Project Management Indicator Species Report

Eiler Fire Salvage and Restoration Project

Hat Creek Ranger District

Lassen National Forest

Prepared by: */s/ Tom Rickman* *April 14, 2015*

Tom Rickman, Wildlife Biologist **Date**

1. Introduction

The purpose of this report is to evaluate and disclose the impacts of the Eiler Fire Salvage and Restoration Project (Eiler Project) on the habitat of the thirteen (13) Management Indicator Species (MIS) identified in the Forest (NF) Land and Resource Management Plan (LRMP) (USDA 1993) as amended by the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (USDA Forest Service 2007a). This report documents the effects of the proposed action and alternatives on the habitat of selected project-level MIS. Detailed descriptions of the Eiler Project alternatives are found in the Eiler Project NEPA document.

MIS are animal species identified in the SNF MIS Amendment Record of Decision (ROD) signed December 14, 2007, which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). Guidance regarding MIS set forth in the Lassen NF's LRMP as amended by the 2007 SNF MIS Amendment ROD directs Forest Service resource managers to (1) at project scale, analyze the effects of proposed projects on the habitat of each MIS affected by such projects, and (2) at the bioregional scale, monitor populations and/or habitat trends of MIS, as identified in the Lassen NF LRMP as amended.

1.a. Direction Regarding the Analysis of Project-Level Effects on MIS Habitat

Project-level effects on MIS habitat are analyzed and disclosed as part of environmental analysis under the National Environmental Policy Act (NEPA). This involves examining the impacts of the proposed project alternatives on MIS habitat by discussing how direct, indirect, and cumulative effects will change the habitat in the analysis area.

These project-level impacts to habitat are then related to broader scale (bioregional) population and/or habitat trends. The appropriate approach for relating project-level impacts to broader scale trends depends on the type of monitoring identified for MIS in the LRMP as amended by the SNF MIS Amendment ROD. Hence, where the Lassen NF LRMP as amended by the SNF MIS Amendment ROD identifies distribution population monitoring for an MIS, the project-level habitat effects analysis for that MIS is informed by available distribution population monitoring data, which are gathered at the bioregional scale. The bioregional scale monitoring identified in the Lassen NF LRMP, as amended, for MIS analyzed for the Eiler Project is summarized in Section 3 of this report.

Adequately analyzing project effects to MIS generally involves the following steps:

- Identifying which habitat and associated MIS would be either directly or indirectly affected by the project alternatives; these MIS are potentially affected by the project.
- Summarizing the bioregional-level monitoring identified in the LRMP, as amended, for this subset of MIS.

- Analyzing project-level effects on MIS habitat for this subset of MIS.
- Discussing bioregional scale habitat and/or population trends for this subset of MIS.
- Relating project-level impacts on MIS habitat to habitat and/or population trends at the bioregional scale for this subset of MIS.

These steps are described in detail in the Pacific Southwest Region's draft document "MIS Analysis and Documentation in Project-Level NEPA, R5 Environmental Coordination" (May 25, 2006) (USDA Forest Service 2006a). This Management Indicator Species (MIS) Report documents application of the above steps to select project-level MIS and analyze project effects on MIS habitat for the Eiler Project.

1.b. Direction Regarding Monitoring of MIS Population and Habitat Trends at the Bioregional Scale.

The bioregional scale monitoring strategy for the Lassen NF's MIS is found in the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (ROD) of 2007 (USDA Forest Service 2007a). Bioregional scale habitat monitoring is identified for all twelve of the terrestrial MIS. In addition, bioregional scale population monitoring, in the form of distribution population monitoring, is identified for all of the terrestrial MIS except for the greater sage-grouse. For aquatic macroinvertebrates, the bioregional scale monitoring identified is Index of Biological Integrity and Habitat. The current bioregional status and trend of populations and/or habitat for each of the MIS is discussed in the 2010 Sierra Nevada Forests Bioregional Management Indicator Species (SNF Bioregional MIS) Report (USDA Forest Service 2010a).

- **MIS Habitat Status and Trend.**

All habitat monitoring data are collected and/or compiled at the bioregional scale, consistent with the LRMP as amended by the 2007 SNF MIS Amendment ROD (USDA Forest Service 2007a).

Habitats are the vegetation types (for example, early seral coniferous forest) or ecosystem components (for example, snags in green forest) required by an MIS for breeding, cover, and/or feeding. MIS for the Sierra Nevada National Forests represent 10 major habitats and 2 ecosystem components (USDA Forest Service 2007a), as listed in Table 1. These habitats are defined using the California Wildlife Habitat Relationship (CWHR) System (CDFG 2005). The CWHR System provides the most widely used habitat relationship models for California's terrestrial vertebrate species (ibid). It is described in detail in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a).

Habitat status is the current amount of habitat on the Sierra Nevada Forests. Habitat trend is the direction of change in the amount or quality of habitat over time. The methodology for assessing habitat status and trend is described in detail in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a).

- **MIS Population Status and Trend.**

All population monitoring data are collected and/or compiled at the bioregional scale, consistent with the LRMP as amended by the 2007 SNF MIS Amendment ROD (USDA Forest Service 2007a). The information is presented in detail in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a).

Population monitoring strategies for MIS of the Lassen NF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment ROD (USDA Forest Service 2007a). Population status is the current condition of the MIS related to the population monitoring data required in the 2007 SNF MIS Amendment ROD for that MIS. Population trend is the direction of change in that population measure over time.

There are a myriad of approaches for monitoring populations of MIS, from simply detecting presence to detailed tracking of population structure (USDA Forest Service 2001, Appendix E, page E-19). A distribution population monitoring approach is identified for all of the terrestrial MIS in the 2007 SNF MIS Amendment, except for the greater sage-grouse (USDA Forest Service 2007a). Distribution population monitoring consists of collecting presence data for the MIS across a number of sample locations over time. Presence data are collected using a number of direct and indirect methods, such as surveys (population surveys), bird point counts, tracking number of hunter kills, counts of species sign (such as deer pellets), and so forth. The specifics regarding how these presence data are assessed to track changes in distribution over time vary by species and the type of presence data collected, as described in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a).

- **Aquatic Macroinvertebrate Status and Trend.**

For aquatic macroinvertebrates, condition and trend is determined by analyzing macroinvertebrate data using the predictive, multivariate River Invertebrate Prediction And Classification System (RIVPACS) (Hawkins 2003) to determine whether the macroinvertebrate community has been impaired relative to reference condition within perennial water bodies. This monitoring consists of collecting aquatic macroinvertebrates and measuring stream habitat features according to the Stream Condition Inventory (SCI) manual (Frasier et al. 2005). Evaluation of the condition of the biological community is based upon the "observed to expected" (O/E) ratio, which is a reflection of the number of species observed at a site versus the number expected to occur there in the absence of impairment. Sites with a low O/E scores have lost many species predicted to occur there, which is an indication that the site has a lower than expected richness of sensitive species and is therefore impaired.

2. Selection of Project level MIS

Management Indicator Species (MIS) for the Lassen NF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA Forest Service 2007a). The habitats and ecosystem components and associated MIS analyzed for the project were selected from this list of MIS, as indicated in Table 1. In addition to identifying the habitat or ecosystem components (1st

column), the CWHR type(s) defining each habitat/ecosystem component (2nd column), and the associated MIS (3rd column), the Table discloses whether or not the habitat of the MIS is potentially affected by the Eiler Project (4th column).

The only perennial streams within the project area are Hat Creek and Honn Creek, which is a bifurcation of Hat Creek. Flow from the ephemeral headwater channels within the project area lacks surface connectivity with any perennial streams. There are no proposed salvage activities or mechanical treatments within the riparian conservation areas (RCAs) of Hat and Honn Creeks. Riparian hand planting along Hat Creek may provide some future shade, but these effects are expected to be localized, as the scale of the planting is too small to have a measureable effect on stream temperature (Eiler Project Hydrology Report, project record). The limited treatments in RCAs, and IDFs, as well as the lack of mechanical fuels treatments adjacent to either perennial streams or seasonal streams with connectivity to downstream perennial waters, greatly reduces the risk of ash from pile burning eroding into streams. A small unit with hand fuels treatments lies within the RCA of Hat Creek though the proposed treatments would be approximately 100 feet from the stream bank and separated from the creek by California State Highway 89, making it highly unlikely that any amount of ash from pile burning would reach the stream (Eiler Project Hydrology Report, project record). The implementation of IDFs with regards to fuels activities within RCAs, such as no pile burning within wet sites, and no hand line construction within RCAs, also minimize the risk of negative effects to water quality due to fuels treatments. The increased groundcover produced by the project activities would aid in filtering out potential sediment from pile burning and mechanical salvage treatments before it reaches stream courses. Additionally, the seasonal nature of streams within proposed mechanical salvage units and lack of surficial connectivity to downstream perennial waters also make the risk of sedimentation very low. Given the general lack of activities and the lack of effects to the habitat factors of analysis for these habitat types, riverine and lacustrine habitats will not be further addressed.

Shrublands and fox sparrow will not be discussed in detail because the Eiler Project alternatives would not change acres of shrub habitat, ground shrub cover class, or shrub size class. The project alternatives focus on the removal of fire-killed trees and reforesting previously forested areas. Because fire is a regenerative factor for this habitat type, ultimately these shrub habitats will resprout and remain as shrub-dominated areas.

Hardwood habitats and mule deer will not be discussed in detail because the Eiler Project considered oak and oak-conifer stands in its project design. As a result the project would not change acres of oak-associated hardwood or hardwood/conifer habitat, hardwood canopy cover, or hardwood size class.

Riparian and yellow warbler will not be discussed in detail because the Eiler Project alternatives would not change riparian habitat acres, deciduous canopy cover, total canopy cover, or CWHR size class within montane riparian habitats, and a project design feature states that riparian species (aspen, cottonwood, alder, willow, dogwood, etc.) would not be removed by project activities.

Table 1. Selection of MIS for Project-Level Habitat Analysis for the Eiler Project.

Habitat or Ecosystem Component	CWHR Type(s) defining the habitat or ecosystem component[1]	Sierra Nevada Forests Management Indicator Species *Scientific Name*	Category for Project Analysis [2]
Riverine & Lacustrine	lacustrine (LAC) and riverine (RIV)	Aquatic macroinvertebrates	2
Shrubland (west-slope chaparral types)	montane chaparral (MCP), mixed chaparral (MCH), chamise-redshank chaparral (CRC)	Fox sparrow *Passerella iliaca*	2
Oak-associated Hardwood & Hardwood/conifer	montane hardwood (MHW), montane hardwood-conifer (MHC)	Mule deer *Odocoileus hemionus*	2
Riparian	montane riparian (MRI), valley foothill riparian (VRI)	Yellow warbler *Dendroica petechia*	2
Wet Meadow	Wet meadow (WTM), freshwater emergent wetland (FEW)	Pacific tree (chorus) frog *Pseudacris regilla*	2
Early Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree sizes 1, 2, and 3, all canopy closures	Mountain quail *Oreortyx pictus*	2
Mid Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 4, all canopy closures	Mountain quail *Oreortyx pictus*	2
Late Seral Open Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 5, canopy closures S and P	Sooty (blue) grouse *Dendragapus obscurus*	2
Late Seral Closed Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), tree size 5 (canopy closures M and D), and tree size 6.	California spotted owl *Strix occidentalis occidentalis*	3
		American marten *Martes americana*	
		Northern flying squirrel *Glaucomys sabrinus*	
Snags in Green Forest	Medium and large snags in green forest	Hairy woodpecker *Picoides villosus*	3
Snags in Burned Forest	Medium and large snags in burned forest (stand-replacing fire)	Black-backed woodpecker *Picoides arcticus*	3

[1] All CWHR size classes and canopy closures are included unless otherwise specified; **DBH** = diameter at breast height; **Canopy Closure classifications:** S=Sparse Cover (10-24% canopy closure); P= Open cover (25-39% canopy closure); M= Moderate cover (40-59% canopy closure); D= Dense cover (60-100% canopy closure); **Tree size classes:** 1 (Seedling)(<1" DBH); 2 (Sapling)(1"-5.9" DBH); 3 (Pole)(6"-10.9" DBH); 4 (Small tree)(11"-23.9" DBH); 5 (Medium/Large tree)(≥24" DBH); 6 (Multi-layered Tree) [In PPN and SMC] (Mayer and Laudenslayer 1988).

[2] **Category 1:** MIS whose habitat is not in or adjacent to the project area and would not be affected by the project.
Category 2: MIS whose habitat is in or adjacent to project area, but would not be either directly or indirectly affected by the project.
Category 3: MIS whose habitat would be either directly or indirectly affected by the project.

Wet meadow and Pacific tree frog will not be discussed further in this document. Because this project is focused on the removal of fire-killed trees and reforesting previously forested areas, the project would not affect the acres of wet meadow habitat, CWHR herbaceous height classes, herbaceous ground cover, or meadow hydrology.

Acres of early, mid seral, and late seral open canopy coniferous forest habitat exists within the fire perimeter. However, this project would not result in changes in acres of these habitat types, CWHR tree size classes, or understory shrub canopy closure. Because this project would remove fire-killed trees or fire-damaged trees at the 0.7 probability of mortality level, potential salvage of such trees from partially burned patches of early and mid seral coniferous forest would not substantively alter the canopy closure and would not be expected to cause a change in CWHR density classification. Therefore early, mid seral and late seral open canopy coniferous forest habitat will not be further addressed.

The MIS whose habitat would be either directly or indirectly affected by the Eiler Project, identified as Category 3 in Table 1, are carried forward in this analysis, which will evaluate the direct, indirect, and cumulative effects of the proposed action and alternatives on the habitat of these MIS. The MIS selected for project-level MIS analysis for the Eiler Project are: California spotted owl, American marten, northern flying squirrel, hairy woodpecker and black-backed woodpecker.

3. Bioregional Monitoring Requirements for MIS Selected for Project-Level Analysis

3.a. MIS Monitoring Requirements.

The Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA Forest Service 2007a) identifies bioregional scale habitat and/or population monitoring for the Management Indicator Species for ten National Forests, including the Lassen NF. The habitat and/or population monitoring requirements for Lassen NF's MIS are described in the 2010 Sierra Nevada Forests Bioregional Management Indicator Species (SNF Bioregional MIS) Report (USDA Forest Service 2010a) and are summarized below for the MIS being analyzed for the Eiler Project. The applicable habitat and/or population monitoring results are also described in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a) and are summarized in Section 5 below for the MIS being analyzed for the Eiler Project.

Habitat monitoring at the bioregional scale is identified for all the habitats and ecosystem components, including the following analyzed for the Eiler Project: shrubland; sagebrush; oak-associated hardwood & hardwood/conifer; riparian; wet meadow; early seral coniferous forest; mid seral coniferous forest; late seral open canopy coniferous forest; late seral closed canopy coniferous forest; snags in green forest; snags in burned forest.

Population monitoring at the bioregional scale for California spotted owl, American marten, northern flying squirrel, hairy woodpecker, and black-backed woodpecker: Distribution population monitoring.

Distribution population monitoring consists of collecting presence data for the MIS across a number of sample locations over time (also see USDA Forest Service 2001, Appendix E).

3.b. How MIS Monitoring Requirements are Being Met.

Habitat and/or distribution population monitoring for all MIS is conducted at the Sierra Nevada scale. Refer to the 2010 Bioregional MIS Report (USDA Forest Service 2010a) for details by habitat and MIS.

4. Description of Proposed Project.

Below is a summary of the proposed actions within the Eiler Project. For a full description please see the Environmental Assessment for this project. The proposed action was developed to accomplish the purpose and need for the Eiler Project by evaluating existing vegetation conditions, burn patterns and intensities, and land allocations within the analysis area.

Table 1. Proposed treatment categories and estimated acres in the Eiler Project

Proposed Treatment	**Treatment Acres**	**Reforestation Acres**			
		Conventional	Cluster	Founder	Natural
Roadside Hazard Trees	1,174	580	228	68	297
Area Salvage – Ground Based	2,567	1,357	1,119	27	65
Area Salvage – Helicopter	481	33	47	402	0
Area Fuels - Mechanical	517	250	39	7	221
Area Fuels - Hand	3,602	114	822	536	2,129
Baker Cypress Treatment	361	0	0	16	345
Reforestation Only		0	0	0	815
Total Acres	8,702	2,334	2,255	1,056	3,872
Deferred Treatment					
Natural Recovery	5,384				
Roadside Hazard Trees	34 miles				
Trailside Hazard Trees	2 miles				

Note: These acreages are subject to adjustment during analysis and implementation due to reductions for wildlife habitat, RCAs, archeological sites, stand deterioration, etc. Additional pockets of merchantable timber may be added in areas currently identified for area fuels treatment.

Hazard Tree Removal

The LNF proposes to fell and remove or fell and leave in place fire-affected hazard trees posing critical threats to safety along 34 miles of maintenance level 2 (ML2) and higher roads, and along two miles of trail within the Eiler Fire perimeter. Hazard tree marking guidelines would be based upon the fire-injured tree marking guidelines (Report #RO-11-01, Smith and Cluck, May 2011) at the 0.6 probability of mortality level (Pm=0.6) and hazard tree marking guidelines (Report #RO-12-01, Angwin et al., April 2012) developed by Region 5 Forest Health Protection. The guideline criteria for delayed, fire-related conifer tree mortality are based on percent crown length killed. The objectives of these guidelines are to: (1) remove those trees that are dead or have a high probability of mortality due to fire-injury or have structural defects that indicate high failure potential to abate potential hazards to visitors and improve safety and access within the Eiler Fire area; and (2) retain those trees that would likely survive to maintain visual quality, wildlife habitat, and recreational values. This balance aims to retain healthy forested conditions while providing for safety and access to the area. Hazard trees are usually within one and a half tree lengths away from the road.

Merchantable trees would be removed using area salvage. Sub-merchantable trees and non-merchantable hazard trees would be felled and left in place, or piled and the piles burned, or broadcast burned depending upon the amount of surface fuel loading present.

Hazard trees would be felled and left in the Thousand Lakes Wilderness along trails and adjacent to campsites. Hazard trees would also be felled and left in place along the portion of the 33N06Y road that is in the IRA just north of the Thousand Lakes Wilderness. No other actions will take place in the wilderness and IRAs.

No snag retention is planned in these areas. Reforestation strategies in the Hazard Tree units would be the same as adjacent stands.

Area Salvage Harvesting

The Forest Service is proposing to salvage harvest fire-killed and fire-injured trees within the perimeter of the Eiler Fire. Merchantable trees would be removed as sawlogs if operations occur in a timely manner before the wood deteriorates. Non-merchantable trees of smaller diameters would be removed as biomass, masticated, felled and lopped, machine or hand piled and burned, and/or broadcast burned to meet desired fuels conditions.

Fire salvage marking guidelines are based upon the fire-injured tree marking guidelines (Report #RO-011-01, Smith and Cluck, May 2011) developed by Region 5 Forest Health Protection at the 0.7 probability of mortality level (Pm = 0.7). The guideline criteria for delayed conifer tree mortality are based on percent crown length killed. The objectives of these guidelines are to: (1) remove those trees that are dead or have a high probability of mortality due to fire-injury; and (2) retain those trees that would likely survive to maintain wildlife habitat and desired forest cover.

The salvage harvest operations would utilize ground-based, mechanical harvesting to remove fire-killed and fire-injured trees from treatment areas on slopes 35 percent or less. On slopes greater than 35 percent, hand-felling and yarding by helicopter would be used to salvage harvest fire-killed and fire-injured trees from treatment areas. Area salvage harvesting would occur on approximately 3,048 acres. Natural and activity-generated fuels would be broadcast burned or piled mechanically or by hand, and piles burned. The number of acres treated by broadcast burning or pile burning is dependent on the amount of biomass removed from within the mechanical or hand treatment units. If more biomass is removed, the number of broadcast or pile burning acres would most likely decrease. The maximum for burning is used in this proposal.

With the proposed area salvage activities, approximately 125 acres would be treated within RCAs adjacent to stream channels and seasonal wetlands. Approximately 110 acres would be treated using ground-based mechanical equipment. In the remaining acres within RCAs proposed for area salvage, harvest activities would consist of hand-felling and helicopter yarding.

Within tractor units, snag retention leave islands would be generally two to five acres in size, and would comprise approximately 25 percent of the acres within each unit. Leave patches would be distributed across the unit to maintain diversity. While rocky areas may represent a small proportion of such patches, the majority would be in good growing sites so that the patches would contain an abundant understory in the future. Snag clump locations would not occur within 150 feet of aspen and cottonwood communties on the east, south, and west side stand or 100 feet on the north side to maximize light to the stand and allow for expansion.

Within the helicopter units, approximately 100 square feet of basal area per acre of snags would be left to maintain black-backed woodpecker habitat ranging from 10 inches diameter at breast height (DBH) to an upper diameter that will vary by unit. In addition, all snags <10 inches DBH would be retained. Snags deemed as safety hazards during operations will be felled and left on site.

Snag retention would differ in the RCA land allocation to provide for future woody debris recruitment that would provide habitat structure and hydrologic function such as sediment trapping. The amount and distribution of standing trees retained would represent the range of natural variability of pre-fire suppression conditions. Within wet and dry meadows and intermittent stream RCAs, a minimum of one to two snags greater than 15 inches in diameter would be retained per 100 feet.

Area Fuel Treatments

In areas that were deforested but the size of the remaining timber is sub-merchantable, the Forest Service is proposing to treat fire-killed and fire-injured trees. Non-merchantable trees of smaller diameters would be removed as biomass, masticated, felled and lopped, machine or hand piled and burned, or broadcast burned. Trees designated for removal and snag retention would use the same guidelines as discussed above under Area Salvage.

Snag retention leave islands would use guidelines as those discussed above for tractor area salvage units.

Mechanical

The fuels treatment operations could utilize ground-based, mechanical equipment to remove or arrange fire-killed and fire-injured trees from treatment areas on slopes 35 percent or less. Mechanical area fuels treatments would occur on approximately 517 acres. Activity-generated fuels would be broadcast burned or piled mechanically or by hand, and piles burned.

Hand

Hand felling would be used on slopes greater than 35 percent, in areas inaccessible to mechanical equipment, and in areas where the biomass is not removed. Hand fuels treatments would occur on approximately 3,602 acres. Natural and activity-generated fuels would be broadcast burned or piled mechanically or by hand, and piles burned.

The number of acres treated by broadcast burning or pile burning is dependent on the amount of biomass removed from within the mechanical or hand treatment units. If more biomass is removed, the number of broadcast or pile burning acres would most likely decrease. The maximum for burning is used in this proposal.

Baker Cypress

Fuels treatments proposed in Baker cypress stands depend upon cypress density. On 200 acres where cypress occurs as isolated trees or small stands, standing fuels would be mechanically piled and burned. On 150 acres where pre-fire densities of cypress were high, and natural regeneration of cypress trees is expected to be high, hand-thinning treatments would occur only in areas where impacts to Baker cypress seedlings could be avoided. On 10 acres within the Eiler Gulch area where Baker cypress is scattered along the riparian corridor, hand thinning and pile burning activities are proposed. No additional site preparation would occur, although windrow spreading may occur within Baker cypress treatment units where windrows are not occupied by Baker cypress.

The remainder of the cypress occurs within hazard tree units or salvage units where impacts to the cypress would be minimized through project design features. Broadcast burning activities are not proposed within Baker cypress occurrences.

Reforestation

Reforestation is proposed on approximately 5,645 acres within the project area in sites prepared by salvage harvest and fuels treatment. In addition, sprouting shrubs and vegetation may need to be treated adjacent to planted trees to reduce competition for site resources in order to assure establishment. This may be done through manual or mechanical cutting methods such as grubbing, mastication, or the use of brush cutters. Soil windrows within burned areas would be spread out using heavy mechanical equipment. An effort will be made to spread the soil as evenly as practicable. All site preparation would occur prior to

planting. Reforestation would typically need to occur within two years to increase the probability of survival of the planted trees with the competing brush.

Tree planting strategies would be implemented to comply with Region 5 Stocking Guidelines over time. These guidelines define future minimum and recommended stocking levels by forest type and site class, ranging from 75 to 300 trees per acre. Lower quality sites would have lower stocking levels than higher quality sites, contributing to a heterogeneous forest structure across the landscape. Planted tree species would be appropriate for the site and would include a mixture of Jeffrey, ponderosa, western white, sugar pine, Douglas-fir, or incense-cedar. Red fir would be planted if a seed source is not present. Only native tree species grown from locally collected seed sources would be planted.

Four planting strategies are proposed for reforestation: conventional planting, cluster planting, founder stands, and natural regeneration (see Silviculture Report for description of strategies). Planting strategies would be utilized to assist in creating forest heterogeneity at different scales to produce a more disturbance-resilient landscape and enhance ecological function in the future. Topography, slope position, aspect, slope steepness, and soil productivity would be taken into account to create different forest structures on the landscape that mimic those created by an active fire regime. For example in steeper high elevation areas, density and canopy cover would be highest in valley bottoms, decreasing over the midslope and become lowest near and on ridgetops. In lower elevation broad valley bottoms, densities and canopy cover would be lowest near the bottoms and increase with elevation. Density and canopy cover along the hill slope would be higher on northeast aspects compared to southwest and vary with slope becoming more open as slopes steepen. This strategy would not only create heterogeneity to increase resiliency but would also create habitat for species that prefer denser canopy mature forest structures, such as northern goshawks. No reforestation would occur in snag retention leave islands.

Spacing for reforestation strategies were developed for these areas to encourage hardwoods and enhance meadow and riparian funtion. Hardwood trees would be encouraged and promoted where they exist in plantations. Planting densities would generally be lower and trees widely spaced around California black oak. Conifers would not be planted within 20 feet of live black oak tree crowns, including sprouts greater than three feet tall.

Reforestation of conifers would not occur within 150 feet of aspen and cottonwood communties on the east, south, and west side stand or 100 feet on the north side to maximize light to the stand and allow for expansion. Where browsing inhibits recruitment of regenerating aspen and cottenwoods, fencing would be implemented to protect regeneration until suckers and sprouts exceed the browse line.

Reforestation planting strategies would differ as well with no reforestation occurring within 50 feet of the meadow edge. From 50 feet of the meadow edge and out, planting density would increase using the planting stategy and spacing based on the surrounding forest stand condition. Along stream channels and seasonal wetlands with existing riparian communities (e.g. willow, alder, aspen, sedges, rushes, etc.), reforestion of conifer species would not occur within 20 feet of the riparian plant community.

Where Baker cypress is widely scattered, reforestation with Baker cypress in founder stands would occur on up to 16 acres. Reforestation would not occur where pre-fire cypress distribution occurred at high densities and natural regeneration of cypress trees is expected to be high. No additional release activities would occur.

Forest Service personnel would visit riparian areas within the Eiler Fire perimeter during the growing season of 2015 to determine the amount and effectiveness of natural regeneration. If vegetation regrowth does not appear to be sufficient, then willow, aspen, sedges, and/or other appropriate riparian species would be hand planted as a follow-up treatment.

First- and third-year survival examinations on all planted units would occur. Planted units would be assessed for competing vegetation and the need for follow-up treatment to ensure survival and stocking are met. The proposed action includes at least one release treatment using manual or mechanical methods such as hand grubbing, mastication, or brush cutting to control competing vegetation within one to three years and a second treatment conducted within two to five years of planting. Animal control actions such as protective barriers or trapping may be used if warranted. Sites planted with trees should be certified of establishment five years after planting.

Transportation System

Where possible, the existing forest transportation system would be used to provide access to treatment units. Road maintenance, including surface protection and erosion control, would be performed on portions of the system as needed for project implementation. A dust abatement plan would be included to control wind-caused erosion from road use. National Forest System roads and non-paved County roads used for haul would receive pre-, during-, and post-haul maintenance.

Approximately 2.4 miles of existing non-system roads within the project area would be needed for project implementation, including salvage and fuels treatments, reforestation, and maintenance, due to the changed condition caused by the fire. These non-system roads would be added to the Forest transportation system as ML2 roads. Approximately one mile of new construction would occur to implement proposed actions. These roads would also be added to the Forest transportation system as maintenance level 1 (ML1) roads. Approximately one mile of temporary roads may be constructed to access proposed treatment areas. Following project implementation, these temporary roads would be decommissioned.

All water sources proposed for use in this project for dust abatement would be brought up to best management practice (BMP) standards, if they currently do not meet those standards. Water sources proposed for use in implementing this project include: Bidwell Pond (T34N R4E, S ½ Sec. 1) and Boundary Camp (T35N R4E SW¼ Sec. 33).

Alternative 2 - No Action

Under the No Action alternative, none of the activities proposed under Alternative 1 would be implemented. Hazard tree felling could occur along roads currently open to the public, trails, and developed recreation sites. These hazard trees could be felled and left in place as part of road maintenance as

per LRMP direction. The No Action alternative would not preclude activities already approved in this area or activities planned as separate projects. No fuels treatments, site preparation, or reforestation would occur.

Alternative 3 - Road Hazard Only

To respond to concerns raised during public scoping, the Responsible Official has proposed limiting treatment to hazard tree removal along approximately 32 miles of roads. Commercial sized hazards would be felled and removed along ML2 and higher roads. Sub-merchantable hazards would be felled and left in place or piled and burned. No other site preparation or reforestation would occur along these roads. No other management activities (besides those previously authorized) would occur. The total footprint of treatments on National Forest lands under Alternative 3 would be approximately 1,095 acres. Existing roads used under this alternative would be repaired and maintained.

5. Effects of Proposed Project on the Habitat for the Selected Project-Level MIS.

The following section documents the analysis for the following 'Category 3' species: California spotted owl, American marten, northern flying squirrel, hairy woodpecker, and black-backed woodpecker. The analysis of the effects of the Eiler Project on the MIS habitat for the selected project-level MIS is conducted at the project scale. Detailed information on the MIS is documented in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

Cumulative effects at the bioregional scale are tracked via the SNF MIS Bioregional monitoring, and detailed in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a).

Late Seral Closed Canopy Coniferous Forest Habitat (California spotted owl, American marten, and northern flying squirrel)

Habitat/Species Relationship.

California spotted owl. The California spotted owl was selected as an MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches DBH) with canopy closures above 40 percent within ponderosa pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. The California spotted owl is strongly associated with forests that have a complex multi-layered structure, large-diameter trees, and high canopy closure (CDFG 2005, USFWS 2006). It uses dense, multi-layered canopy cover for roost seclusion; roost selection appears to be related closely to thermoregulatory needs, and the species appears to be intolerant of high temperatures (CDFG 2005). Mature, multi-layered forest stands are required for breeding (Ibid). The mixed-conifer forest type is the predominant type used by spotted owls in the Sierra Nevada: about 80 percent of known sites are found in mixed-conifer forest, with 10 percent in red fir forest (USDA Forest Service 2001).

American Marten. The American marten was selected as an MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches DBH) with canopy closures above 40 percent within ponderosa pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. Martens prefer coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high canopy closure, and an interspersion of riparian areas and meadows. Important habitat attributes are: vegetative diversity, with predominately mature forest; snags; dispersal cover; and large woody debris (Allen 1982). Key components for westside and eastside marten habitat can be found in the Sierra Nevada Forest Plan Amendment FEIS (USDA Forest Service 2001), Volume 3, Chapter 3, part 4.4, pages 20-21.

Northern flying squirrel. The northern flying squirrel was selected as an MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches DBH) with canopy closures above 40 percent within ponderosa pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. The northern flying squirrel occurs primarily in mature, dense conifer habitats intermixed with various riparian habitats, using cavities in mature trees, snags, or logs for cover (CDFG 2005).

Project-level Effects Analysis – Late Seral Closed Canopy Coniferous Forest Habitat.

Habitat Factor(s) for the Analysis: (1) Acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat [CWHR ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), tree size 5 (canopy closures M and D), and tree size 6]. (2) Acres with changes in canopy closure (D to M). (3) Acres with changes in large down logs per acre or large snags per acre.

Current Condition of the Habitat Factor(s) in the Project Area: Table 2 shows the amount of late seral, closed canopy coniferous forest on USFS lands within the Eiler Fire perimeter, and the acres per CWHR type that burned at various levels of severity. As shown in the table, approximately 950 acres of 5M and 5D existed prior to the fire. Of this total, approximately 133 acres (14%) burned at severities below 50 percent mortality. These 133 acres will be included in this analysis.

Table 2. Acres of late seral closed canopy coniferous forest and burn severity; USFS lands only.

CWHR type	Acres pre-fire	No mortality	0-25% mortality	25-50% mortality	50-75% mortality	75-100% mortality
PPN5M	1	0	<1	<1	0	0
RFR5M	5	0	<1	2	2	1
SMC5M	530	<1	34	42	40	414
SMC5D	207	0	13	14	13	167
WFR5M	114	<1	7	16	16	75
WFR5D	93	<1	<1	4	8	80
Total Acres	950	<1	55	78	79	738

Alternative 1 - Proposed Action

Direct and Indirect Effects to Habitat.

Of the 133 acres of late seral, closed canopy coniferous forest that burned at mortalities of 50 percent or less, nine acres are included within proposed salvage units, including about two acres in helicopter units and seven acres in ground-based salvage units. These nine acres are made up of small, isolated patches of this habitat type.

Of the factors of analysis for this habitat type, these treatments would potentially remove trees that are fire-killed, or sufficiently fire–damaged to meet harvest guidelines. Removal of such trees should not substantively reduce the existing canopy closure, or alter the CWHR density designation for the stand, because dead trees contribute little to existing canopy closure. Thus, proposed treatments would not result in a further loss of acres of this habitat type other than that already caused by the Eiler Fire itself. Also, given the small size of these remnant patches of habitat within treatment units, they may no longer represent a forested 'stand', but may be more accurately described as a small aggregate of surviving green trees within a burned forest landscape.

Harvest prescriptions are focused on the removal of standing fire-killed trees. Downed logs are not likely to be "included product" within treatment units, and downed log retention standards would capture many of the existing logs. While some damage to or removal of downed logs may occur, salvage treatments would not result in a total or substantial loss of downed logs. Some logs could be removed during site preparation prior to reforestation. While downed log retention standards would insure a minimum would be retained, some existing downed logs, especially in areas of concentrations, could be removed.

Harvest prescriptions within the units that include these remnant acres would reduce the number of existing snags. Due to snag retention for this project being primarily within leave patches that represent 25 percent of ground harvested units, the degree of snag reduction would depend on whether the leave patches for a given unit included green forest remnants. If so, then all of the included snags within the leave patch would remain unharvested. If not, then the majority of the existing snags would likely be removed due to retention being achieved in other parts of the same unit. Therefore, there may be some

reduction of snags within green patches that are included within treatment units. However, the degree of removal cannot be definitively estimated.

Cumulative Effects to Habitat in the Analysis Area.

The cumulative effects analysis for this and all alternatives was expanded from USFS lands to encompass the entire footprint of the Eiler Fire, including private timber lands. Within this analysis area, the primary actions that could represent cumulative effects are fire salvage and reforestation actions on private lands that were burned, fuelwood harvest on USFS lands, and hazard tree removal on USFS lands along the Highway 89 corridor.

Table 3 shows the amount of late seral, closed canopy coniferous forest on non-USFS lands within the Eiler Fire perimeter, and the acres per CWHR type that burned at various levels of severity. As shown in the table, approximately 132 acres of 5M and 5D existed prior to the fire. Of this total, approximately 46 acres (35%) burned at severities below 50 percent mortality. These 46 acres will be included in this analysis.

Minimal late seral, closed canopy forested habitat existed prior to the fire in these areas. The 132 acres represents just 0.7 percent of the 18,236 acres that burned on non-USFS lands. Essentially all the pre-fire high probability marten habitat predicted by modeling (Rustigian-Romsos and Spencer 2010) was located on USFS lands.

Table 3. Acres of late seral closed canopy coniferous forest and burn severity; non-USFS lands.

CWHR type	Acres pre-fire	No mortality	0-25% mortality	25-50% mortality	50-75% mortality	75-100% mortality
PPN5M	25	<1	9	6	5	5
SMC5M	68	0	6	12	13	37
SMC5D	38	<1	3	10	9	16
WFR5M	1	0	0	<1	<1	<1
WFR5D	< 1	0	<1	0	0	0
Total Acres	132	<1	18	28	27	58

Private land fire salvage is ongoing at the time of this writing and reforestation will occur on private timberlands within the fire footprint. Due to different harvest and timber management practices on private lands as compared to USFS lands, private salvage operations are expected to remove most of the burned forest habitat on private lands. Some fire-killed trees will inevitably be left in inaccessible areas or where trees were naturally scattered prior to the fire, but for the majority of the fire footprint on private lands, fire-killed trees will be removed. Therefore it is assumed that existing numbers of snags will be reduced within 100 percent of the 46 acres of this habitat type that exists on private lands. Downed logs would likely also be reduced within these same 46 acres located on private lands.

Personal fuelwood harvest would occur within the Eiler footprint on USFS lands. The Lassen NF has one of the most active fuelwood programs in the region, selling over 16,000 cord permits in 2011. This program allows the felling of snags by woodcutters, with upper diameter limits set at 20 inches diameter

at breast height (DBH) for snags of commercial species of conifers, and with no diameter restrictions on lodgepole pine snags. Siegel et al (2013) in their monitoring of black-backed woodpeckers in the Peterson and Wheeler fires on the Lassen and Plumas NFs, respectively, noted woodcutting to be pervasive along roads within both fires. Fuelwood harvest would primarily be immediately along roads, as well as in relatively flat areas that allow off-road travel. Helicopter units and portions of other units on slopes that would prevent off-road travel or would make fuelwood gathering too arduous would be avoided. Siegel et al (2013) indicated the main woodcutting activity in the fires they monitored was along roads. Since it is along roads that hazard trees will be felled and removed as part of this alternative, the greatest proportion of snags that would most likely be vulnerable to woodcutters would be removed anyway. Also, as evidenced by only about 13 of the 133 acres of late seral, closed canopy coniferous forest habitat being included within salvage units and roadside hazard tree corridors, the majority of this surviving habitat is likely inaccessible to salvage harvest, and thus inaccessible to woodcutters. Therefore, woodcutting should not represent a substantive cumulative effect in terms of snag reduction within this habitat type.

Removal of hazard trees (along Highway 89, within the Honn Campground and the USFS administrative site at the Hat Creek Work Center) will take place outside of this document. All of these sites are in developed locations along or within the Highway 89 corridor. None of these sites overlap with late seral closed canopy forest, so this activity would not affect this habitat type.

Cumulative Effects Conclusion – Alternative 1

Prior to the Eiler Fire, approximately 1,082 acres of late seral, closed canopy coniferous forest existed within the footprint of the fire across all ownerships. Approximately 179 acres of this total burned at severities of less than 50 percent, representing about 16 percent of the pre-burn total.

As a result of proposed actions on both USFS lands and other ownership, cumulatively there would be a reduction in snags and/or downed logs on approximately141 acres of the combined 179 acres of late seral closed canopy forest that remain after the fire. This represents 79 percent of the 179 acres within the analysis area. The majority of the acres that may be affected (132 of the 141 acres) would be on non-USFS lands. The proposed action would retain late seral closed canopy coniferous forest habitat but may affect some of the habitat elements, such as snags and downed logs. Past, present, and future actions would not be expected to cause a change in the amount of late seral closed canopy coniferous forest habitat. The proposed action is not expected to add cumulatively to the reduction in habitat and therefore the proposed project would not alter the existing trend in the habitat.

Alternative 2 - No Action

Direct, Indirect and Cumulative Effects to Habitat.

In this alternative, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along approximately 1,095 acres of road corridors would be subject to being felled and left in place as downed logs. Such activities would affect relatively few

(7%) of the 14,926 burned acres on USFS lands, and over the majority of the burned acres snags would remain until they toppled due to decay. Burned vegetation would go through natural recovery.

Less than one acre of late seral, closed canopy coniferous forest was located in roadside corridors within which hazard trees may be removed. Thus this alternative would have minimal effect on the remnant patches of this habitat type that survived the Eiler Fire.

Personal fuelwood harvest would occur within the Eiler footprint on USFS lands. Siegel et al (2013) indicated that the main woodcutting activity in the fires they monitored was along roads. As evidenced by only about 13 of the 133 acres of late seral, closed canopy coniferous forest habitat being included within proposed treatment units within Alternative 1, including less than one acre along roads, the majority of this surviving habitat is likely inaccessible to salvage harvest, and thus inaccessible to woodcutters. Therefore, woodcutting should not represent a substantive cumulative effect in terms of snag reduction within this habitat type.

Actions on private lands and the removal of hazard trees along the Highway 89 corridor would be as described under Alternative 1.

Cumulative Effects Conclusion – Alternative 2

As a result of hazard tree abatement on USFS lands and actions on other ownership, cumulatively there would be a reduction in snags and/or downed logs on approximately133 acres of the combined 179 acres of late seral closed canopy forest that remain after the fire. This represents 74 percent of the 179 acres within the analysis area. The majority of the acres that may be affected (132 of the 133 acres) would be on non-USFS lands. Past, present, and future actions would not be expected to cause a change in the amount of late seral closed canopy coniferous forest habitat. This alternative would not be expected to add cumulatively to the reduction in habitat and therefore would not alter the existing trend in the habitat.

Alternative 3 - Roadside Hazard Tree

Direct, Indirect and Cumulative Effects to Habitat.

In this alternative, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along approximately 1,095 acres of road corridors would be subject to being felled and commercially removed, while smaller diameter trees within the corridors may be piled and burned. Such activities would affect relatively few (7%) of the 14,926 burned acres on USFS lands, and over the majority of the burned acres snags would remain until they toppled due to decay. Burned vegetation would go through natural recovery.

Alternatives 2 and 3 are essentially the same, other than commercial removal of trees in this alternative versus the felling and leaving of such trees within Alternative 2. As a result, the potential direct, indirect and cumulative effects on this habitat type for Alternative 3 are as described above for Alternative 2.

Cumulative Effects Conclusion – Alternative 3

As a result of hazard tree abatement on USFS lands and actions on other ownership, cumulatively there would be a reduction in snags and/or downed logs on approximately133 acres of the combined 179 acres of late seral closed canopy forest that remain after the fire. This represents 74 percent of the 179 acres within the analysis area. The majority of the acres that may be affected (132 of the 133 acres) would be on non-USFS lands. Past, present, and future actions would not be expected to cause a change in the amount of late seral closed canopy coniferous forest habitat. This alternative would not be expected to add cumulatively to the reduction in habitat and therefore would not alter the existing trend in the habitat.

Summary of Status and Trend at the Bioregional Scale

California spotted owl, American marten, and Northern flying squirrel. The Lassen NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the California spotted owl, American marten, and northern flying squirrel; hence, the late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat effects analysis for the Eiler Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data. This information is drawn from the detailed information on habitat and population trends in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 1,006,923 acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands in the Sierra Nevada. Over the last two decades, the trend is slightly increasing (changing from 7% to 9% of the acres on National Forest System lands); since the early 2000s, the trend has been stable at 9%.

Population Status and Trend - California spotted owl. California spotted owl has been monitored in California and throughout the Sierra Nevada through general surveys, monitoring of nests and territorial birds, and demography studies (Verner et al. 1992; Gutierrez et al. 2008, 2009, 2010; USDA Forest Service 2001, 2004, 2006b; USFWS 2006; Sierra Nevada Research Center 2007, 2008, 2009, 2010). Current data at the rangewide, California, and Sierra Nevada scales indicate that, although there may be localized declines in population trend [e.g., localized decreases in "lambda" (estimated annual rate of population change)], the distribution of California spotted owl populations in the Sierra Nevada is stable.

Population Status and Trend – American marten. American marten has been monitored throughout the Sierra Nevada as part of general surveys and studies since 1996 (e.g., Zielinski et al. 2005, Moriarty 2009). Since 2002, the American marten has been monitored on the Sierra Nevada forests as part of the Sierra Nevada Forest Plan Amendment (SNFPA) monitoring plan (USDA Forest Service 2005, 2006b, 2007b, 2009, 2010b). Current data at the rangewide, California, and Sierra Nevada scales indicate that, although marten appear to be distributed throughout their historic range, their distribution has become fragmented in the southern Cascades and northern Sierra Nevada, particularly in

Plumas County. The distribution appears to be continuous across high-elevation forests from Placer County south through the southern end of the Sierra Nevada, although detection rates have decreased in at least some localized areas (e.g., Sagehen Basin area of Nevada County).

Population Status and Trend – northern flying squirrel. The northern flying squirrel has been monitored in the Sierra Nevada at various sample locations by live-trapping, ear-tagging, camera surveys, snap-trapping, and radiotelemetry: 2002-present on the Plumas and Lassen National Forests (Sierra Nevada Research Center 2007, 2008, 2009, 2010), and 1958-2004 throughout the Sierra Nevada in various monitoring efforts and studies (see USDA Forest Service 2008, Table NOFLS-IV-1). These data indicate that northern flying squirrels continue to be present at these sample sites, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of northern flying squirrel populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trends.

California spotted owl. As a result of the proposed actions in Alternative 1 of the Eiler Project, combined with effects on private lands, a decrease in snags and downed logs would be expected on approximately 141 of the 179 acres of late seral, closed canopy coniferous forest. This projected reduction of habitat components within these 141 acres, out of the greater than 1,000,000 acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands currently estimated to exist in the Sierra Nevada, would not alter the existing trend in the habitat, nor would it lead to a change in the distribution of California spotted owl across the Sierra Nevada bioregion.

American marten. As a result of the proposed actions in Alternative 1 of the Eiler Project, combined with effects on private lands, a decrease in snags and downed logs would be expected on approximately 141 of the 179 acres of late seral, closed canopy coniferous forest. This projected reduction of habitat components within these 141 acres, out of the greater than 1,000,000 acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands currently estimated to exist in the Sierra Nevada would not alter the existing trend in the habitat, nor would it lead to a change in the distribution of American marten across the Sierra Nevada bioregion.

Northern flying squirrel. As a result of the proposed actions in Alternative 1 of the Eiler Project, combined with effects on private lands, a decrease in snags and downed logs would be expected on approximately 141 of the 179 acres of late seral, closed canopy coniferous forest. This projected reduction of habitat components within these 141 acres, out of the greater than 1,000,000 acres of late seral, closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands currently estimated to exist in the Sierra Nevada, would not alter the existing trend in the habitat, nor would it lead to a change in the distribution of northern flying squirrel across the Sierra Nevada bioregion.

Snags in Green Forest Ecosystem Component (Hairy woodpecker)

Habitat/Species Relationship.

The hairy woodpecker was selected as the MIS for the ecosystem component of snags in green forests. Medium (diameter breast height between 15 to 30 inches) and large (diameter breast height greater than 30 inches) snags are most important. The hairy woodpecker uses stands of large, mature trees and snags of sparse to intermediate density; cover is also provided by tree cavities (CDFG 2005). Mature timber and dead snags or trees of moderate to large size are apparently more important than tree species (Siegel and DeSante 1999).

Project-level Effects Analysis – Snags in Green Forest Ecosystem Component

Habitat Factor(s) for the Analysis: (1) Medium (15-30 inches DBH) snags per acre. (2) Large (greater than 30 inches DBH) snags per acre.

Current Condition of the Habitat Factor(s) in the Project Area: The current condition of habitat within the project area was calculated using all pre-fire CWHR forest types with average tree size greater than 11 inches DBH (size class 4s and 5s) and all canopy cover classes in forests that experienced less than 50 percent basal area mortality as a result of the Eiler Fire. Habitat defined by these criteria was considered to best represent the approximate amount of habitat containing the snags in green forest ecosystem component.

As indicated in Table 4, there were approximately 9,587 acres of size class 4s and 5s of all density categories within the Eiler Fire perimeter prior to the fire. The Eiler Fire caused greater than 50 percent mortality in about 7,927 acres (83%) of this total. Approximately 1,660 acres (17%) burned at less than 50 percent mortality. These 1,660 acres will be considered the acreage that provides snags in green forest habitat on USFS lands within the Eiler Fire perimeter.

Alternative 1 - Proposed Action
Direct and Indirect Effects to Habitat.

Of the estimated 1,660 acres of this habitat on USFS lands, about 327 acres (20%) are included within proposed treatment units. The largest patch of habitat within proposed units is 54 acres, but most are much smaller, with an average size of about five acres, and a median patch size of two acres. The majority of the acres within treatment areas are within ground-based salvage and roadside hazard tree corridors, which combined include 224 acres of this habitat type. Proposed helicopter units include another 46 acres, and mechanical fuels treatments in areas not otherwise being salvaged include 57 acres. All of these proposed treatments could result in some snags being removed from the remnant patches of this habitat type.

Approximately 127 acres of this habitat type occurs within roadside hazard tree units. Due to the need to abate public hazards, dead trees (including those that meet mortality guidelines) along these roadsides,

and snags within these green patches would be removed if they represent hazards to the roadway. Also, no snag retention is designed within these areas due to the hazard potential. Therefore, it can be assumed that most existing snags would be removed in these 127 acres.

Table 4. Acres of hairy woodpecker habitat within the pre-fire Eiler Fire perimeter, USFS lands only. Values < 0.5 acres reported as zero.

CWHR type	Acres pre-fire	No mortality	0-25% mortality	25-50% mortality	50-75% mortality	75-100% mortality
EPN4P	195	0	10	17	35	133
EPN4S	178	0	44	30	54	50
LPN4P	40	1	22	7	2	8
LPN4S	5	0	4	1	0	0
LPN4M	24	0	2	1	0	21
MHC4M	0	0	0	0	0	0
MHC4S	5	0	0	0	2	3
MHW4P	3	0	0	0	0	3
MHW4S	4	0	0	0	0	4
PPN4D	546	0	30	70	68	378
PPN4M	1497	2	68	131	186	1110
PPN4P	472	0	29	51	64	328
PPN4S	153	0	15	11	30	97
PPN5M	0	0	0	0	0	0
PPN5P	5	0	1	0	1	3
PPN5M	1	0	0	0	1	0
RFR4M	1	0	0	0	0	1
RFR4P	10	0	7	2	0	1
RFR5M	5	0	0	2	2	1
RFR5P	12	0	2	4	3	3
RFR5S	19	0	4	7	6	2
SMC4D	612	0	48	50	34	480
SMC4M	1271	2	86	104	105	974
SMC4P	1814	2	127	114	152	1419
SMC4S	707	1	60	86	111	449
SMC5D	207	0	13	14	13	167
SMC5M	531	0	34	42	40	415
SMC5P	220	1	38	36	35	110
SMC5S	36	0	7	6	9	14
WFR4D	274	0	13	11	10	240
WFR4M	250	0	35	27	20	168
WFR4P	139	0	26	21	21	71
WFR4S	67	0	12	12	21	22
WFR5D	93	0	1	4	8	80
WFR5M	115	0	7	16	17	75
WFR5P	69	0	10	14	13	32
WFR5S	7	0	2	3	2	0
Total Acres	9587	9	757	894	1065	6862

Approximately 97 acres of this habitat type occur within salvage units proposed for ground-based salvage treatments outside of roadside corridors. Snag retention within these salvage areas is based on leave patches that represent about 25 percent of each proposed unit. Such leave patches were designed to generally be from about two to five acres in size and were to be distributed across units to maintain diversity. While rocky areas may represent a small proportion of such patches, the majority were designed to be located within good growing sites so that the patches would contain an abundant understory in the future. As such, the leave patches were designed to be located so as to represent the stand structure within each unit. The 25% leave patches were designed primarily to retain burned forest habitat. However, some did include remnant patches of green forest. The two to five acre size of leave patches would capture the average and median sizes of the areas of this habitat type that survived the fire. Effects of these treatments on snag abundance within these green forest areas would thus depend on the inclusion or lack of inclusion of the green forest area within the 25 leave patches. If fully included, there would be no snag reduction. If fully excluded, there would be a substantive reduction in snags. Therefore, snag reduction would be expected to occur in a subset of these 97 acres, but likely not all of them.

Approximately 57 acres of this habitat type occurs in areas proposed for mechanical site preparation prior to reforestation activities. Snag retention within these areas would be the same as described above for ground-based salvage. Potential reduction of snags within green patches within this treatment type would be expected to be reduced relative to ground-based salvage since site preparation, and reforestation, would be focused on "de-forested" areas that lack a green-tree component, not within the green-tree patch. So while some snags may be reduced in these 57 acres, this treatment should not result in a substantive reduction.

Given all of the above, some level of snag reduction would be expected to varying degrees within potentially all the 327 acres of this habitat type that exists on USFS lands and within proposed treatment units.

Cumulative Effects to Habitat in the Analysis Area

The cumulative effects analysis for this and all alternatives was expanded from USFS lands to encompass the entire footprint of the Eiler Fire, including private timber lands. Within this analysis area, the primary actions that could represent cumulative effects are fire salvage and reforestation actions on private lands that were burned, fuelwood harvest on USFS lands, and hazard tree removal on USFS lands along the Highway 89 corridor.

Table 5 shows the amount of green forest, hairy woodpecker habitat on non-USFS lands within the Eiler Fire perimeter, and the acres per CWHR type that burned at various levels of severity. As shown in the table, approximately 14,261 acres of these forested types existed prior to the fire. Of this total, approximately 2,891 acres (20%) burned at severities below 50 percent mortality. These 2,891 acres will be included in this analysis. The majority of this acreage occurred on private timberlands. About 26 acres were on other Federal lands, such as the Bureau of Land Management.

Table 5. Acres of hairy woodpecker habitat within the pre-fire Eiler Fire perimeter, non-USFS lands only. Values < 0.5 acres reported as zero; values 0.5-0.9 rounded to 1.

CWHR type	Acres pre-fire	No mortality	0-25% mortality	25-50% mortality	50-75% mortality	75-100% mortality
EPN4P	168	0	0	10	34	124
EPN4S	97	1	7	6	15	68
EPN4M	17	0	0	0	4	13
LPN4M	37	0	0	0	8	29
MHC4M	3	0	0	1	0	2
MHC4P	8	0	2	1	1	4
MHC4S	226	0	18	49	50	109
MHC5P	1	0	0	0	0	1
MHW4P	5	0	0	0	0	5
MHW4S	14	0	0	0	1	13
PPN4D	349	0	7	35	34	273
PPN4M	865	2	33	67	88	675
PPN4P	2,061	3	74	101	164	1719
PPN4S	834	1	54	139	128	512
PPN5M	26	0	9	6	5	6
PPN5P	13	0	3	2	3	5
PPN5S	14	0	4	2	3	5
SMC4D	164	0	5	16	22	121
SMC4M	1,181	4	160	233	162	622
SMC4P	3,925	6	441	581	483	2,414
SMC4S	4,053	4	240	506	613	2,690
SMC5D	38	0	3	10	9	16
SMC5M	68	0	6	12	13	37
SMC5P	25	0	2	9	6	8
WFR4D	1	0	1	0	0	0
WFR4M	30	0	6	4	5	15
WFR4P	36	1	2	2	4	27
WFR5P	2	0	0	0	1	1
Total Acres	14,261	22	1,077	1,792	1,856	9,514

Private land fire salvage is ongoing at the time of this writing and reforestation will occur on private timberlands within the fire footprint. Due to different harvest and timber management practices on private lands as compared to USFS lands, private salvage operations are expected to remove most of the burned forest habitat on private lands. Some fire-killed trees will inevitably be left in inaccessible areas or where trees were naturally scattered prior to the fire, but for the majority of the fire footprint on private lands, fire-killed trees will be removed. Therefore, it is assumed that existing numbers of snags will be reduced within most or all of this habitat type that exists on private timber lands. Downed logs may also be reduced within these same acres, such as during site preparation activities prior to reforestation.

Personal fuelwood harvest would occur within the Eiler footprint on USFS lands. The Lassen NF has one of the most active fuelwood programs in the region, selling over 16,000 cord permits in 2011. This program allows the felling of snags by woodcutters, with upper diameter limits set at 20 inches DBH for snags of commercial species of conifers, and with no diameter restrictions on lodgepole pine snags. Siegel

et al (2013) in their monitoring of black-backed woodpeckers in the Peterson and Wheeler fires on the Lassen and Plumas NFs, respectively, noted woodcutting to be pervasive along roads within both fires. Fuelwood harvest would primarily be immediately along roads, as well as in relatively flat areas that allow off-road travel. Helicopter units and portions of other units on slopes that would prevent off-road travel or would make fuelwood gathering too arduous would be avoided. Because Siegel et al (2013) indicated the main woodcutting activity in the fires they monitored was along roads, and since it is along roads that hazard trees will be felled and removed as part of this alternative, the greatest proportion of snags that would most likely be vulnerable to woodcutters would be removed anyway. Also, as evidenced by only about 224 of the 1,660 acres (13%) of hairy woodpecker habitat being included within roadside hazard tree corridors and ground-based salvage units, the majority of this habitat is likely to be largely to salvage harvest and thus inaccessible to woodcutters. Therefore, woodcutting should not represent a substantive cumulative effect in terms of snag reduction within this habitat type.

Removal of hazard trees (along Highway 89, within the Honn Campground and the USFS administrative site at the Hat Creek Work Center) will take place outside of this document. All of these sites are in developed locations along or within the Highway 89 corridor. While some of these areas may represent hairy woodpecker habitat in terms of CHWR size class and density, all of these sites are in developed locations along or within the Highway 89 corridor. Due to the developed nature of these sites, and the routine identification and removal of hazard trees and snags from these high-use areas, the opportunities for hairy woodpeckers to find suitable snags for nesting within these sites is likely low.

Cumulative Effects Conclusion – Alternative 1

After the Eiler Fire, approximately 4,551 acres of the snags in green forest ecosystem component existed within the footprint of the fire across all ownerships. Given the above analysis, as a result of proposed actions on both USFS lands and other ownership, cumulatively there may be a reduction in snags and/or downed logs on approximately 3,218 acres of these areas. This represents 71 percent of the 4,551 acres within the analysis area. The majority of the acres that may be affected would be on non-USFS lands.

Alternative 2 - No Action

Direct, Indirect and Cumulative Effects to Habitat.

In this alternative, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. In order to abate public hazards, fire-killed trees along approximately 1,095 acres of road corridors could be subject to being felled and left in place as downed logs. Smaller diameter trees within these corridors that would not represent hazards to the road would remain. Such felling of hazard trees would likely occur over time, and may be most prevalent along well-used roads needed to access features such as wilderness trailheads. These 1,095 acres represent about seven percent of USFS lands burned in the fire. Over the majority of the burned acres snags would remain until they toppled due to decay. Burned vegetation would go through natural recovery.

Approximately 120 acres of snags in green forest ecosystem component exist within these roadside corridors. Due to the abatement of public hazards within these corridors, snags within these 120 acres may be felled if they represented a hazard to the roadway.

Personal fuelwood harvest would occur within the Eiler footprint on USFS lands. Siegel et al (2013) indicated that the main woodcutting activity in the fires they monitored was along roads. As stated within the effects discussion for Alternative 1, the majority of this habitat is outside of salvage harvest areas and thus largely inaccessible to woodcutters. And, as indicated above, relatively few acres are within roadside corridors. Therefore, woodcutting should not represent a substantive cumulative effect in terms of snag reduction within this habitat type.

Cumulative effects of the removal of hazard trees (along Highway 89, within the Honn Campground and the USFS administrative site at the Hat Creek Work Center) would be as discussed under Alternative 1. Effects to this habitat on non-USFS lands would also be as described under Alternative 1.

Cumulative Effects Conclusion – Alternative 2

After the Eiler Fire, approximately 4,551 acres of the snags in green forest ecosystem component existed within the footprint of the fire across all ownerships. Given the above analysis, as a result of proposed actions on both USFS lands and other ownership, cumulatively there may be a reduction in snags and/or downed logs on approximately 3,011 of these acres. This represents 66 percent of the 4,551 acres within the analysis area. The majority of the acres that may be affected would be on non-USFS lands.

Alternative 3 - Roadside Hazard Tree

Direct, Indirect and Cumulative Effects to Habitat.

In this alternative, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along approximately 1,095 acres of road corridors would be subject to being felled and commercially removed, while smaller diameter trees within the corridors may be piled and burned. Such activities would affect relatively few (7%) of the 14,926 burned acres on USFS lands, and over the majority of the burned acres snags would remain until they toppled due to decay. Burned vegetation would go through natural recovery.

Alternatives 2 and 3 are essentially the same, other than commercial removal of sawtimber-sized trees in this alternative versus the felling and leaving of such trees within Alternative 2. As a result, the potential direct, indirect and cumulative effects on this habitat type for Alternative 3 are as described above for Alternative 2.

Cumulative Effects Conclusion – Alternative 3

After the Eiler Fire, approximately 4,551 acres of the snags in green forest ecosystem component existed within the footprint of the fire across all ownerships. Given the above analysis, as a result of proposed actions on both USFS lands and other ownership, cumulatively there may be a reduction in snags and/or downed logs on approximately 3,011 of these acres. This represents 66 percent of the 4,551 acres within the analysis area. The majority of the acres that may be affected would be on non-USFS lands.

Summary of Hairy Woodpecker Status and Trend at the Bioregional Scale

The Lassen NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the hairy woodpecker; hence, the snag effects analysis for the Eiler Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the hairy woodpecker. This information is drawn from the detailed information on habitat and distribution population trends in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

Ecosystem Component Status and Trend.

The current average number of medium-sized and large-sized snags (≥ 15" DBH, all decay classes) per acre across major coniferous and hardwood forest types (westside mixed conifer, ponderosa pine, white fir, productive hardwoods, red fir, eastside pine) in the Sierra Nevada ranges from 1.5 per acre in eastside pine to 9.1 per acre in white fir. In 2008, snags in these types ranged from 1.4 per acre in eastside pine to 8.3 per acre in white fir (USDA Forest Service 2008).

Data from the early-to-mid 2000s were compared with the current data to calculate the trend in total snags per acre by Regional forest type for the 10 Sierra Nevada national forests and indicate that, during this period, snags per acre increased within westside mixed conifer (+0.76), white fir (+2.66), productive hardwoods (+0.35), and red fir (+1.25) and decreased within ponderosa pine (-0.16) and eastside pine (-0.14) Detailed information by forest type, snag size, and snag decay class can be found in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a).

Population Status and Trend.

Monitoring of the hairy woodpecker across the ten National Forests in the Sierra Nevada has been conducted since 2009 in partnership with PRBO Conservation Science, as part of a monitoring effort that also includes mountain quail, fox sparrow, and yellow warbler (USDA Forest Service 2010a, http://data.prbo.org/partners/usfs/snmis/). Hairy woodpeckers were detected on 15.1% of 1659 point counts (and 25.2% of 424 playback points) in 2009 and 16.7% of 2266 point counts (and 25.6% of 492 playback points) in 2010, with detections on all 10 national forests in both years. The average abundance (number of individuals recorded on passive point count surveys) was 0.116 in 2009 and 0.107 in 2010. These data indicate that hairy woodpeckers continue to be distributed across the 10 Sierra Nevada

National Forests. In addition, the hairy woodpeckers continue to be monitored and surveyed in the Sierra Nevada at various sample locations by avian point count and breeding bird survey protocols. These are summarized in the 2008 Bioregional Monitoring Report (USDA Forest Service 2008).Current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of hairy woodpecker populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Hairy Woodpecker Trend.

As a result of actions on both USFS and non-USFS lands, there would be an expected change in medium and large snags on about 4,551 acres of this ecosystem component within the Eiler Fire analysis area. This includes about 327 acres on USFS lands and about 2,891 acres on non-USFS lands. The change in medium to large-sized snags per acre on 3,218 acres out of approximately 4,551 acres of this ecosystem component in the Eiler Fire Salvage and Restoration Project analysis area would not alter the existing trend in the ecosystem component, nor would it lead to a change in the distribution of hairy woodpecker across the Sierra Nevada bioregion, given the ubiquity of this ecosystem component across the bioregion.

Snags in Burned Forest Ecosystem Component (Black-backed woodpecker)

Habitat/Species Relationship. The black-backed woodpecker was selected as the MIS for the ecosystem component of snags in burned forests. Recent data indicate that black-backed woodpeckers prefer snags created by stand-replacement fires (Hutto 1995, Kotliar et al. 2002, Smucker et al. 2005), although they will also use snags found in unburned forests (Fogg et al. 2014). The abundant snags associated with severely burned forests provide both prey (by providing food for the specialized beetle larvae that serve as prey) and nesting sites (Hutto and Gallo 2006).

Project-level Effects Analysis – Snags in Burned Forest Ecosystem Component

Habitat Factor(s) for the Analysis: (1) Medium (15-30 inches DBH) snags per acre within burned forest created by stand-replacing fire. (2) large (greater than 30 inches DBH) snags per acre within burned forest created by stand-replacing fire.

Current Condition of the Habitat Factor(s) in the Project Area: The following parameters were used to estimate the amount of burned forest habitat which contain the snags in burned forest ecosystem component:

• Pre-fire medium to large average tree size (average DBH >6"; CWHR size classes 3, 4, 5, and 6) which contained moderate to dense canopy cover (canopy cover ≥40%; CWHR canopy classes M or D) for coniferous forest types within the fire perimeter. Conifer forest types were lodgepole pine, ponderosa pine, mixed-conifer, white fir and red fir.

• ≥50 percent basal area mortality

In the CWHR classification system, average tree size classes are broken out at the following DBH intervals: less than one inch (size class 1), one to six inches (size class 2), six to 11 inches (size class 3), 11 to 24 inches (size class 4), and greater than 24 inches (size class 5 and 6). Size class 6 represents multi-layered canopy stands. Size class 3 was used for the minimum tree size class in this analysis because snags within this classification could contain potential nest trees. This analysis focused on areas which burned at greater than or equal to 50 percent basal area mortality as indicative of snags in burned forest habitat.

Table 6 shows that approximately 4,854 acres of suitable forest types burned at moderate and high severity on USFS lands within the Eiler Fire perimeter. The majority of this habitat was represented by size class 4 stands that contributed about 78 percent of the total acreage.

Table 6. Acres of black-backed woodpecker habitat on USFS lands within the Eiler Fire perimeter by CWHR size class and density of all forest types.

CWHR	Acres of CWHR type burned at moderate and high severity
3M	184
3D	42
4M	2,600
4D	1,211
5M	547
5D	270
Totals	4,854

Alternative 1 - Proposed Action

Direct and Indirect Effects to Habitat.

Table 7 shows the effects of different proposed actions on the acres of burned forest. As indicated, approximately 4,854 acres of suitable habitat exists on USFS lands, of which approximately 1,825 would be affected by salvage harvests. Tractor salvage harvest would potentially affect 1,505 acres of this habitat type, while helicopter salvage harvest would potentially affect 320 acres. About 62 percent of the habitat would not be affected by commercial salvage operations. Because roadside hazard tree units would be harvested by tractor salvage operations, and most of the corridors would have salvage units 'behind' them, acres contained in roadside hazard tree units were included within the tractor salvage total.

Proposed in this alternative are approximately 2,567 acres of ground-based salvage units. These units would affect approximately 1,505 acres of black-backed woodpecker habitat (Table 7). The design for snag retention within these units is to retain approximately 25 percent of each unit in un-harvested or untreated patches. This amounts to a total of about 642 acres within these treatment areas that would remain in their existing condition relative to snag densities, including about 376 acres within black-backed woodpecker habitat. These un-harvested leave patches, especially when located near areas that would not be salvaged, may provide some foraging habitat for black-backed woodpeckers.

Table 7. Acres of snags in burned forest ecosystem component within treatments proposed by the Eiler Project.

	Tractor Salvage Harvest	Helicopter Salvage Harvest	No Salvage Harvest	Total Acres
Acres	1,505	320	3,029	4854

Also proposed are approximately 517 acres of mechanical fuels and 3,602 acres of hand fuels treatments that would primarily occur within areas that were deforested but where the size of the remaining timber is sub-merchantable. Because fuels-only treatments are in locations that lacked sufficient saw-timber sized trees to support a commercial timber sale unit, fuels treatments are generally in lower quality or marginal woodpecker habitat due to smaller or sparser trees. In these treatments, totaling 4,119 acres, approximately 25 percent of each treatment type would be retained in un-harvested or untreated patches. This amounts to about 970 acres that would remain in their existing condition relative to snag densities. These un-harvested leave patches, especially when located near areas that would not be salvaged, may provide some foraging habitat for black-backed woodpeckers.

Snag retention within the helicopter salvage harvest units would retain all snags <10 inches in DBH, as well as approximately 100 square feet per acre of snags over 10 inches in diameter. The upper diameter limit to which snags over 10" DBH were retained was based on the cumulative additions of basal area contributed by snags in incremental 2 inches diameter classes >10 inches DBH until 100 square feet of basal area per acre was obtained. Due to differences in stand structure, this upper diameter limit would vary by unit (see Table 8). During the design of this project, approximately 549 acres of proposed helicopter units were dropped from the proposed action in order to maintain burned forest black-backed woodpecker habitat. Landings at which the helicopter-harvested snags would be processed would be located outside of the actual helicopter harvest units due to lack of road access.

Snag retention within these units was an attempt to facilitate limited helicopter harvest while still retaining sufficient snag basal area, of sufficient size, to maintain black-backed woodpecker habitat. The 100 square feet per acre retention level was based on findings by Siegel et al (2013), who in monitoring black-backed woodpeckers on the Plumas and Lassen NFs found that mean snag basal area (which accounted for snags down to 4" DBH) of individual black-backed woodpecker home ranges varied between 3.4 and 39 square meters per hectare (about 15 to 170 square feet/acre), with a mean of 23 square meters per hectare (100 square feet/acre). Tingley et al (2014), using data from the same monitoring effort as Siegel et al (2013), found that of 12 monitored black-backed woodpeckers that foraged exclusively or primarily within burned forests, all had home ranges with an average snag basal area greater than 17 meters squared per hectare (about 74 square feet/acre). The 17 meters squared per hectare of snag basal area was suggested by the authors to represent a potential minimum benchmark for selecting burned stands for retention as black-backed woodpecker habitat. The designed retention within helicopter units (100 square feet per acre of snags >10 inches DBH, as well as the basal area of snags <10 inches DBH that was not accounted for but that would increase the residual basal area so that retention would

exceed 100 square feet per acre) would thus be greater than this minimum benchmark figure derived by Tingley at al (2014a).

Table 8. Summary of proposed helicopter units within the Eiler Project.

Unit Number	Acres	Estimated upper diameter in inches to obtain 100 sq ft BA of snags >10" DBH
406	60	20
408	31	24
412	44	20
414	33	23
423	92	22
424	41	≤24 and ≥40
432	133	20
602	2	22
609	26	28
657	19	24
Total	481	

Removing the larger diameter snags within these units would reduce habitat quality and snag basal area within the helicopter units. Post-harvest, reduced basal area would lead to larger home ranges of black-backed woodpeckers that would occupy these units as compared to the pre-harvest condition (Tingley et al 2014). This, plus a low degree of overlap in adjacent home ranges (Tingley et al 2014) would serve to reduce the numbers of pairs that such units would likely be able to support as compared to the pre-harvest condition. While harvest may reduce the total numbers of pairs supported, the proposed level of retention should allow black-backed woodpeckers to continue occupying these units. While about five to 10 percent of helicopter units would be reforested to founder stands, the remaining 90 to 95 percent of the helicopter acres would still provide a sufficient level of snags for this species. There would be no salvage harvest within the 2,226 acres of the Inventoried Roadless Area on the north side of the Thousand Lakes Wilderness, and only site-specific hazard tree elimination within the 1,730 acres that burned within the Wilderness.

To summarize the direct and indirect effects to this habitat, approximately 3,029 acres (62%) of the estimated 4,854 acres of burned forest black-backed woodpecker habitat would be unaffected by proposed salvage treatment areas. Due to project design, helicopter harvest would still allow for black-backed woodpeckers to occupy the helicopter units post-treatment. Tractor salvage harvest, which would have the greatest impact on black-backed woodpecker habitat, would affect a total of about 1,505 acres of

habitat, out of the 4,854 acres existing on USFS lands. Due to project design, about 25 percent of these tractor-harvested units would be retained in unharvested patches totaling about 376 acres. Despite these hundreds of acres of leave patches, it was assumed that these tractor-harvested salvage units would be "lost" as habitat due to the salvage harvest.

Cumulative Effects to Habitat in the Analysis Area.

The cumulative effects analysis area for this and all alternatives was expanded from USFS lands within the Eiler Fire to include all of the Eiler Fire area, including private lands. Approximately 2,203 acres of burned forest black-backed woodpecker habitat existed on non-USFS lands within the Eiler Fire footprint (Table 9). Due to different harvest and timber management practices on private lands as compared to USFS lands, private salvage operations are expected to remove most burned forest black-backed woodpecker habitat. Some fire-killed trees will inevitably be left in inaccessible areas or where trees were naturally scattered prior to the fire, but the 2,203 acres of non-USFS habitat for black-backed woodpeckers is assumed to eventually be 'lost' due to salvage efforts.

Table 9. Acres of black-backed woodpecker habitat on non-USFS lands within the Eiler Fire perimeter by CWHR size class and density of all forest types.

CWHR	Acres of CWHR type burned at moderate and high severity
3M	43
3D	1
4M	1,622
4D	451
5M	61
5D	25
Totals	2,203

Removal of hazard trees (along Highway 89, within the Honn Campground and the USFS administrative site at the Hat Creek Work Center) will take place outside of the Eiler Project. All of these sites are in developed locations within the Highway 89 corridor. Due to the developed nature of these sites, the routine identification and removal of snags and structurally defective trees from these high-use areas, and the small acreage involved, this removal of public hazard trees should not represent a substantive loss of habitat for this species.

Personal fuelwood harvest would occur within the Eiler Fire footprint on USFS lands. The Lassen NF has one of the most active fuelwood programs in the region, selling over 16,000 cord permits in 2011. This program allows the felling of snags by woodcutters, with upper diameter limits set at 20 inch DBH for snags of commercial species of conifers, and with no diameter restrictions on lodgepole pine snags. Woodcutters are allowed to drive off road to access snags. Due to woodcutting activity in the fall of 2014 after the fire, including the felling and removal of oversized incense-cedar snags, the fire was signed "closed" until salvage operations were completed. Fuelwood gathering would again be permitted after salvage operations are complete. As such, snags retained from salvage harvest would be subject to

removal as fuelwood if accessible. Firewood harvest has been identified as a risk factor for black-backed woodpeckers (Bond et al 2012).

Fuelwood harvest would primarily occur immediately along roads, as well as in relatively flat areas that allow off-road travel, and along user-created roads, post-harvest skid trails, meadow edges or other features that allow off-road travel. Helicopter units and portions of other units on slopes that would prevent off-road travel or would make fuelwood gathering too arduous would be avoided. As part of the design of this project, snag retention clumps were not placed within about 150 feet of ML2 or greater roads where snags would be considered as hazards. Thus retained snag patches would be distant from roadsides and should be less accessible. The presence of stumps along roadside corridors may also make off road travel difficult. Because Siegel et al (2013) indicated that the main woodcutting activity in the fires they monitored was along roads, and since it is along roads that hazard trees will be felled and removed as part of this alternative, the greatest proportion of snags that would most likely be targeted by woodcutters would be removed anyway by this alternative.

Inevitably some retained snags will likely be removed by fuelwood harvesters. However, given the large areas of snag retention (see discussion in Direct and Indirect Effects, above), including within the Wilderness and Roadless Areas, and the presence of slopes and other features that would limit access, most of the fuelwood harvest should be localized to areas that are accessible, as indicated in the Siegel et al (2013) study. Also, all black-backed woodpecker habitat that was contained within tractor-harvested units was considered "lost" as habitat due to this harvest. Thus, any additional snags lost to woodcutters within these same units would not add to acres of habitat considered lost. Therefore, this activity should not result in a substantial decrease in burned forest black-backed woodpecker habitat across the USFS lands involved in the fire.

Cumulative Effects Conclusion - Alternative 1

Combined, about 7,057 acres of burned forest black-backed woodpecker habitat existed on both USFS and non-USFS lands within the Eiler Fire perimeter. Due to salvage harvest, it was assumed that about 2,203 acres of this habitat on non-USFS lands would be lost. On USFS lands, tractor harvest proposed under Alternative 1 would cause a loss of about 1,505 acres. Helicopter harvest would affect 320 acres, but these acres would still provide habitat post-harvest. Approximately 3,029 acres on USFS lands would not be impacted by treatments. Thus, actions across all ownerships within the fire perimeter would cause approximately 3,708 acres of the 7,057 acres (about 52%) to be lost, leaving approximately 3,349 acres available as burned forest black-backed woodpecker habitat.

Alternative 2 - No Action

Direct and Indirect Effects to Habitat.

The cumulative effects analysis area was expanded from USFS lands within the Eiler Fire to include all of the Eiler Fire area, including private lands. The 2009 Browns Fire is contained within the northern boundary of the Eiler Fire. This is the only fire within the last 10 years that the Eiler overlapped or contained. On-going projects within the Eiler Fire include fire salvage and reforestation operations on

private lands, hazard tree removal in specific locations along Highway 89 on USFS lands, and fuelwood harvest on USFS lands.

In this alternative, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. In order to abate public hazards, fire-killed trees along approximately 1,095 acres of road corridors could be subject to being felled and left in place as downed logs. Smaller diameter trees within these corridors that would not represent hazards to the road would remain. Such felling of hazard trees would likely occur over time, and may be most prevalent along well-used roads needed to access features such as wilderness trailheads. Approximately 396 acres of black-backed woodpecker habitat is included within these 1,095 acres of roadside corridors.

As in the other alternatives, personal fuelwood harvest would take place in this alternative. Fuelwood harvest would be most prevalent along roads (Siegel et al 2013). The combination of hazard tree abatement and fuelwood harvest would likely combine to affect much of the burned forest habitat within the road corridors, including within the 396 acres of suitable burned forest black-backed woodpecker habitat. Therefore, for this analysis these acres of burned forest habitat were considered 'lost' as black-backed woodpecker habitat under this alternative.

However, this is likely an overestimate of impact because the removal of fire-killed trees along the roadways would not be a scheduled action but would be realized over time. Also, small diameter trees would be left, which may provide some foraging habitat through time, so these roadside corridors may not be fully "lost" as habitat. Because the potential felling of hazard trees would occur along roads and most of the fuelwood harvest would also be localized to areas that are accessible, these activities should not result in a substantive cumulative effect across all USFS lands involved in the fire, especially given the lack of other actions proposed in this alternative.

Due to different harvest and timber management practices on private lands as compared to USFS lands, private salvage operations are expected to remove most burned forest habitat for this species. Some fire-killed trees will inevitably be left in inaccessible areas or where trees were naturally scattered prior to the fire, but for the majority of non-USFS habitat for black-backed woodpeckers, totaling about 2,203 acres, is assumed to eventually be "lost" due to salvage efforts.

Cumulative Effects Conclusion - Alternative 2:

Combined, about 7,057 acres of burned forest black-backed woodpecker habitat existed on both USFS and non-USFS lands within the Eiler Fire perimeter. Due to salvage harvest, it was assumed that about 2,203 acres of this habitat on non-USFS lands would be lost. On USFS lands, hazard tree abatement and personal fuelwood harvest may remove or alter about 396 acres of habitat along roadside corridors. Thus, under Alternative 2, actions across ownerships within the fire perimeter could cause approximately 2,599 acres of the 7,057 acres (about 37%) to be lost, leaving approximately 4,458 acres available as burned forest black-backed woodpecker habitat.

Alternative 3 - Roadside Hazard Tree

Direct, Indirect and Cumulative Effects to Habitat.

In this alternative, hazard trees within 1,095 acres located along road corridors that are of sawtimber size would be felled and removed, and sub-merchantable trees may be piled and burned or left in place. Approximately 396 acres of black-backed woodpecker habitat is included within these 1,095 acres of roadside corridors.

Compared to Alternative 2, the removal of burned forest habitat within these acres would be more complete due to the commercial removal, and in order to realize the commercial value of the fire-killed trees before decay set in the removal would occur more quickly than in Alternative 2. Therefore, impacts to burned forest habitat within these road corridors would be greater in this alternative than in Alternative 2. Due to commercial removal of snags, landings would need to be created in order to deck and process these trees, which would not be required under Alternative 2. No snag retention would be designed for these roadside corridors due to the inherent hazard snags would represent to the adjacent road. No reforestation or other treatments would be implemented. As a result, the 396 acres of black-backed woodpecker habitat within the 1,095 acres of roadside corridors would be assumed 'lost' as a result of actions within this alternative.

Due to the similarity of the two alternatives, direct, indirect and cumulative effects to burned forest habitat would be as described for Alternative 2.

Cumulative Effects Conclusion - Alternative 3:

Combined, about 7,057 acres of burned forest habitat existed on both USFS and non-USFS lands within the Eiler Fire perimeter. Due to salvage harvest, it was assumed that about 2,203 acres of this habitat on non-USFS lands would be lost. On USFS lands, hazard tree abatement and personal fuelwood harvest would likely combine to remove about 396 acres of habitat along roadside corridors. Thus, under Alternative 3, actions across ownerships within the fire perimeter would cause approximately 2,599 acres of the 7,057 acres (about 37%) to be lost, leaving approximately 4,458 acres available as burned forest black-backed woodpecker habitat.

Summary of Black-backed Woodpecker Status and Trend at the Bioregional Scale

The Lassen NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the black-backed woodpecker; hence, the snags effects analysis for the Eiler Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the black-backed woodpecker. This information is drawn from the detailed information on habitat and distribution population trends in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

Ecosystem Component Status and Trend.

The current average number of medium-sized and large-sized snags (≥ 15" DBH, all decay classes) per acre across major coniferous and hardwood forest types (westside mixed conifer, ponderosa pine, white fir, productive hardwoods, red fir, eastside pine) in the Sierra Nevada ranges from 1.5 per acre in eastside pine to 9.1 per acre in white fir. In 2008, snags in these forest types ranged from 1.4 per acre in eastside pine to 8.3 per acre in white fir (USDA Forest Service 2008).

Data from the early-to-mid 2000s were compared with the current data to calculate the trend in total snags per acre by Regional forest type for the 10 Sierra Nevada national forests and indicate that, during this period, snags per acre increased within westside mixed conifer (+0.76), white fir (+2.66), productive hardwoods (+0.35), and red fir (+1.25) and decreased within ponderosa pine (-0.16) and eastside pine (-0.14).

Detailed information by forest type, snag size, and snag decay class can be found in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a).

In the spring of 2014 a regional analysis was conducted to estimate the amount of burned forest black-backed woodpecker habitat on forested lands that burned from 2006 to 2013. The region is in the process of updating this information to include wildfires that burned in 2014. Included in this analysis were burned timber removal activities that occurred in 2006 to 2013, as well as burned timber removal activity proposed to occur in 2014 within areas that burned previously. The analysis showed that during this time frame, wildfires on USFS lands resulted in approximately 180,823 acres of black-backed woodpecker habitat. Of these acres, 21 percent (37,727 acres) had been, or were proposed to be, treated with post-fire timber removal. The estimates for all lands (regardless of landowner) showed that wildfires resulted in about 243,251 acres of black-backed woodpecker habitat, of which 31 percent (74,490 acres) had been, or were proposed to be, treated with post-fire timber removal. Combined, an estimated 168,761 acres of untreated burned forest black-backed woodpecker habitat suitable for black-backed woodpeckers was created by wildfires that burned from 2006 to 2013.

This value for treated acres on all lands is likely an overestimate because it includes the assumption that all "other lands" (non-FS and non-NPS) are harvested following a fire. The value for treated acres on FS lands may be an overestimate because it was assumed that if an area is marked as a roadside hazard treatment salvage area, that the entire polygon was treated; however, sometimes only a portion of the polygon may be treated on the ground. Moreover, the percent treated values for all lands is likely missing fires that occurred exclusively on NPS land due to lack of access to data on fires that occurred exclusively on NPS lands. An increase in fires on NPS lands would likely increase the amount of habitat available to woodpeckers and lead to an overall decrease in the percent treated on all lands.

Population Status and Trend.

Monitoring of the Black-backed Woodpecker across the 10 National Forests in the Sierra Nevada has been conducted in partnership with The Institute for Bird Populations (IBP) (Forest Service 2010a, http://www.birdpop.org/pages/blackBackedWoodpecker.php). The project began with a pilot study in 2008,

(Siegel et al. 2008) and has subsequently been implemented fully in 2009-2014 (Siegel et al. 2010, 2011, 2012, 2014a, 2014b and *in preparation*). Surveys of randomly selected fire areas 1-10 years post-fire have generally yielded Black-backed Woodpecker detections at around half (min = 47% in 2013; max = 75% in 2012) of the fires surveyed, and around 20% of the individual survey points surveyed (Table 1).

During the years of full survey implementation (2009-2013), Black-backed Woodpeckers were detected in fire areas on all ten National Forest units surveyed in 2011 through 2013, and on all National Forest units surveyed except for Sierra National Forest in 2009 and 2010. These data indicate a stable population distribution in the Sierra Nevada in which black-backed woodpeckers continue to be distributed across the 10 National Forests in the study area (ranging from the Modoc National Forest in the north to the Sequoia National Forest to the south). A recent report (Siegel et al. 2014) summarizes the MIS monitoring of Black-backed Woodpeckers from 2009-2013 across the ten Sierra Nevada national forests and found that (page 2), "At this time there is no evidence of a temporal trend in occupancy rates during the five years (2009-2013) we have been monitoring Black-backed Woodpeckers on National Forests in California, or of a broad scale change in the species' distribution in California. Although the distribution of the species appears to change slightly from year to year, Black-backed Woodpeckers remain present across their historic range in California." Data for 2014 are still being analyzed.

Table 1. Number of fires surveyed (each with a transect of 10-20 survey points), fires with Black-backed Woodpecker detections, points surveyed, and points with Black-backed Woodpecker detections during each year of MIS surveys for Black-backed Woodpecker.

Year	No. of Fires Surveyed	No. (Percent) of Fires with Black-backed Woodpecker Detections	No. of Points Surveyed	No. (Percent) of Points with Black-backed Woodpecker Detections
2008[1]	19	10 (53%)	371	68 (18%)
2009	51	28 (55%)	899	169 (19%)
2010	49	29 (59%)	860	132 (15%)
2011	50	24 (48%)	895	148 (17%)
2012	52	39 (75%)	953	207 (22%)
2013	53	25 (47%?)	1008	217 (22%)

[1]Pilot study in which methods differed slightly from methods in subsequent years.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Black-Backed Woodpecker Trend.

The proposed action of the Eiler Fire Salvage and Restoration Project would result in a loss of approximately 3,708 acres (52%) of the 7,057 acres of burned forest black-backed woodpecker habitat created by the Eiler Fire, leaving approximately 3,349 acres (48%) available as burned forest habitat. Of the acres estimated to be lost, approximately 2,203 acres would be due to actions on non-USFS lands, and about 1,505 acres on USFS lands would be impacted by treatments on USFS lands. This reduction of less than 4,000 acres of burned forest black-backed woodpecker habitat would not alter the existing trend in this ecosystem component, nor would it lead to a change in the distribution of black-backed woodpecker across the Sierra Nevada bioregion, given that from 2006 to 2013 wildfires created an estimated 168,761 acres of burned forest, black-backed woodpecker habitat.

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