	7
Roadside Hazard overlap with modified fuels	0	0	240	0	0	117	0	74	1
Underburn only	0	0	1,351	0	0	1,184	0	1,480	508
Site/prep and plant	0	0	0	3	0	0	7	0	8
Roadside hazard overlap with underburn	0	0	98	0	0	89	0	177	26
Landings[2]	1	0	0	1	0	0	2	0	2
TOTAL	10	126	1,841	6	194	1,520	11	2,234	814

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

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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*. Salvage harvest and felling of hazard trees will reduce potential nest and roost sites from nesting and roosting habitat; these activities will also 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 (PDF Wildlife-3), legacy tree retention (PDF Wildlife-4), and retention of pre-fire existing snags (PDF Wildlife-5) 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 (≤9") 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*

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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. Approximately 4,800 acres of Fuels Management Zones on strategic ridgetop locations would be constructed as a part of the Westside Fire Recovery.

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. Approximately 4,400 acres of Roadside Fuels Reduction would be accomplished as part of the Westside Fire Recovery.

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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. There are 10,700 acres of understory prescribed fire that would be accomplished by the Westside Fire Recovery.

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. Approximately 650 miles of roads would be considered for hazard removal. Actual miles treated would likely be substantially less.

Site Preparation and Planting: This action provides a long-term benefit by reducing the time required to reestablish coniferous forests (and hence NSO habitat) in severely burned areas.

In addition, research has shown that plantations established where residual slash had been adequately treated burned with much less intensity or not at all (Thompson, Spies and Ganio 2007; Weatherspoon and Skinner 1995). Therefore, effective fuel treatment (site preparation) is an important component of sustainable reforestation in the Klamath Province. As part of the Westside Fire Recovery, approximately 7,850 acres of plantations and natural stands and 6,000 acres of salvage units would be site prepared and planted.

Salvage units occur in areas that were largely affected by moderate- and high-severity fire that resulted in mostly dead or dying trees, especially on the upper slope positions. On these upper slope positions, the lack of live trees to provide a seed source may be problematic for natural regeneration for many years. Lacking site prep and planting treatment, the stands will generally consist of brush and hardwood species. However, salvage units will be planted with tree seedlings to promote the rapid recovery of the forest and provide a future seed source for the areas treated. Seedlings will be of a variety of coniferous species that would naturally occur and are suited to the site, planted in heterogeneous matrix of uneven spacing.

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 lay 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 25) for the listed reasons:

Table 25: 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.

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Species	Reason for **No Effect** Determination
Shasta crayfish (*Pacifastacus fortis*)	Based on the best available scientific and commercial information, this species is not known to occur on the in the analysis area.
California red-legged frog (*Rana draytonii*)	Based on the best available scientific and commercial information, this species is not known to occur in 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 94 activity centers, or 31% of the ACs on the west side of the Forest. Of these 94 ACs, 70 of these have "Likely to Adversely Affect" determinations. Therefore, a total of **75% of the ACs in the analysis area, and 20% of all activity centers on the west side of the KNF will be adversely affected by the proposed activities.**

There are **seventeen activity centers** with "***May Affect, Not Likely to Adversely Affect***" and **seven** "***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. Large snags and live trees removed in suitable habitat, in addition to the removal of suitable NSO nesting/roosting and foraging habitat, occurring at a large scale, across four subunits of critical habitat is of a magnitude and scale that is not insignificant or discountable.

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XI. Appendices and Maps

Appendix A: Pre- and Post-Fire NSO Habitat, Salvage Treatments, Retention Area Analysis, Ongoing and Future Actions in the Analysis Area and List of Threatened and Endangered Species

Submitted

Table A-1: Pre-fire NSO habitat within the core and home range

Activity Center Number	0 - 0.5 mi Radius			0.5- 1.3 mi Radius Total			Total NRF (0 - 1.3 mile)
	NR	F	Total	NR	F	Total	
0380	33	239	273	415	295	709	982
1202	71	279	351	1,226	224	1,450	1,800
0096A	225	54	279	627	507	1,134	1,413
0096B	127	190	317	1,605	337	1,942	2,259
0229	44	137	181	474	240	714	895
0239	31	107	138	368	42	410	548
0241	114	211	325	818	378	1,196	1,521
0245	44	4	48	306	393	699	747
0247	210	95	304	374	349	723	1,027
0254	57	157	214	181	19	200	414
0257	65	380	445	1,369	100	1,470	1,914
0269	198	141	339	1,044	841	1,885	2,224
0272	345	105	450	937	1,139	2,076	2,526
0276A	82	95	178	467	195	662	840
0276B	44	76	120	655	173	827	947
0277	19	242	261	599	258	857	1,118
0278A	168	128	296	342	252	594	890
0278B	56	164	220	420	173	593	814
0283	118	254	372	696	101	797	1,169
0284	35	40	76	417	376	793	868
0315	190	137	327	737	850	1,586	1,913
0346	50	94	144	479	96	576	720
0350	52	73	125	367	195	563	687
0358	298	168	466	960	652	1,612	2,078
0381	30	79	109	540	138	678	787

Submitted

Activity Center Number	0 - 0.5 mi Radius			0.5- 1.3 mi Radius Total			Total NRF (0 - 1.3 mile)
	NR	F	Total	NR	F	Total	
1027	84	46	130	745	824	1,569	1,699
1028	219	27	247	812	459	1,271	1,518
1029	66	258	324	1,478	521	1,999	2,323
1030	174	235	409	957	409	1,366	1,775
1039	147	265	411	1,198	577	1,775	2,186
1040	277	53	329	651	1,125	1,776	2,105
1041	145	167	311	1,256	401	1,657	1,968
1046	197	76	274	637	565	1,202	1,476
1047	281	75	356	807	578	1,386	1,742
1100	105	120	225	532	239	771	996
1101	265	208	473	1,244	1,130	2,374	2,847
1109	55	229	284	796	244	1,040	1,323
1110	66	149	215	471	231	702	917
1111		38	38	313	90	402	440
1112	125	68	193	774	678	1,452	1,645
1116	396	73	470	1,182	1,316	2,498	2,968
1117	113	236	349	961	1,030	1,991	2,340
1119	253	114	367	857	884	1,742	2,109
1121	193	202	395	843	753	1,597	1,991
1122	2	191	193	847	363	1,210	1,403
1130	154	176	331	978	914	1,892	2,223
1212	13	128	142	668	91	759	900
1213	94	107	201	916	162	1,078	1,279
1214	25	228	252	815	98	912	1,165
1258	286	48	334	395	1,067	1,462	1,795
1265	241	96	337	760	966	1,726	2,063
1266	368	19	387	599	1,029	1,629	2,015
4095	104	233	337	917	437	1,354	1,691

Submitted

Activity Center Number	0 - 0.5 mi Radius			0.5- 1.3 mi Radius Total			Total NRF (0 - 1.3 mile)
	NR	F	Total	NR	F	Total	
4097	99	213	312	778	269	1,047	1,359
4099	15	305	320	1,057	263	1,320	1,640
4128	152	53	205	265	272	536	742
4129	25	44	69	275	105	380	449
4133	190	39	229	373	909	1,282	1,511
4143	149	154	303	702	549	1,251	1,554
4144	63	36	100	204	99	303	403
4145	133	129	262	508	319	827	1,089
4146	81	177	257	692	83	775	1,033
9990	1	230	231	749	22	771	1,002
9991	4	157	161	669	213	882	1,043
99910	64	332	396	844	696	1,540	1,936
99912	92	249	341	1,289	431	1,720	2,061
99913	50	172	223	791	162	954	1,176
99914	42	62	105	236	158	394	499
99915	35	128	164	755	394	1,148	1,312
9992	141	89	230	278	147	425	655
9993	45	125	169	261	173	435	604
9994	83	98	181	298	241	539	720
9995	10	216	227	984	86	1,070	1,296
9996	35	51	85	476	157	633	718
9998	174	110	285	515	293	808	1,092
9999	268	65	333	1,013	955	1,968	2,301
NEW3A	91	48	139	442	1,156	1,598	1,737
NEW3B	245	81	326	430	879	1,309	1,636
NEW7A	7	94	101	727	124	851	952
NEW7B	3	95	98	963	197	1,161	1,258

Submitted

Table A-2: Post-fire NSO habitat within the core and home range of activity centers in the analysis area

Activity Center Number	0 - 0.5 mile Radius				0.5- 1.3 mile Radius			
	NR (acres)	F (acres)	Total NRF (acres)	Dispersal (acres)	NR (acres)	F (acres)	Total NRF (acres)	Dispersal (acres)
0210	54	158	212	132	310	865	1,175	508
0229	44	137	181	86	240	474	714	428
0239	31	107	138	123	39	358	397	313
0241	99	170	270	67	301	700	1,001	694
0245	44	4	48	14	380	300	679	214
0247	206	93	299	106	348	329	678	847
0252	60	7	67	275	194	153	347	1,250
0254	57	157	214	79	19	174	193	626
0255	77	33	110	222	421	440	861	940
0257	65	380	445	19	100	1,307	1,407	483
0269	197	139	336	61	829	1,002	1,832	417
0272	140	61	202	30	709	467	1,176	343
0277	19	242	261	180	258	599	857	773
0283	58	123	181	32	62	363	425	317
0284	35	40	76	249	376	417	793	778
0293	27	112	138	100	334	649	983	899
0315	190	137	327	93	845	697	1,542	423
0322	35	321	356	24	184	1,006	1,190	481
0346	31	45	76	92	42	140	182	175
0350	52	73	125	102	195	366	562	631
0352	140	193	333	49	273	1,063	1,335	308
0358	298	168	466	11	651	865	1,515	637
0365	15	137	151	210	639	506	1,145	967
0380	30	276	306	92	272	554	826	480
0381	25	149	175	184	134	686	820	482
0499	40	300	340	62	258	924	1,182	432
0567	133	108	241	132	244	491	735	557
1027	80	37	117	183	704	597	1,300	582
1028	219	27	247	207	459	810	1,269	1,144
1029	60	225	286	32	385	1,264	1,649	296
1030	174	227	401	67	309	626	936	491
1039	146	253	400	26	558	956	1,514	371
1040	203	40	243	63	939	541	1,481	461
1041	138	140	278	31	327	769	1,096	262
1046	168	60	229	62	495	430	924	512
1047	279	74	352	69	548	711	1,259	547
1100	96	103	199	118	213	422	634	868
1101	252	206	458	9	1,022	1,096	2,118	121
1109	55	227	282	109	231	667	898	789
1110	66	135	200	189	220	444	664	835

Submitted

Activity Center Number	0 - 0.5 mile Radius				0.5- 1.3 mile Radius			
	NR (acres)	F (acres)	Total NRF (acres)	Dispersal (acres)	NR (acres)	F (acres)	Total NRF (acres)	Dispersal (acres)
1111	0	29	29	123	79	290	368	823
1112	92	60	151	150	334	559	892	482
1116	318	82	401	3	1,153	1,015	2,168	140
1117	36	109	145	61	319	170	490	104
1119	148	73	220	11	286	266	552	239
1121	123	71	193	54	309	361	670	375
1122	2	115	117	113	291	723	1,014	441
1130	97	111	208	38	413	593	1,006	320
1164	67	216	283	58	382	927	1,309	599
1165	271	158	429	10	1,081	782	1,864	334
1202	0	13	14	15	66	573	639	394
1212	13	184	197	117	91	968	1,059	583
1213	94	138	233	54	125	690	816	402
1214	25	246	271	40	95	924	1,019	766
1258	187	24	211	68	765	281	1,045	504
1265	28	22	50	16	559	465	1,025	402
1266	231	12	243	86	465	263	729	377
2124	63	50	113	169	314	421	735	1,015
4026	20	130	150	300	424	870	1,294	1,152
4095	104	233	337	93	437	916	1,353	844
4097	81	173	254	37	219	633	852	724
4099	14	269	283	47	196	647	842	334
4128	152	53	205	203	272	265	536	928
4129	25	44	69	42	105	275	380	715
4133	17	8	24	36	467	96	563	557
4143	135	130	264	92	488	555	1,043	664
4144	63	32	96	61	68	149	217	451
4145	88	86	174	50	192	383	576	414
4146	50	87	137	69	35	266	300	313
4189	144	209	353	74	301	828	1,129	924
9990	0	151	151	50	15	400	415	324
9991	4	235	239	26	203	907	1,110	471
9992	140	100	240	99	144	395	539	880
9993	45	125	169	103	170	260	431	314
9994	77	97	174	91	230	274	504	246
9995	10	186	196	67	85	1,141	1,225	398
9996	34	125	160	144	151	645	795	910
9998	149	120	269	99	265	472	737	462
9999	85	15	100	29	712	457	1,169	156
99910	62	265	328	22	679	658	1,337	457
99912	78	200	278	49	397	1,165	1,562	623

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Activity Center Number	0 - 0.5 mile Radius				0.5- 1.3 mile Radius			
	NR (acres)	F (acres)	Total NRF (acres)	Dispersal (acres)	NR (acres)	F (acres)	Total NRF (acres)	Dispersal (acres)
99913	49	156	205	97	95	572	667	662
99914	25	30	55	54	139	193	331	460
99915	32	118	150	267	380	668	1,047	617
0096A	225	54	279	127	498	579	1,077	821
0096B	127	190	317	72	337	1,601	1,938	511
0276A	82	121	203	217	195	550	745	976
0276B	44	76	120	220	171	693	864	1,016
0278A	166	116	282	135	241	310	552	554
0278B	56	163	219	82	168	388	556	821
NEW3A	43	12	55	105	428	123	551	344
NEW3B	30	2	31	4	302	99	402	445
NEW7A	7	132	139	226	123	822	944	597
NEW7B	3	94	97	75	165	957	1,122	545

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Table A-3: Estimated retention areas of NSO habitat, PFF and FANR in salvage units comprised of riparian reserves and low fire severity affected areas

Salvage Unit Name	Salvage units size (acres)[1]	Riparian reserve (RR) retention areas in salvage unit (acre)	Low[2] fire severity retention areas in salvage unit outside of RR (acres)[3]	NRF occurring **in** RR retention areas in salvage unit (acres)[3]	NRF occurring in retention areas in salvage unit **outside** of RR (acres)[3]	PFF and FANR occurring in salvage unit (acres)[3]	Estimated NRF within retention areas (acres)[3, 4]	Total estimated NRF in retention areas after adjusting for 10% loss[5] of NRF (acres)[3, 4]	Total estimated D in retention areas after adjusting for 10% loss[5] of D (acres)[3, 4]
Less Than 100 acre salvage Units									
3	31	0	4	0	4	0	4	3	0
31	21	3	9	0	2	0	2	2	7
33	49	19	17	4	3	3	7	7	1
34	37	24	6	18	5	0	23	20	0
35	16	2	8	0	6	0	7	6	3
36	58	4	35	4	30	0	33	30	5
37	26	0	17	0	17	0	17	16	0
38	10	0	5	0	0	0	0	0	5
39	28	0	9	0	8	0	8	7	1
40	34	5	10	1	8	4	9	8	2
58	29	0	4	0	2	0	2	2	1
63	17	6	6	0	0	0	0	0	9
64	10	4	4	2	4	1	6	5	0
65	50	0	18	0	18	0	18	17	0
200	8	0	7	0	6	0	6	6	0
203	30	3	9	2	2	1	4	4	1
204	32	0	6	0	6	0	6	6	0
206	14	0	7	0	3	0	3	3	3
207	10	2	2	0	0	0	0	0	2
209	5	3	1	0	0	0	0	0	2
211	8	3	0	0	0	3	0	0	0
212	41	0	7	0	0	0	0	0	2
213	11	0	6	0	3	0	3	2	3
216	32	0	20	1	5	0	6	5	10
221	8	0	2	0	0	0	0	0	2

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Salvage Unit Name	Salvage units size (acres)[1]	Riparian reserve (RR) retention areas in salvage unit (acre)	Low[2] fire severity retention areas in salvage unit outside of RR (acres)[3]	NRF occurring **in** RR retention areas in salvage unit (acres)[3]	NRF occurring in retention areas in salvage unit **outside** of RR (acres)[3]	PFF and FANR occurring in salvage unit (acres)[3]	Estimated NRF within retention areas (acres)[3, 4]	Total estimated NRF in retention areas after adjusting for 10% loss[5] of NRF (acres)[3, 4]	Total estimated D in retention areas after adjusting for 10% loss[5] of D (acres)[3, 4]
223	4	2	1	1	1	1	1	1	0
224	61	6	22	3	22	3	25	22	0
225	32	9	9	6	8	1	14	12	3
227	40	0	32	0	29	0	29	26	0
228	74	0	19	0	19	0	19	17	0
229	15	2	4	0	4	2	4	4	0
230	6	0	0	2	0	1	2	2	0
232	19	1	4	0	0	0	0	0	0
233	11	0	8	0	6	0	6	5	1
234	8	0	6	0	5	0	5	4	1
235	22	1	3	0	2	0	2	2	1
236	17	0	7	1	1	0	2	2	5
241	18	0	5	0	0	0	0	0	3
242	40	3	9	0	4	0	4	4	0
244	11	1	4	0	2	0	2	2	1
262	33	1	19	1	16	0	17	16	1
263	26	3	7	1	1	1	2	2	0
264	24	8	6	3	5	1	8	7	0
265	36	1	2	0	1	0	1	1	0
266	7	2	4	2	4	3	6	5	0
267	9	2	5	1	4	0	5	4	2
268	21	4	3	0	0	0	0	0	0
400	15	0	3	0	3	0	3	3	0
403	10	1	2	0	2	1	2	2	0
407	16	0	8	0	4	0	4	4	3
409	45	7	27	7	26	1	33	30	0
410	13	5	5	1	1	1	2	2	0
411	36	12	4	0	0	7	1	1	11
418	3	0	0	0	0	0	0	0	0

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Salvage Unit Name	Salvage units size (acres)[1]	Riparian reserve (RR) retention areas in salvage unit (acre)	Low[2] fire severity retention areas in salvage unit outside of RR (acres)[3]	NRF occurring **in** RR retention areas in salvage unit (acres)[3]	NRF occurring in retention areas in salvage unit **outside** of RR (acres)[3]	PFF and FANR occurring in salvage unit (acres)[3]	Estimated NRF within retention areas (acres)[3, 4]	Total estimated NRF in retention areas after adjusting for 10% loss[5] of NRF (acres)[3, 4]	Total estimated D in retention areas after adjusting for 10% loss[5] of D (acres)[3, 4]
420	8	0	6	0	5	0	5	4	1
423	47	0	28	0	28	0	28	25	0
426	20	7	7	2	3	2	5	5	4
500	21	7	2	3	0	3	3	3	1
503	40	0	17	0	11	0	11	10	6
509	9	6	2	1	0	0	1	1	0
510	16	0	2	0	0	0	0	0	1
516	8	1	4	0	0	0	0	0	4
517	25	0	2	0	2	0	2	2	1
518	4	0	2	0	1	0	1	1	1
527	19	0	11	0	9	0	9	9	1
530	17	0	4	0	0	0	0	0	0
532	6	1	3	0	0	0	0	0	2
536	1	0	0	1	0	0	1	1	0
537	78	22	10	3	0	10	3	3	0
539	3	0	1	0	0	0	0	0	0
545	20	0	8	0	0	0	0	0	3
546	30	0	9	0	1	0	1	1	5
1128	19	0	3	0	0	0	0	0	0
1137	31	16	9	13	8	1	21	19	1
1138	6	2	0	1	0	4	1	1	1
1142	48	8	10	0	1	0	1	1	1
1155	77	10	9	3	6	8	9	8	3
Greater than 100 acre salvage units[6]									
5	332	36	34	10	27	32	37	33	6
21	11	0	5	0	1	0	1	1	4
022	88	13	3	0	2	6	2	2	1
22	19	1	2	0	1	0	1	1	1
23	577	50	51	5	12	19	17	15	31

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Salvage Unit Name	Salvage units size (acres)[1]	Riparian reserve (RR) retention areas in salvage unit (acre)	Low[2] fire severity retention areas in salvage unit outside of RR (acres)[3]	NRF occurring **in** RR retention areas in salvage unit (acres)[3]	NRF occurring in retention areas in salvage unit **outside** of RR (acres)[3]	PFF and FANR occurring in salvage unit (acres)[3]	Estimated NRF within retention areas (acres)[3, 4]	Total estimated NRF in retention areas after adjusting for 10% loss[5] of NRF (acres)[3, 4]	Total estimated D in retention areas after adjusting for 10% loss[5] of D (acres)[3, 4]
32	313	67	36	5	5	10	10	9	18
50	96	5	3	0	2	4	2	1	0
51	274	25	25	2	13	18	15	13	11
52	84	0	10	0	10	1	10	9	0
53	111	12	21	2	21	9	23	21	0
54	14	0	3	0	3	0	3	3	0
55	198	14	16	5	12	9	17	15	5
056	13	10	1	4	1	6	5	4	0
56	79	14	5	2	5	11	7	7	0
57	115	25	6	0	0	4	0	0	7
058	514	24	210	16	170	4	186	168	27
59	56	28	1	0	0	5	0	0	2
60	255	31	35	4	21	12	24	22	17
61	291	30	64	10	36	8	46	42	28
62	128	52	10	5	3	20	8	8	8
208	32	1	1	0	1	0	1	1	0
226	72	20	6	3	6	26	9	8	0
243	175	18	38	3	29	8	32	29	6
245	107	0	57	0	18	0	18	16	26
406	123	47	11	3	10	30	13	12	2
414	22	0	3	0	3	0	3	2	0
415	171	23	10	1	4	11	4	4	6
417	94	24	26	5	25	31	30	27	0
501	236	76	31	11	20	16	31	28	9
505	128	19	27	0	10	7	10	9	18
506	8	0	5	2	4	0	6	6	1
508	253	11	60	4	28	7	32	29	12
515	258	86	26	7	9	53	16	14	13
520	193	66	4	2	4	62	5	5	0

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Salvage Unit Name	Salvage units size (acres)[1]	Riparian reserve (RR) retention areas in salvage unit (acre)	Low[2] fire severity retention areas in salvage unit outside of RR (acres)[3]	NRF occurring **in** RR retention areas in salvage unit (acres)[3]	NRF occurring in retention areas in salvage unit **outside** of RR (acres)[3]	PFF and FANR occurring in salvage unit (acres)[3]	Estimated NRF within retention areas (acres)[3, 4]	Total estimated NRF in retention areas after adjusting for 10% loss[5] of NRF (acres)[3, 4]	Total estimated D in retention areas after adjusting for 10% loss[5] of D (acres)[3, 4]
521	36	0	5	0	3	0	3	3	1
522	32	1	0	0	0	1	0	0	0
523	175	11	34	6	32	5	37	34	2
524	153	23	0	0	0	22	0	0	0
525	238	30	18	0	3	22	3	3	8
528	198	34	30	2	17	11	20	18	12
1109	13	6	2	2	0	3	2	2	0
1110	45	8	4	0	4	10	4	4	0

[1]salvage unit retention area analysis doesn't include the portion of the salvage unit that overlaps roadside hazard (including any combination of roadside hazard and fuels treatment); roadside hazard is analyzed separately in this document.
[2] Low fire severity is RAVG grid code 1 and 2
[3]The retention area acres displayed in this table were estimated based on remote sensing data (RAVG and EVEG) and the actual delineation of these areas will be applied based on-the-ground prescriptions; thus these acres are subject to change.
[4]The table displays acres that have been rounded to the nearest whole number and consequently the summation of acres include any partial acres thus the result may appear incorrect.
[5]Although salvage harvest is not planned to occur within NRF and dispersal habitat, impacts during implementation may affect 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.
[6]100 acre salvage units are individual units greater than 100 acres or two or more units that have touching boundaries and the combined units contain greater than 100 acres.

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Table A-4: List of future foreseeable or ongoing actions on national forest lands in the analysis area

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

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Table A-5: Threatened and Endangered Species List

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Listed/Proposed Threatened and Endangered Species for Siskiyou County (Candidates Included)

March 8, 2015

Document number: 611463646-123213

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KEY:
(PE) Proposed Endangered Proposed in the Federal Register as being in danger of extinction
(PT) Proposed Threatened Proposed as likely to become endangered within the foreseeable future
(E) Endangered Listed in the Federal Register as being in danger of extinction
(T) Threatened Listed as likely to become endangered within the foreseeable future
(C) Candidate Candidate which may become a proposed species Habitat Y = Designated, P = Proposed, N = None Designated
* Denotes a species Listed by the National Marine Fisheries Service

Type		Scientific Name	Common Name	Category	Critical Habitat
Plants					
		Astragalus applegatei	Applegate's milk-vetch	E	N
		Calochortus persistens	Siskiyou mariposa lily	C	N
		Fritillaria gentneri	Gentner's fritillary	E	N
		Orcuttia tenuis	slender Orcutt grass	T	Y
		Phlox hirsuta	Yreka phlox	E	N
Invertebrates					
		Branchinecta lynchi	vernal pool fairy shrimp	T	Y
		Lepidurus packardi	vernal pool tadpole shrimp	E	N
		Pacifastacus fortis	Shasta crayfish	E	N
Fish					
	*	*Acipenser medirostris*	green sturgeon	T	Y
		Chasmistes brevirostris	shortnose sucker	E	P
		Deltistes luxatus	Lost River sucker	E	P
	*	*Oncorhynchus kisutch*	S. OR/N. CA coho salmon	T	Y
	*	*Oncorhynchus mykiss*	Central Valley steelhead	T	Y
	*	*Oncorhynchus tshawytscha*	Central Valley fall/late-fall chinook salmon	C	N
	*	*Oncorhynchus tshawytscha*	Central Valley spring-run chinook salmon	T	Y
	*	*Oncorhynchus tshawytscha*	winter-run chinook salmon	E	Y
Amphibians					

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	Rana draytonii	California red-legged frog	T	Y
Birds				
	Coccyzus americanus	Western yellow-billed cuckoo	T	Y
	Strix occidentalis caurina	northern spotted owl	T	Y
Mammals				
	Canis lupus	gray wolf	E	Y
	Martes pennanti	fisher, West Coast DPS	PT	P

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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.

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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 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.

spotted owl habitat because it is occurring in high severity burned forest and is being proposed to address hazard trees adjacent to open system roads. While the project maintains the function of NSO habitat, the purpose is to increase public safety not to restore habitat for spotted owls.

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

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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 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 STNF 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

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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.

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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 benefit 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 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.

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

Site Name	Master Owl No.	Basis for AC creation	Last Year of Detection	Best Status for Site	Last Nest	Status in 2013 or 2014	Last year of confirmed or likely occupancy	Barred Owl Detected	NRIS Data	CNDDB Data	Fire Complex
Lower South Fork Kelsey Creek	KL0096	Pair 1991	1997	Pair 1997	Unknown	Not Surveyed	1997 Confirmed. 2014 Likely.	No		Yes	H.C
Buckhorn Creek	KL0239	Repro 1991	1991	Repro 1991	1991	Not Surveyed	1991 Confirmed	No		Yes	Beaver
Upper Three Biscuit Gulch	KL0241	Single 1990 CNDDB	2014	Repro 2013	2013	Repro	2014 Confirmed	No	Yes	Yes	H.C.
Bear Creek	KL0245	Pair 1991	1996	Repro 1992	1992	Not Surveyed	1996 Confirmed. 2014 Likely.	No		Yes	H.C.
Kelsey Creek	KL0247	Repro 1991	2012	Repro 1995	1995	Not Surveyed	2012 Confirmed. 2014 Likely	No		Yes	H.C.
Negro Creek	KL0252	Single 1983	2003	Pair 2003	Unknown	Not Surveyed	2003 Confirmed. 2014 Likely.	No		Yes	H.C.
Woodchopper Gulch	KL0254	Pair 1991	1998	Repro 1994	1994	Not Surveyed	1998 Confirmed	No		Yes	H.C.
Pat Ford Creek	KL0255	Single 1981	2001	Single 2001	Unknown	Not Surveyed	2001 Confirmed. 2014 Likely.	No	Yes		H.C.
Upper West Fork Sixmile Creek	KL0257	Single 1990	2008	Repro 1991	1991	Not Surveyed	2008 Confirmed. 2014 Likely.	No	Yes		Whites
Bumblebee Creek	KL0269	Single 1978	2008	Repro 1998	1998	Not Surveyed	2008 Confirmed. 2014 Likely.	No	Yes	Yes	Beaver
Tom Martin	KL0272	Pair 1992	1992	Pair 1992	Unknown	Not Surveyed	1992	No	Yes		H.C.

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							Confirmed. 2014 Likely.				
Malone Creek	KL0276	Pair 1992	1999	Pair 1999	Unknown	Not Surveyed	1999 Confirmed. 2014 Likely	No	Yes		H.C.
Bishop Creek/Titus Peak	KL0277	Single 1992	2003	Repro 1999	1999	Not Surveyed	2003 Confirmed. 2014 Likely.	No	Yes		H.C.
Doolittle Elk	KL0278	Single 1981	2002	Pair 1992	Unknown	Not Surveyed	2002 Confirmed. 2014 Likely.	No	Yes		H.C
Wesf Fork Doggett Creek	KL0283	Single 1989	2010	Repro 2002	2002	Not Surveyed	2010 Confirmed. 2014 Likely.	Yes? Need to look up in old paperwork.	Yes	Yes	Beaver
Bear Creek	KL0284	Pair 1990	2009	Repro 1991	1991	Not Surveyed	2009 Confirmed. 2014 Likely	No	Yes	Yes	Beaver
Stanza Creek	KL0293	Single 1981	2003	Pair 1992	Unknown	Not Surveyed	2003 Confirmed. 2014 Likely.	No	Yes		H.C.
Salt Lick Gulch	KL0314	Pair 1989 CNDDB Data	1996	Repro 1994	1994	Not Surveyed	1996 Confirmed. Not likely active. Surveyed in the early 2000's. No response.	Yes? Need to look up in old paperwork.	Yes	Yes	Beaver
West Fork Beaver	KL0315	Pair 1993	1998	Repro 1997	1997	Not Surveyed	1997 Confirmed. 2014 Likely.	No	Yes		Beaver

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Site Name	Master Owl No.	Basis for AC creation	Last Year of Detection	Best Status for Site	Last Nest	Status in 2013 or 2014	Last year of confirmed or likely occupancy	Barred Owl Detected	NRIS Data	CNDDB Data	Fire Complex
Kohl Creek (Lower)	KL0346	Single 1974	2010	Pair 1995	Unknown	Not Surveyed	2010 Confirmed. 2014 Likely.	No	Yes		Beaver
Trail Gulch	KL0350	Pair 1994	1996	Repro 1996	1996	Not Surveyed	1996 Confirmed.	No		Yes	Beaver
UpperBuckhorn Creek	KL0352	Single 1980	2010	Repro 2010	2010	Not Surveyed	2010 Confirmed. 2014 Likely.	No	Yes		Beaver
Lower Jaynes Canyon	KL0358	Pair 1993	2003	Repro 1998	1998	Not Surveyed	2003 Confirmed. 2014 Likely.	No	Yes		Beaver
Eddy Gulch	KL0365	Single 1988	2007	Repro 2002	2007	Not Surveyed	2007 Confirmed. 2014 Likely	No		Yes	Whites
East Fork Elk Creek	KL0380	Pair 1998	2003	Pair 2003	Unknown	Not Surveyed	2003 Confirmed. 2014 Likely.	No	Yes		H.C.
Cougar Creek	KL0381	Single 1981	2007	Repro 2003	2003	Not Surveyed2007 Confirmed. 2014 Likely.	No	Yes		H.C.	
Shadow Creek	KL1028	Single 1987	2008	Pair 1991	Unknown	Not Surveyed	2008 Confirmed. 2014 Likely.	No	Yes		Whites
Lower East Fork Whites Gulch	KL1029	Single 1989	1992	Single 1992	Unknown	Not Surveyed	1992 Confirmed.	No	Yes		Whites
Upper East Fork Whites Gulch	KL1030	Single 1981	2007	Repro 1986	2007	Not Surveyed	2007 Confirmed. 2014 Likely	No		Yes	Whites
Russian Crek	KL1039	Pair 1989	1995	Repro	1995	2014 NR	1995	No	Yes	Yes	Whites

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Site Name	Master Owl No.	Basis for AC creation	Last Year of Detection	Best Status for Site	Last Nest	Status in 2013 or 2014	Last year of confirmed or likely occupancy	Barred Owl Detected	NRIS Data	CNDDB Data	Fire Complex
				1991			Confirmed. 2014 Likely.				
Applesauce Gulch	KL1040	Pair 1981	1999	Pair 1988	1999	2014NR	1999 Confirmed	No	Yes. Also including updated info not entered into NRIS yet.	Whites	
Music Creek	KL1041	Pair 1983	2014	Repro 2013	2013	Repro 2013. Pair 2014	2014 Confirmed	No	Yes. Also including updated info not entered into NRIS yet.	Whites	
Cow Creek	KL1046	Repro 1985	2009	Repro 1985	1985	Surveyed N/R	2009 Confirmed	No	Yes		Whites
Etna Summit	KL1047	Pair 1986	2013	Repro 20013	2013	Repro 2013. Active 2014 (Get info specifics from Sam for pair or single status.	2014 Confirmed	No		Yes. Also including updated info not entered in to NRIS yet.	Whites
Lower West Fork Tomkins Creek	KL1100	Single 1980	1997	Repro 1996	1996	Not Surveyed	1997 Confirmed. 2014 Likely.	No		Yes	H.C.

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Site Name	Master Owl No.	Basis for AC creation	Last Year of Detection	Best Status for Site	Last Nest	Status in 2013 or 2014	Last year of confirmed or likely occupancy	Barred Owl Detected	NRIS Data	CNDDB Data	Fire Complex
Cliff Valley	KL1101	Single 1980	1994	Repro 1990	1990	Not Surveyed	1994 Confirmed. 2014 Likely.	No		Yes	H.C.
West Fork Tomkins Creek	KL1109	Pair 1985	1997	Pair 1997	Unknown	Not Surveyed	1997 Confirmed. 2014 Likely.	No		Yes	H.C.
Tomkins Creek	KL1110	Single 1980	1991	Repro 1988	1988	Not Surveyed	1991 Confirmed. 2014 Likely.	No		Yes	H.C.
East Fork Tomkins Creek	KL1111	Repro Pair 1980	1989	Repro 1985	1985	Not Surveyed	1989 Confirmed	No	Yes		H.C.
Walker Creek	KL1112	Pair 1986	2008	Repro 1988	1988	Not Surveyed	2008 Confirmed. 2014 Likely.	No	Yes		H.C.
Fish Creek (Grider)	KL1116	Single 1988	1990	Pair 1990	Unknown	Not Surveyed	1990 Confirmed. 2014 Likely	No		Yes	H.C.
Rancheria Creek	KL1117	Single 1980	1990	Repro 1989	1989	Not Surveyed	1990 Confirmed. 2014 Likely	No		Yes	H.C.
North Fork Rancheria Creek	KL1119	Pair 1989	1989	Pair 1989	Unknown	Not Surveyed 1989 Confirmed.	1989 Confirmed. This is AC is solely based on two separate sightings, both in 1989. No other surveys	No	Yes		H.C.

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Site Name	Master Owl No.	Basis for AC creation	Last Year of Detection	Best Status for Site	Last Nest	Status in 2013 or 2014	Last year of confirmed or likely occupancy	Barred Owl Detected	NRIS Data	CNDDB Data	Fire Complex
							have been conducted.				
Bark Shanty	KL1121	Single 1981	1992	Repro 1992	1992	Not Surveyed	1992 Confirmed. 2014 Likely.	No		Yes	H.C.
Limestone Bluffs	KL1122	Pair 1985	1989	Pair 1989	Unknown	Not Surveyed	1989 confirmed	No		Yes	H.C.
O'Neil Creek	KL1130	Single 1988	2012	Repro 2012	2012	Not Surveyed	2012 Confirmed. 2014 Likely	No	Yes		H.C.
Smokey Creek	KL1166	Pair 1985	2005	Repro 1994	1994	Not Surveyed	2005 Confirmed. 2014 Likely	No	Yes		Beaver
Tyler Meadows	KL1202	Single 1980	1996	Pair 1996	Unknown	Not Surveyed	1996 Confirmed. 2014 Likely.	No		Yes	H.C.
Happy Horse	KL1212	Single 1982	2014	Repro 2007	2007	Single	2014 Confirmed	No	Yes		H.C.
Upper Elk Creek	KL1213	Single 1980	1995	Repro 1990	1990	Not Surveyed	1995 Confirmed	No	Yes		H.C.
Lower Three Biscuit	KL1214	Pair 2007	2014	Repro 2009	2009	Single	2014 Confirmed	No	Yes		H.C.
Rainy Valley	KL1227	Pair 1982	1990	Pair 1990	Unknown	Not Surveyed	1990 Confirmed. 2014 Likely	No	Yes		H.C.
Hickey Gulch	KL1258	Single 1981	1991	Pair 1991	Unknown	Surveyed N/R	1991 Confirmed.	No	Yes		Whites
No Name Creek	KL1265	Pair 1992	2007	Pair 1992	Unknown	Not Surveyed	2007 Confirmed. 2014 Likely	No	Yes		H.C.
Salt Creek	KL1266	Single	2012	Repro	2012	Not Surveyed	2012	No	Yes		H.C.

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Site Name	Master Owl No.	Basis for AC creation	Last Year of Detection	Best Status for Site	Last Nest	Status in 2013 or 2014	Last year of confirmed or likely occupancy	Barred Owl Detected	NRIS Data	CNDDB Data	Fire Complex
Grider		1992		2012			Confirmed. 2014 Likely				
Dona Creek	KL2124	Repro 1990	2003	Repro 1991	1991	2013,2014 NR	2003 Confirmed.	No	Yes. Also including updated info not entered into NRIS yet.	Beaver	
Lower West Fork Sixmile Creek	KL4026	Pair 1990	1991	Pair 1990	Unknown	Not Surveyed	1991 Confirmed	No	Yes		Whites
Upper South Fork Kelsey Creek	KL4095	Repro 1978	2012	Repro 1984	1984	Not Surveyed	2012 Confirmed. 2014 Likely	No	Yes		H.C.
Cayanne Ridge	KL4097	Single 1988	1995	Pair 1995	Unknown	Not Surveyed	1995 Confirmed	No		Yes	H.C.
Middle Creek (Scott)	KL4099	Pair 1985	2001	Pair 2001	Unknown	Not Surveyed	2001 Confirmed. 2014 Likely.	No		Yes	H.C.
Lime Gulch	KL4128	Single 1980	2011	Pair 1991	Unknown	Surveyed not to six visit protocol due to illegal activity in area; however ACS and four SC yielded NR	2011 Confirmed	No	Yes		Beaver
Cherry Flat	KL4129	Pair 1991	1991	Pair 1991	Unknown	2014 NR	1991	No		Yes	Beaver

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							Confirmed				
Louie Creek	KL4133	Pair 1980	2007	Repro 1980	Unknown	Not Surveyed	2007 Confirmed. 2014 Likely	No	Yes		H.C.
Fish Trap Creek	KL4143	Pair 1990	1995	Repro 1991	1991	Not Surveyed	1995 Confirmed. 2014 Likely.	No		Yes	Beaver
Miller Gulch	KL4144	Pair 1992	1995	Repro 1994	1995	Not Surveyed	1995 Confirmed	No	Yes		Beaver
Doggett Creek	KL4145	Pair 1993	2004	Repro 1999	1999	Not Surveyed	2004 Confirmed. 2014 Likely.	Yes? Need to look up in old paperwork.	Yes	Beaver	
Kohl Creek 1 (Upper)	KL4146	Pair 1986 CNDDB Data.	2010	Repro 2010	2010	Not Surveyed 2010 Confirmed . 2014 Very likely.	2010 Confirmed. 2014 Likely.	No	Yes	Yes	Beaver
Scott Bar Mtn. Lookout	KL4189	Pair 1989	2001	Repro 1998	1998	Not Surveyed	2001 Confirmed. 2014 Likely.	No	Yes		H.C.
China Creek	KLNew7	Pair 2009	2011	Pair 2009	Unknown	Surveyed N/R	2011 Confirmed	No	Yes		H.C.
West Whites	KL New#	Pair 1989 CNDDB Data	2010	Pair 1989	Unknown	Not Surveyed	2010 Confirmed. 2014 Likely.	No	Yes		Whites
Grider Campground	KL0241	Pair 1988	1991	Repro 1991	1991	Not Surveyed	1991	No	Yes		H.C.

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Appendix D: Maps

Map Attachment A: Units_System_TempRds_Alt2Units_Beaver

Map Attachment B:Units_System_TempRds_Alt2Units_HappyCamp

Map Attachment C: Units_System_TempRds_Alt2Units_Whites

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