Management Indicator Species Report

MOONLIGHT AND WHEELER FIRES RECOVERY & RESTORATION PROJECT

Mt. Hough Ranger District

Plumas National Forest

Prepared by:

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1. Introduction

The purpose of this report is to evaluate and disclose the impacts of the Moonlight and Wheeler Fires Recovery & Restoration Project (Moon-Wheeler Project) on the thirteen (13) Management Indicator Species (MIS) identified in the Plumas National Forest (NF) Land and Resource Management Plan (LRMP) (USDA 1988) as amended by the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (USDA 2007). This report documents the effects of the proposed action and alternatives on the habitat of selected MIS. Detailed descriptions of the Moon-Wheeler Project alternatives are found in Chapter 2 of the Moonlight and Wheeler Fires Recovery & Restoration Project Revised Final Environmental Impact Statement (USDA 2009a).

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). The current rule applicable to project decisions is the 2004 Interpretive Rule, which states "Projects implementing land management plans…must be developed considering the best available science in accordance with §219.36(a)…and must be consistent with the provisions of the governing plan." (Appendix B to §219.35). Guidance regarding MIS set forth in the 1988 Plumas 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 1988 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 Plumas NF LRMP as amended by the SNF MIS Amendment ROD identifies distribution population monitoring for an MIS, the project-level 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 1988 Plumas NF LRMP, as amended, for MIS analyzed for the Moon-Wheeler 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 that 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" (USDA 2006a). This MIS Report documents application of the above steps to select and analyze MIS for the Moon-Wheeler Project.

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

The bioregional scale monitoring strategy for the Plumas NF's MIS is found in the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (ROD) of 2007. 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 Sierra Nevada Forests Bioregional Management Indicator Species (SNF Bioregional MIS) Report (USDA 2008).

- **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 2007).

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 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 SNF Bioregional MIS Report (USDA 2008).

Habitat status is the current amount of habitat on the Sierra Nevada Forests. Habitat trend is the direction of change in the amount of habitat over time. The methodology for assessing habitat status and trend is described in detail in the SNF Bioregional MIS Report (USDA 2008).

- **MIS Population Status and Trend.**

All population monitoring data are collected and/or compiled at the bioregional scale and consistent with the LRMP as amended by the 2007 SNF MIS Amendment ROD (USDA 2007). The information is presented in detail in the 2008 SNF Bioregional MIS Report (USDA 2008).

Population monitoring strategies for MIS of the Plumas NF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment ROD (USDA 2007). 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 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 2007). 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 analyzed to track changes in distribution over time vary by species and the type of presence data collected, as described in SNF Bioregional MIS Report (USDA 2008).

- Aquatic Macroinvertebrate Status and Trend

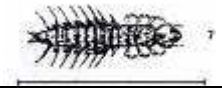
For aquatic macroinvertebrates, condition and trend is determined by analyzing macroinvertebrate data using the predictive, multivariate River Invertebrate Prediction And Classification System (RIVPACS) (Hawkins 2003) to determine whether the macroinvertebrate community has been impaired relative to 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 Plumas NF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA 2007).

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 Moon-Wheeler Project (4th column).

Table 1. Selection of MIS for Project-Level Habitat Analysis for the Moon-Wheeler 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 	3
Shrubland (west-slope chaparral types)	montane chaparral (MCP), mixed chaparral (MCH), chamise-redshank chaparral (CRC)	fox sparrow *Passerella iliaca* 	3
Oak-associated Hardwoods & Hardwood/conifers	montane hardwood (MHW), montane hardwood-conifer (MHC)	mule deer *Odocoileus hemionus* 	3
Riparian	montane riparian (MRI), valley foothill riparian (VRI)	yellow warbler *Dendroica petechia* 	3
Wet Meadow	Wet meadow (WTM), freshwater emergent wetland (FEW)	Pacific tree frog *Pseudacris regilla* 	3
Early Seral Coniferous	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* 	3
Mid Seral Coniferous	ponderosa pine (PPN),	mountain quail	2

	Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 4, all canopy closures	*Oreortyx pictus* 	
Late Seral Open Canopy Coniferous	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* 	3
Late Seral Closed Canopy Coniferous	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
		northern flying squirrel *Glaucomys sabrinus* 	3
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 analysis area and would not be affected by the project.
Category 2: MIS whose habitat is in or adjacent to analysis 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.

All species in Table 1 have been identified as Category 3. The CWHR type defining the habitat or ecosystem component represented for yellow warbler, Pacific tree frog, sooty grouse, California spotted owl, Northern flying squirrel, and hairy woodpecker, although present in low quantities within the analysis area and/or present adjacent to the analysis area, would not be directly affected by the removal of dead or hazard trees by helicopter or tractor yarding and subsequent reforestation. It is determined that indirect and cumulative effects are possible, primarily due to the effects of wildfire in combination with the present project and future actions. The proposed action and action alternatives propose to treat coniferous forest areas that have burned at high/moderate severity demonstrating >50% basal area mortality. There may be instances where individual live trees may be cut for safety purposes or to facilitate access to harvest fire-killed trees. These instances are expected to be rare and impacts to existing live tree stands minimal. Therefore, the project would not directly affect the following CWHR types: mid seral coniferous in all canopy covers size 4 trees, late seral closed canopy coniferous in all canopy covers size 5 trees, or medium and large snags in green forest. In addition, based on the proposed action and action alternatives, no direct effects would occur to the following CWHR types: Montane Riparian (MRI), Valley Foothill Riparian (VRI), Wet meadow (WTM), or Freshwater Emergent Wetland (FEW).

The MIS whose habitat would be either directly or indirectly affected by the Moon-Wheeler 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 Moon-Wheeler Project are all species listed in Table 1.

3. 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 2007) identifies bioregional scale habitat and/or population monitoring for the Management Indicator Species for ten National Forests including the Plumas NF (USDA 2007). The habitat and/or population monitoring requirements for Plumas NF's MIS are described in the Sierra Nevada Forests Bioregional Management Indicator Species (SNF Bioregional MIS) Report (USDA 2008) and are summarized below for the MIS being analyzed for the Moon-Wheeler Project. The applicable habitat and/or population monitoring results are described in the SNF Bioregional MIS Report (USDA 2008) and are summarized in Section 5 below for the MIS being analyzed for the Moon-Wheeler Project.

Habitat monitoring at the bioregional scale is identified for all the habitats and ecosystem components, including the following analyzed for the Moon-Wheeler Project: Riverine/lacustrine; shrubland; 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.

Bioregional Monitoring for aquatic macroinvertebrates: Index of Biological Integrity (IBI) and habitat condition and trend are measured by collecting aquatic macroinvertebrates, and analyzing the resulting data using the 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. In addition, stream habitat features are measured according to the Stream Condition Inventory (SCI) manual (Frasier et al. 2005).

Population monitoring at the bioregional scale for fox sparrow, mule deer, yellow warbler, Pacific tree frog, mountain quail, blue grouse, California spotted owl, 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 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 SNF Bioregional MIS Report (USDA 2008) for details by habitat and MIS.

4. Description of Proposed Project.

The **Proposed Action (Alternative A)** would harvest fire-killed and fire-injured conifer trees from 14,755 acres within the analysis area. This includes approximately 4,389 acres of roadside hazard timber harvest. Specifically, merchantable trees (>16 inches dbh) would be felled, lopped and limbed, and removed utilizing helicopter logging systems and skyline logging systems on 6,219 acres. Within salvage units, merchantable fire-killed trees (>14 inches dbh) would be felled on 4,147 acres using ground-based logging systems. Trees less than 14 inches dbh within these units would be removed as biomass product. Within roadside hazard units, hazard trees greater than 10 inches dbh would be removed as sawlog product and hazard trees less than 10 inches dbh would be removed as a biomass product Temporary road construction of approximately 19 miles would occur with this action. Fourteen helicopter service landings would be constructed. Temporary roads and landings would be decommissioned, mulched or subsoiled afer project implementation. Reforestation, involving site prep and planting native conifer seedlings would occur across 16,006 acres of the analysis area. A detailed description of each action of the proposed action, including snag retention design, is in Chapter 2 of the Moon-Wheeler Project RFEIS (USDA 2009a).

Project Design standards for all action alternatives include standards & guidelines identified in Table 2 of the Supplemental SNFPA (2004) Record of Decision, and the use of limited operating periods identified in Table 2.3, HFQLG FEIS (1999).

The **No Action Alternative (Alternative B)** would not implement the above actions to achieve the stated objectives. There would be no removal of dead trees, no removal of roadside hazard trees, no road construction/reconstruction, and no site prep or reforestation.

Action alternative C of the Moon-Wheeler Project would harvest fire-killed and fire-injured conifer trees from 8,536 acres within the analysis area. This includes approximately 4,389 acres of roadside hazard timber harvest. Within salvage units, merchantable trees (>14 inches dbh) would be felled on 4,147 acres using ground-based logging systems. Trees less than 14 inches dbh within these units would be removed as biomass product. Within roadside hazard units, hazard trees greater than 10 inches dbh would be removed as sawlog product and hazard trees less than 10 inches dbh would be removed as a biomass product. Temporary road construction of approximately 18 miles would occur with this action. Temporary roads would be decommissioned, mulched or subsoiled afer project implementation. Reforestation, involving site prep and planting native conifer seedlings would occur across 9,306 acres of the analysis area.

Action alternative D of the Moon-Wheeler Project would harvest fire-killed and fire-injured conifer trees from 5,656 acres within the analysis area. This includes approximately 4,389 acres of roadside hazard timber harvest. Within salvage units, merchantable trees (>14 inches dbh) would be felled on 1,267 acres using ground-based logging systems. Trees less than 14 inches dbh within these units would be removed as biomass product. Within roadside hazard units, hazard trees greater than 10 inches dbh would be removed as sawlog product and hazard trees less than 10 inches dbh would be removed as a biomass product. Temporary road construction of approximately 3 miles would occur with this action. Temporary roads would be decommissioned, mulched or subsoiled afer project implementation. Reforestation, involving site prep and planting native conifer seedlings would occur across 16,006 acres of the analysis area.

Action alternative E includes roadside hazard timber harvest and reforestation. Alternative E does not include salvage timber harvest or access activities. No new roads, skid trails, or landings would be constructed. Approximately 4,389 acres would be treated for roadside hazard removal. Hazard trees greater than 10 inches dbh would be removed as sawlog product and hazard trees less than 10 inches dbh would be removed as a biomass product. Reforestation, involving site prep and planting native conifer seedlings would occur across 16,006 acres of the analysis area.

Analysis Area: The **analysis area** is defined as the 87,647 acre area where the Moonlight and Antelope Complex fires burned with the exception of 82 acres of spot fires which occurred outside of the main fire perimeters. Forest Service (FS) lands make up 68,408 acres or 78% of the analysis area. The analysis area is located in predominately Sierra mixed conifer forest habitat ranging in elevation from 3,800 feet in the North Arm

of Indian Valley to 7,500 feet at the top of Eisenheimer Peak The analysis area is largely along the cusp of the Transition and Eastside ecological zones (USDA 1999).

The Moonlight and Wheeler Fire perimeter (87,647 acres) was chosen as the analysis area for the following reasons: 1) Proximity and adjacency of these two fires and similar severity effects has had a major effect on the landscape. 2) The proposed actions would treat and modify burned areas only. Therefore, selection of the total area that burned within both fires for analysis provides a more appropriate context for reasonable determination of effects to habitat (and the species associated with this habitat) proposed for treatment. 3) Relevant cumulative effects, particularly other projects that have or will treat burned habitat resulting from the two fires, are more effectively addressed. 4) The impacts to habitat as a result of the wildfires and the effects from cumulative actions within this burned landscape are not diluted by expanding the analysis area boundary to include larger parcels of unburned habitat outside the wildfire boundary.

For the purpose of the wildlife analysis, the temporal bounds include a 30-year horizon for future effects because modeling indicates that, within 30 years, the treated stands would approach stocking levels corresponding with forest development (i.e. young forested stands could develop within this timeframe). General trends and trajectories of stand development that extends beyond this timeframe are discussed in this analysis to document when habitat conditions suitable for specific species will likely be reached.

Forest-wide vegetation typing into California Wildlife Habitat Relationships (CWHR) habitat classifications was done for the Plumas-Lassen Administrative Study in 2002 (Vestra, 2002). This vegetation layer was updated after various fires (including the 2001 Stream fire within the analysis area) and in 2008 updated again to reflect the Antelope Complex fires. Existing updated Vestra maps, vegetation severity maps and 2007 infra-red aerial photos were used to generate the post fire vegetation map used for this analysis (Veg Mgt Solutions).

The updated layer produced by this typing is used in this analysis. All vegetation information is displayed using the California Wildlife Habitat Relationships (CWHR) vegetation codes and serves as the baseline acres for analysis. Table 2 summarizes the CWHR types within the analysis area. Other sources of information used in the assessment of effects were aerial photos, burn severity maps generated from satellite imagery, data generated from common stand exam plots and field reconnaissance.

Table 2: Summary of CWHR acres within Analysis Area; from VESTRA 2002, updated with Fire Severity maps and 2007 aerial photography (public land only).

CWHR Type*	Pre-fire	Post Fire (first five years)	CWHR Type	Pre-Fire	Post Fire (first five years)	CWHR Type	Pre-Fire	Post Fire (first five years)
SMC1	23	57	RFR3M	5	0	EPN4P	1961	1861
SMC2S	1400	103	RFR4S	2	33	EPN4M	928	325
SMC2P	45	36	RFR4P	51	102	EPN4D	107	42
SMC2M	0	2	RFR4M	136	41	EPN5S	0	59

SMC2D	138	0	RFR4D	6	0	EPN5P	14	29
SMC3S	264	407	RFR5P	18	0	EPN5M	100	42
SMC3P	120	146	RFR5M	38	0	EPN5D	42	
SMC3M	111	31	PPN1	0	23	JPN5M	0	20
SMC3D	151	4	PPN2S	1052	199	LPN3P	0	1
SMC4S	551	3081	PPN2P	90	7	LPN3M	0	6
SMC4P	3469	6416	PPN2M	0	3	LPN3D	0	11
SMC4M	12529	1674	PPN3S	130	140	LPN4S	2	5
SMC4D	1313	149	PPN3P	542	116	LPN4P	0	19
SMC5S	84	187	PPN3M	571	0	LPN4M	0	11
SMC5P	899	403	PPN4S	199	427	LPN4D	8	
SMC5M	10211	296	PPN4P	575	757	LPN5P	0	3
SMC5D	3171	91	PPN4M	1358	176			
WFR2S	104	19	PPN4D	171	5	AGS	221	810
WFR3S	317	146	PPN5S	25	18	ASP	851	472
WFR3P	75	33	PPN5P	163	24	MCP	1338	39023
WFR3M	103	1	PPN5M	77	0	MHC	5	11
WFR3D	53	0	EPN1	33		MHW	1733	1214
WFR4S	799	1204	EPN2S	33	22	MRI	438	532
WFR4P	1967	3785	EPN2P	0	5	PGS	7	339
WFR4M	8775	938	EPN2M	26		SGB	188	132
WFR4D	1325	90	EPN3S	0	21	WTM	690	171
WFR5S	39	4	EPN3P	397	176	ROCK	192	242
WFR5M	4827	147	EPN3M	71		BAR	0	98
WFR5D	537	6	EPN3D	0	5			
RFR3P	50	23	EPN4S	284	1094			
						Total	68408	68408

*1 = seedling tree <1" dbh, 2 = Sapling tree 1-6" dbh, 3 = Pole tree 6-11" dbh, 4=small 11-24"dbh, 5=medium/large >24"dbh.
D= Dense Canopy Cover > 60%, M= Moderate Canopy 40-59%, SMC=Sierra Mixed Conifer, PPN = Ponderosa Pine, WFR = White Fir, EPN = Eastside Pine, RFR = Red Fir, MHC = Montane Hardwood Conifer, MHW = Montane HardwoodPGS = Perennial Grassland, MCP = Montane Chaparral, MRI = Montane Riparian, WAT = Water, WTM = Wet Meadow.

Table 3 indicates the following: 1) As a result of the wildfire, within the analysis area, 97 percent of the late seral closed canopy habitat (CWHR 5M, 5D) was consumed by wildfire (19,003 acres reduced to 602 acres); 2) a large majority of CWHR 4 and 5 stands were converted to non-forested vegetation types that are expected to be dominated by brush; 3) 519 acres of wet meadow were either converted to dry meadow (expressed as PGS) or some other CWHR type as a result of more precise mapping of this particular type; 4) losses in aspen habitat actually resulted from more precise mapping of this particular type; no aspen loss is anticipated as a result of wildfire or project actions.

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: aquatic macro invertebrates**,** fox sparrow, mule deer, yellow warbler, Pacific tree frog, mountain quail, sooty grouse, California spotted owl, northern flying squirrel, hairy woodpecker, and black-backed woodpecker**.** The analysis of the effects of the Moon-Wheeler Project on the MIS habitat for the selected project-level MIS is conducted at the project scale. The analysis used the following habitat data**:** Forest wide vegetation typing

into CWHR habitat classifications was done for the Plumas-Lassen Administrative Study in 2002 (Vestra, 2002). This vegetation layer was updated after the Moonlight and Antelope Complex fires using vegetation severity maps and 2007 aerial photos (Veg Mgt Solutions). Detailed information on the MIS is documented in the SNF Bioregional MIS Report (USDA 2008), which is hereby incorporated by reference.

For macroinvertebrate analysis, rapid bioassessment data collected within the analysis area has been analyzed to determine local biotic conditions. Stream Condition Inventory data was also analyzed to determine the pre-fire condition of streams within the analysis area.

Cumulative effects at the bioregional scale are tracked via the SNF MIS Bioregional monitoring, and detailed in the SNF Bioregional MIS Report (USDA 2008).

Lacustrine/Riverine Habitat (Aquatic Macroinvertebrates)

Project analysis for this MIS was completed by Tina Hopkins, Plumas NF Fisheries Biologist and can be found in a separate report in the project record titled: Aquatic Management Indicator Species Report, Moonlight and Wheeler Fires Recovery and Restoration Project.

Shrubland (West-Slope Chaparral) Habitat (Fox Sparrow)

Habitat/Species Relationship.
The fox sparrow was selected as the MIS for shrubland (chaparral) habitat on the west-slope of the Sierra Nevada, comprised of montane chaparral (MCP), mixed chaparral (MCH), and chamise-redshank chaparral (CRC) as defined by the California Wildlife Habitat Relationships System (CWHR) (CDFG 2005). Recent empirical data from the Sierra Nevada indicate that, in the Sierra Nevada, the fox sparrow is dependent on open shrub-dominated habitats for breeding. The empirical data include six years of point count vegetation data and analysis from the Lassen National Forest (Burnett and Humple 2003) and analysis of the 2002-2006 data from the Plumas-Lassen Study (Sierra Nevada Research Center 2007).

Project-level Effects Analysis - Shrubland (West-Slope Chaparral) Habitat

> **Habitat Factor(s) for the Analysis:** (1) Acres of shrubland (chaparral) habitat [CWHR montane chaparral (MCP), mixed chaparral (MCH), and chamise-redshank chaparral (CRC)]. (2) Acres with changes in shrub ground cover class (Sparse=10-24%; Open=25-39%; Moderate=40-59%; Dense=60-100%) . (3) Acres with changes in CWHR shrub size class (Seedling shrub (seedlings or sprouts <3years); Young shrub (no crown decadence); Mature Shrub (crown decadence 1-25%); Decadent shrub (>25%) **{note:** all classes described above can be lumped if needed}.

Current Condition of the Habitat Factor(s) in the Analysis Area: There is no chamise-redshank chaparral (CRC) or mixed chaparral habitat (MCH) in the project area. Very little montane chaparral (MCP) was present prior to the Moonlight and Antelope Complex fires, but most of the high and moderate severity burned sites burnt at an intensity that resulted (or will result) in the sites dominated by shrub species consistent with montane chaparral. Thus post fire vegetation within the project area resulted in a large increase in this habitat post wildfire (Tables 2 and 4). All classes as described have been lumped, but it is assumed that in the post-fire five year period identified in Table 2 that MCP will be in either young seedling or young shrub (CWHR 1 or 2). Prior to the fire, MCP made up about 2 percent of the vegetative component within the analysis area (NF lands); post fire MCP makes up about 57 percent.

Table 4: Summary of MCP acres within Analysis Area; from VESTRA 2002, updated with Fire Severity maps and 2007 aerial photography (all acres are approximate and all are National Forest).

CWHR Type	Pre-Fire	Post Fire (first five years)	Post Project Alt A	Post Project Alt C	Post Project Alt D	Post Project Alt E
MCP	1,338	39,023*	23,017 *	29,717 *	23,017 *	23,017 *

*39,023 acres reflects no reforestation by project (Alt B); 23,017 acres reflects reforestation, as proposed, on 16,006 acres (Alt A, D, E), 29,717 acres reflects reforestation, as proposed, on 9,306 acres (Alt C).

Action Alternatives (A, C, D, E) Direct and Indirect Effects to Habitat.

Dead tree removal will not directly result in any direct change in the amount of MCP within the project area. Alternatives A, D, and E would reforest 16,006 acres and alternative C would reforest 9,306 acres, all of which is considered MCP. Thus after reforestation, MCP would be classified as SMC1 and within a couple years be SMC 2. Both of these habitat types function similar to MCP but because they will be plantations, they could be subject to actions that release seedlings (such as grubbing, brush mastication, and pre-commercial thinning) that would accelerate the development into pole size conifer habitat (SMC 3). Thus there would be a 16,006 acre reduction in the existing MCP under alternatives A, D, and E and a 9,306 acre reduction under alternative C. This would leave approximately 23,017 (Alts A, D, E) to 29,717 (Alt C) acres of MCP present in the analysis area, which is an increase from pre-fire conditions of 21,679 to 28,379 acres. Thus between 34 and 43 percent of the analysis area would remain in MCP post dead tree removal/reforestation.

Review of the Plumas NF database, district files and vegetation mapping reveals that fox sparrow habitat is distributed across the entire project area. Although not specifically identified as CWHR type MCP, based on localized information, early seral brush component of ponderosa pine and sierra mixed conifer (PPN and SMC) provides transitory habitat for fox sparrows for several years after a stand replacing wildfire. Thus the 9,306 to 16,006 acres proposed for reforestation and planned for conversion from MCP to SMC1 would still provide some habitat for fox sparrow until the planted seedlings emerge from the brush and dominate the site.

Cumulative Effects to Habitat in the Analysis Area. Past, present, and reasonably foreseeable future actions affecting the habitat in the analysis area have been identified in Appendix B of the Moon-Wheeler project RFEIS.

Reforestation of national forest lands where no salvage harvest is proposed began within the analysis area in spring 2008. A combination of wide spaced cluster planting in the Antelope Lake and Babcock Peak areas and square-spaced planting in the Camp 14 area occurred within areas of high fire severity accounting for a total of approximately 1,200 acres planted in 2008. Up to 7,000 acres of reforestation in unsalvaged areas are currently being planned for spring 2009 and 2010 across the Mt. Hough and Beckwourth Ranger Districts; these additional acres of reforestation would also occur in unsalvaged areas of the fire including old plantations and natural stands. The net cumulative effect would be the enhanced establishment of conifer seedlings across the analysis area in order to re-establish forested conditions. An additional reforestation project, the Frazier Cabin project, located on the Beckwourth Ranger District, is planned for 2009 and proposes to plant 203 acres. No fire-killed tree removal is planned with these two projects.

Therefore, as a result of reforestation, an additional 8,403 acres of MCP would be converted to SMC 1 and SMC 2, resulting in less MCP within the analysis area. Cumulatively MCP could decline from 39,023 acres post fire to 14,614 acres (Alt A, D, E) or 21,314 acres (Alt C) after all reforestation is complete.

Private lands account for 19,239 acres within the analysis area. Post-fire mapping indicates there is an additional 13,371 acres of MCP on these private lands. To date, 11,454 private acres have been or is planned to be salvaged. It is reasonably assumed based on state forest practice regulations and private timber practices that these and any other additional private land salvage areas would be re-planted and managed for maximizing tree growth, thus resulting in a cumulative reduction in MCP across the analysis area.

> **Cumulative Effects Conclusion:** The wildfire resulted in an increase in MCP within the analysis area of 37,685 acres. The direct/indirect and cumulative effects of reforestation on FS lands will result in 24,409 acres (Alts A, D, E) or 17,709 acres (Alt C) being converted to conifer plantation, or SMC 1 and SMC2, resulting in 14,614 acres (Alt A, D, E) or 21,314 acres (Alt C) of MCP present within the analysis area with no plans for future management actions. Thus over the long term FS land within the analysis area would support more MCP than prior to the fire (21 percent of the analysis area under Alts A, D, and E, 31 percent of the analysis area under Alt C).

Alternative B (No Action): None of the MCP habitat created by wildfire would be converted to conifer plantation (SMC 1 and SMC2). Thus there would be no short term conversion or loss of this habitat. Over time, with natural regeneration, some MCP would gradually be lost to conifer succession, especially on north aspects and productive sites. Overall there would be a long term net gain in MCP habitat within the analysis area. MCP would be the dominant vegetation, occupying 57% of the analysis area.

Cumulative Effects to Habitat in the Analysis Area. Reforestation of national forest lands where no salvage harvest is proposed began within the analysis area in

spring 2008. A combination of wide spaced cluster planting in the Antelope Lake and Babcock Peak areas and square-spaced planting in the Camp 14 area occurred within areas of high fire severity accounting for a total of approximately 1,200 acres planted in 2008. Up to 7,000 acres of reforestation in unsalvaged areas are currently being planned for spring 2009 and 2010 across the Mt. Hough and Beckwourth Ranger Districts; these additional acres of reforestation would also occur in unsalvaged areas of the fire including old plantations and natural stands. The net cumulative effect would be the enhanced establishment of conifer seedlings across the analysis area in order to re-establish forested conditions. An additional reforestation project, the Frazier Cabin project, located on the Beckwourth Ranger District, is planned for 2009 and proposes to plant 203 acres. No fire-killed tree removal is planned with these two projects. Reforestation efforts should hasten restoration of large tree forest conditions that could provide CWHR 4M stands in approximately 90 years.

Therefore, due to reforestation, up to 8,403 acres of MCP would be converted to SMC 1 and SMC 2, resulting in less MCP within the analysis area. Cumulatively MCP could decline from 39,023 acres post fire to 30,620 acres after all reforestation is complete.

Private lands account for 19,239 acres within the analysis area. Post-fire mapping indicates there is an additional 13,371 acres of MCP on these private lands. To date, 11,454 private acres have been or is planned to be salvaged. It is reasonably assumed based on state forest practice regulations and private timber practices that these and any other additional private land salvage areas would be re-planted and managed for maximizing tree growth, thus resulting in a cumulative reduction in MCP across the analysis area.

> **Cumulative Effects Conclusion:** The wildfire resulted in an increase in MCP within the analysis area of 37,685 acres. There would be no direct/indirect effect to this habitat. The cumulative effects of the above reforestation projects on public lands would result in up to 8,403 acres being converted to conifer plantation, or SMC 1 and SMC2. This would reduce the amount of MCP in the analysis area from 39,023 acres to 30,620 acres. Thus over the long term the analysis area would still support 29,282 acres more MCP than prior to the fire, or 45 percent of the analysis area.

Summary of Fox Sparrow Status and Trend at the Bioregional Scale

The Plumas NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the fox sparrow; hence, the shrubland effects analysis for the Wheeler 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 fox sparrow. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 922,000 acres of west-slope chaparral shrubland habitat on National Forest System lands in the Sierra Nevada. Within the last decade, the trend is stable.

Population Status and Trend. The fox sparrow has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including: 1997 to present – Lassen National Forest (Burnett and Humple 2003, Burnett et al. 2005); 2002 to present - Plumas and Lassen National Forests (Sierra Nevada Research Center 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that fox sparrows continue to be present at these sample sites, and current data at the rangewide, California, and Sierra Nevada scales indicate that, although there may be localized declines in the population trend, the distribution of fox sparrow populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Fox Sparrow Trend. The indirect and/or cumulative effects of the Moon-Wheeler Project under all alternatives would change with time, the amount and distribution of MCP shrubland currently existing within the analysis area – a reduction to 14,614 acres under Alternatives A, D, and E (62% reduction) and a reduction to 21,314 acres under Alternative C (45% reduction) through reforestation. Montane chaparral availability and distribution after implementation of the action alternatives would remain much higher than pre-fire conditions, an increase of at least 13,000 acres. Therefore the change in the amount of shrubland habitat in the Moon-Wheeler analysis area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of fox sparrows across the Sierra Nevada bioregion.

Oak-Associated Hardwoods and Hardwood/Conifer Habitat (Mule deer)

Habitat/Species Relationship.

The mule deer was selected as the MIS for oak-associated hardwood and hardwood/conifer in the Sierra Nevada, comprised of montane hardwood (MHW) and montane hardwood-conifer (MHC) as defined by the California Wildlife Habitat Relationships System (CWHR) (CDFG 2005). Mule deer range and habitat includes coniferous forest, foothill woodland, shrubland, grassland, agricultural fields, and suburban environments (CDFG 2005). Mule deer migrate seasonally between higher elevation summer range and low elevation winter range, and on the west slope of the Sierra Nevada, oak-associated hardwood and hardwood/conifer areas are an important winter habitat.

Project-level Effects Analysis - Oak-Associated Hardwoods and Hardwood/Conifer Habitat

Habitat Factor(s) for the Analysis: (1) Acres of oak-associated hardwood and hardwood/conifer habitat [CWHR montane hardwood (MHW), montane hardwood-conifer (MHC)]. (2) Acres with changes in hardwood canopy cover (Sparse=10-24%; Open=25-39%; Moderate=40-59%; Dense=60-100. (3) Acres with changes in CWHR size class of hardwoods **[**1/2 (Seedling/Sapling)(<6"" dbh); 3 (Pole)(6"-10.9" dbh); 4 (Small tree)(11"-23.9" dbh); 5 (Medium/Large tree)(≥24" dbh); **{note:** all classes described above can be lumped if needed}.

Current Condition of the Habitat Factor(s) in the Analysis Area:
Based on CWHR, the Moon-Wheeler Project analysis area supported 1,738 acres of MHC and MHW before the Moonlight and Antelope Complex Fires and that post –fire this was reduced to 1,225 acres (being converted to MCP habitat). Montane hardwood conifer and Montane hardwood make up less than two percent of the vegetative component of the analysis area.

Table 5. Summary of MHC acres within Analysis Area; from VESTRA 2002, updated with Fire Severity maps and 2007 aerial photography (all acres are approximate and all are National Forest).

CWHR Type	Pre-Fire	Post Fire (first five years)	Post Wheeler Project
MHC, MHW	1,738	1,225	1,225

Most of the analysis area is classified as summer range for the Doyle deer herd herd (approximately 3.6% of total Doyle deer herd summer range). There is 2,358 acres within the analysis area that is winter range for the Sloat deer herd (approximately 2% of total Sloat deer herd winter range).

Action Alternatives (A, C, D, E) and the No Action Alternative (B)
Direct and Indirect Effects to Habitat.

The proposed actions of dead or hazard tree removal would not result in any changes in the quantity, quality or distribution of Oak-Associated Hardwoods (MHW) and Hardwood/Conifer (MHC) habitat. Reforestation would not occur within any MHW or MHC. Black Oak is scattered throughout the project area and with time will re-establish itself through sprout and growth. It is expected that reforestation guidelines and methodologies (see Chapter 2 of RFEIS) would result in long term availability of oak species and that some transitory MHC and MHW would manifest itself in 80 to 100 years, but the amounts of this habitat type cannot be predicted at this time.

Cumulative Effects to Habitat in the analysis area. Past, present, and reasonably foreseeable future actions affecting the habitat in the project area have been identified in the project RFEIS.

Reforestation of national forest lands where no salvage harvest is proposed began within the analysis area in spring 2008. A combination of wide spaced cluster planting in the Antelope Lake and Babcock Peak areas and square-spaced planting in the Camp 14 area occurred within areas of high fire severity accounting for a total of approximately 1,200 acres planted in 2008. Up to 7,000 acres of reforestation in unsalvaged areas are currently being planned for spring

2009 and 2010 across the Mt. Hough and Beckwourth Ranger Districts; these additional acres of reforestation would also occur in unsalvaged areas of the fire including old plantations and natural stands. The net cumulative effect would be the enhanced establishment of conifer seedlings across the analysis area in order to re-establish forested conditions. An additional reforestation project, the Frazier Cabin project, located on the Beckwourth Ranger District, is planned for 2009 and proposes to plant 203 acres. No fire-killed tree removal is planned with these two projects. Reforestation efforts should hasten restoration of large tree forest conditions that could provide CWHR 4M stands in approximately 90 years.

Cumulative Effects Conclusion: There is no direct or indirect effect to MHC or MHW by any of the action alternatives; thus there are no cumulative effects (other than the loss of 513 NF acres across the 87,647 acre analysis area due to wildfire).

Summary of Mule deer Status and Trend at the Bioregional Scale

The Plumas NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the mule deer; hence, the oak-associated hardwood and hardwood/conifer effects analysis for the Moon-Wheeler 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 mule deer. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 809,000 acres of oak-associated hardwood and hardwood/mixed conifer habitat on National Forest System lands in the Sierra Nevada. The trend is essentially stable (within the last decade, only changing from 5% to 7% of the acres on National Forest System lands).

Population Status and Trend. The mule deer has been monitored in the Sierra Nevada at various sample locations by herd monitoring (spring and fall) and hunter survey and associated modeling (CDFG 2007). California Department of Fish and Game (CDFG) conducts surveys of deer herds in early spring to determine the proportion of fawns that have survived the winter, and conducts fall counts to determine herd composition (CDFG 2007). This information, along with prior year harvest information, is used to estimate overall herd size, sex and age rations, and the predicted number of bucks available to hunt (ibid). These data indicate that mule deer continue to be present across the Sierra Nevada, and current data at the rangewide, California, and Sierra Nevada scales indicate that, although there may be localized declines in some herds or Deer Assessment Units, the distribution of mule deer populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Mule Deer Trend. The direct/indirect and cumulative effects of the Moon-Wheeler Project would not change the amount and distribution of MHC or MHW within the analysis area with dead or hazard tree removal, reforestation, or if no actions are taken. This will not alter

the existing trend in the habitat, nor will it lead to a change in the distribution of mule deer across the Sierra Nevada bioregion.

Riparian Habitat (Yellow Warbler

Habitat/Species Relationship.
The yellow warbler was selected as the MIS for riparian habitat in the Sierra Nevada. This species is usually found in riparian deciduous habitats in summer (cottonwoods, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland) (CDFG 2005). Yellow warbler is dependent on both meadow and non-meadow riparian habitat in the Sierra Nevada (Siegel and DeSante 1999).

Project-level Effects Analysis – Riparian Habitat

Habitat Factor(s) for the Analysis: (1) Acres of riparian habitat (CWHR montane riparian (MRI) and valley foothill riparian (VRI)). (2) Acres with changes in deciduous canopy cover. (3) Acres with changes in total canopy cover. (4) Acres with changes in CWHR size class size class [1/2 (Seedling/Sapling)(<6”" dbh); 3 (Pole)(6"-10.9" dbh); 4 (Small tree)(11"-23.9" dbh); 5 (Medium/Large tree)(>24" dbh **{note:** all classes described above can be lumped if needed}.

Current Condition of the Habitat Factor(s) in the Analysis Area: There is no valley foothill riparian (VRI) habitat in the analysis area. Table 6 displays the pre- and post fire amount of montane riparian (MRI) present within the project area, as derived from vestra vegetation map. All MRI has been lumped as it was not categorized with size and canopy closure information. Montane riparian makes up less than one percent of the vegetative component of the analysis area (NF lands).

Table 6. Summary of MRI acres within Analysis Area; from VESTRA 2002, updated with Fire Severity maps and 2007 aerial photography (all acres are approximate and all are National Forest).

CWHR Type	Pre-Fire	Post Fire (first five years)	Post Wheeler Project
MRI	438	532	532

Riparian vegetation is composed primarily of willow, with occasional inclusions of aspen, scattered cottonwood, and an occasional alder thicket. Riparian vegetation is not confined just to the perennial streams identified above, as willow is present along intermittent streams throughout the project area. The transition between MRI and adjacent nonriparian upland vegetation is abrupt, as the topography is steep and the MRI is confined to the narrow stream zones, expanding out a bit into alluvial areas now supporting meadow type vegetation. All this MRI, prior to the fire intergraded with sierra mixed conifer and ponderosa pine forest; post-fire it now intergrades with montane chaparral. The increase in MRI as a result of the wildfires is reflective of areas immediately adjacent to riparian sites that were classified pre-fire as non-MRI, due mainly to conifer encroachment. These areas burned at high enough intensity to set back

habitat succession and, as a result, riparian species (willows/alders/etc.) are expected to grow back quickly and become the dominant vegetation type.

Action Alternatives (A,C, D, and E)

Direct and Indirect Effects to Habitat.

All action alternatives propose to remove fire-killed or hazard trees within RHCA's. No change is expected in the amount of riparian habitat as a result of dead tree removal. No green conifers would be cut and removed, except for safety purposes or to facilitate access to harvest units. These instances are expected to be rare and impacts to existing live tree stands minimal.No riparian trees (dead or alive) would be removed, except for safety/operability. Therefore, although the project would occur within areas supporting riparian habitat, it will not result in a change from the existing condition in terms of acres of riparian habitat (CWHR montane riparian (MRI), changes in deciduous canopy cover, acres with changes in total canopy cover, or changes in acres of CWHR size class.

Reforestation with conifers would occur within RHCAs, but no planting of conifers would occur within the boundaries of the riparian habitat present at the time of planting. This could be defined as the green line, demarcated by the presence of grass/sedges growing out and away from the stream channel.

Cumulative Effects to Habitat in the Analysis Area. Past, present, and reasonably foreseeable future actions affecting the habitat in the project area have been identified appendix B of the Moon-Wheeler project RFEIS.

Two roadside safety and hazard tree removal projects (Antelope Complex on the Mt. Hough Ranger District and Dry Flat on the Beckwourth Ranger District) were implemented in 2008. These two projects removed hazard trees from approximately 3,330 acres. Removal of hazard trees from RHCAs that intersect these road corridors is expected to occur but no MRI habitat should be impacted by these actions.

There are two additional Forest Service projects currently being planned that would remove fire-killed trees within the analysis area. One is on the Beckwourth Ranger District (Camp 14 Salvage Project – 249 acres) and one falls on Lassen National Forest, Eagle Lake Ranger District (North Moonlight Salvage Project – 210 acres). These projects also propose to enter RHCAs to remove fire-killed trees but no MRI habitat should be impacted by these actions.

Private lands account for 19,239 acres within the analysis area. Post-fire mapping indicates there is an additional 183 acres of MRI on these private lands. Salvage operations, re-planting, and management on private lands is largely concentrated within timbered, non-riparian stands. Therefore, it is expected that a large amount of riparian habitat present on private acres should persist and contribute cumulatively to MRI across the analysis area.

Additional cumulative effects to MRI include past impacts to the vegetation from the Moonlight and Antelope Complex wildfires and foreseeable impacts from livestock grazing**.** The two fires burned almost all the riparian habitat within the analysis area at high to moderately high fire severity. Aspen, cottonwood, willow and alder all were consumed; most of this habitat should sprout back, although past history indicates that cottonwood may struggle to come back. Photo plots taken in burned aspen areas of the Stream Fire indicate that within one year post fire aspen sprout is 2-3 feet tall and within 5 years these sprouts exceed 10 feet. In the Antelope Complex Fire, willow was sprouting in some areas one month after the burn. Most riparian has been set back to early seral, and should be once again functioning as habitat and microhabitat for riparian species. Mature aspen will be back in 30-50 years. Removal of dead trees from riparian areas should not add cumulatively to the succession or development of MRI.

Within the nine active grazing allotments in the fire perimeters there is expected to be minimal impacts to critical riparian areas due to the following reasons: 1) cows did not graze burned areas in 2008, the season after the wildfires, therefore riparian vegetation have had a full year of rest to resprout, 2) the increase in transitory (upland) range 2-5 years after the fires may take some grazing pressure off of the meadows and riparian areas with a flush of dryland grass/forbs that livestock may find palatable, and 3) long term recovery will be unimpeded through strict adherence to use standards which are: 20% willow use, 20% aspen use, 20% bank alteration, and 50% meadow use.

Cumulative Effects Conclusion: The direct/indirect and cumulative effect of dead or hazard tree removal and reforestation would not change the existing amount of montane riparian habitat present in the analysis area, would not result in any reduction in deciduous canopy closure, no change in size class of existing riparian vegetation. Live tree removal (deciduous or coniferous) would be incidental and would have no significant effects on suitable habitat for this species. Thus the amount of total live tree canopy cover would not be reduced. This action will not alter the existing trend in the habitat.

Alternative B (No Action)

Selection of this alternative would not authorize any federal actions and therefore no direct or indirect effects would result. Therefore, there would be no direct or indirect impacts to montane riparian habitat. As a result, existing riparian and yellow warbler habitat conditions would not change from management actions but could improve over time as riparian growth recovers with time.

Summary of Yellow Warbler Status and Trend at the Bioregional Scale

The Plumas NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the yellow warbler; hence, the riparian habitat effects analysis for the Wheeler 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 yellow warbler. This information

is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 29,000 acres of riparian habitat on National Forest System lands in the Sierra Nevada. Within the last decade, the trend is stable.

Population Status and Trend. The yellow warbler has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including Lassen NF (Burnett and Humple 2003, Burnett et al. 2005) and Inyo NF (Heath and Ballard 2003) point counts; California Partners in Flight monitoring and studies; and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that yellow warblers continue to be present at these sample sites, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of yellow warbler populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Yellow Warbler Trend. The direct/indirect and cumulative effects of the Moon-Wheeler Project would not change the amount and distribution of riparian vegetation within the Wheeler Project Area. Dead or hazard tree removal and reforestation will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of yellow warbler across the Sierra Nevada bioregion.

Wet Meadow Habitat (Pacific tree frog)

Habitat/Species Relationship.
The Pacific tree frog was selected as an MIS for wet meadow habitat in the Sierra Nevada. This broadly distributed species requires standing water for breeding; tadpoles require standing water for periods long enough to compete aquatic development, which can be as long as 3 or more months at high elevations in the Sierra Nevada (CDFG 2005). During the day during the breeding season, adults take cover under clumps of vegetation and surface objects near water; during the remainder of the year, they leave their breeding sites and seek cover in moist niches in buildings, wells, rotting logs or burrows (ibid).

Project-level Effects Analysis – Wet Meadow Habitat

Habitat Factor(s) for the Analysis: (1) Acres of wet meadow habitat [CWHR wet meadow (WTM) and freshwater emergent wetland (FEW)]. (2) Acres with changes in CWHR herbaceous height classes [short herb (<12”), tall herb (>12”)]. (3) Acres with changes in CWHR herbaceous ground cover classes (Sparse=2-9%; Open=10-39%; Moderate=40-59%; Dense=60-100%)**{note:** all classes described above can be lumped if needed}. (4) Changes in meadow hydrology.

Current Condition of the Habitat Factor(s) in the Analysis Area: There is no habitat classified as freshwater emergent (FEW) in the project area. Table 7 displays the pre- and post fire amount of wet meadow (WTM) present within the

analysis area, as derived from vestra vegetation map. All WTM has been lumped as it was not categorized with size and canopy closure information. Wet meadow habitat makes up less than one percent of the analysis area.

Table 7. Summary of WTM acres within analysis area; from VESTRA 2002, updated with Fire Severity maps and 2007 aerial photography (all acres are approximate and all are National Forest).

CWHR Type	Pre-Fire	Post Fire (first five years)	Post Wheeler Project
WTM	690	171	171

The reduction in WTM reflected post fire is a result of converting WTM to perennial grassland (PGS) or dry meadow. This is more a result of reclassification of meadow system than an actual change brought about by wildfire.

Action Alternatives (A, C, D, and E)

Direct and Indirect Effects to Habitat. Project actions propose to remove dead or hazard trees within RHCA's, which could include meadow edges, but no change is expected in the amount of wet meadow habitat as a result of these tree removal actions. Live tree removal (deciduous or coniferous) would be incidental and would have no significant effects on suitable habitat for this species. Therefore, although the project would occur within areas supporting wet meadow habitat, it will not result in a change from the existing condition in terms of acres of wet meadow habitat (CWHR WTM), no changes in CWHR herbaceous height classes, changes in herbaceous ground cover classes, or changes in meadow hydrology.

Cumulative Effects to Habitat in the Analysis Area. Past, present, and reasonably foreseeable future actions affecting the habitat in the project area have been identified in appendix B of the Moon-Wheeler project RFEIS.

There could be some changes in meadow hydrology due to the lack of upland trees. As a result of the wildfire, the amount of green trees present in the upland has been reduced to near zero in high severity burn areas. This lack of live vegetation could result in more surface and ground water available to sustain wet meadow conditions longer throughout the late summer and fall. Over time, as the brush growth increases and as seedling conifers establish and grow, less ground and surface water would be available within the meadows. Thus in the next 10+ years, meadow systems may support more surface and groundwater for longer periods of time, sustaining the wet meadow component.

Within the nine active grazing allotments in the fire perimeters there is expected to be minimal impacts to critical riparian areas due to the following reasons: 1) cows did not graze burned areas in 2008, the season after the wildfires, therefore riparian vegetation have had a full year of rest to resprout, 2) the increase in transitory (upland) range 2-5 years after the fires may take some grazing pressure off of the meadows and riparian areas with a flush of dryland grass/forbs that

livestock may find palatable, and 3) long term recovery will be unimpeded through strict adherence to use standards which are: 20% willow use, 20% aspen use, 20% bank alteration, and 50% meadow use..

Cumulative Effects Conclusion: The direct/indirect and cumulative effect of dead or hazard tree removal and reforestation would not change the existing amount of wet meadow habitat present in the project area, would not alter amount and availability of herbaceous height classes or herbaceous ground cover classes. Changes in meadow hydrology, primarily due to loss of live coniferous trees from the wildfire could result, in changes in the above key factors until such time that upland vegetation recovers. No live trees (deciduous or coniferous) are expected to be removed from WTM edges. This action will not alter the existing trend in the habitat.

Alternative B (No Action)

Selection of this alternative would not authorize any federal actions and therefore no direct or indirect effects would result. Therefore, there would be no direct or indirect impacts to wet meadow habitat. As a result, existing meadow conditions and Pacific tree frog habitat conditions would not change from management actions but could improve over time as grass/forb/sedge growth recovers with time.

Summary of Pacific Tree Frog Status and Trend at the Bioregional Scale
The Plumas NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the Pacific tree frog; hence, the wet meadow effects analysis for the Wheeler 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 Pacific tree frog. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 66,000 acres of wet meadow habitat on National Forest System lands in the Sierra Nevada. Within the last decade, the trend is stable.

Population Status and Trend. Since 2002, the Pacific tree frog has been monitored on the Sierra Nevada forests as part of the Sierra Nevada Forest Plan Amendment (SNFPA) monitoring plan (USDA Forest Service 2006b, Brown 2008). These data indicate that Pacific tree frog continues to be present at these sample sites, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of Pacific tree frog populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Pacific Tree Frog Trend. The direct/indirect and cumulative effects of the Moon-Wheeler Project would not change the amount and distribution of WTM within the analysis area . The amount of wet meadow habitat actually decreased from pre-fire conditions, due to reclassification of a portion of meadow to a dry meadow (or perennial grassland). Wildfire may have reversed the trend of meadow loss through succession, killing conifers encroaching into the meadow, reducing the meadow size as well as creating changes in soil moisture availability. Meadows should be wetter for longer periods due to the lack of transpiring conifer vegetation. Therefore the change in the amount of wet meadow habitat in the Moon-Wheeler Project analysis area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of Pacific tree frogs across the Sierra Nevada bioregion.

Early and Mid-Seral Coniferous Forest Habitat (Mountain quail)

Habitat/Species Relationship.
The mountain quail was selected as the MIS for early and mid seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat in the Sierra Nevada. Early seral coniferous forest habitat is comprised primarily of seedlings (<1" dbh), saplings (1"-5.9" dbh), and pole-sized trees (6"-10.9" dbh). Mid seral coniferous forest habitat is comprised primarily of small-sized trees (11"-23.9" dbh). The mountain quail is found particularly on steep slopes, in open, brushy stands of conifer and deciduous forest and woodland, and chaparral; it may gather at water sources in the summer, and broods are seldom found more that 0.8 km (0.5 mi) from water (CDFG 2005).

Project-level Effects Analysis – Early and Mid Seral Coniferous Forest Habitat

Habitat Factor(s) for the Analysis: (1) Acres of early (CWHR tree sizes 1, 2, and 3) and mid seral (CWHR tree size 4) coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat [CWHR ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), [all canopy closures]. (2) Acres with changes in CWHR tree size class. (3) Acres with changes in tree canopy closure. (4) Acres with changes in understory shrub canopy closure.

Current Condition of the Habitat Factor(s) in the Analysis Area: Table 8 displays the amount of early and mid seral coniferous forest habitat present within the analysis area prior to the Moonlight and Antelope Complex fires and the amount present after the fire. The high severity burned sites burnt at an intensity that resulted (or will result) in the sites dominated by shrub species consistent with montane chaparral. Sites that burnt at lesser intensities either resulted in a decrease in canopy cover (M to a P for example) or no change to existing CWHR types. Some projections were made, based on fire severity and aerial photo interpretation, that some additional mortality could occur between 2007 and 2010. The post fire (first five years) column in the below table reflects this projected mortality.

Table 8. Summary of Early and Mid Seral acres within Analysis Area; from VESTRA 2002, updated with Fire Severity maps and 2007 aerial photography (all acres are approximate and all are National Forest).

CWHR Type	Pre-Fire	Post Fire (first five years)	Post Wheeler Project
Early Seral			
EPN1	33	0	0
EPN2M	26	0	0
EPN2P	0	5	5
EPN3D	0	5	5
EPN2S	33	22	22
EPN3M	71	0	0
EPN3P	397	176	176
EPN3S	0	21	21
PPN1	0	23	23
PPN2P	90	7	7
PPN2S	1052	199	199
PPN2M	0	3	3
PPN3M	571	0	0
PPN3P	542	116	116
PPN3S	130	140	140
RFR3M	5	0	0
RFR3P	50	0	0
SMC1	23	57	57
SMC2D	138	0	0
SMC2P	45	36	36
SMC2S	1400	103	103
SMC2M	0	2	2
SMC3D	151	4	4
SMC3M	111	31	31
SMC3P	120	146	146
SMC3S	264	407	407
WFR2S	104	19	19
WFR3D	53	0	0
WFR3M	103	1	1
WFR3P	75	33	33
WFR3S	317	146	146
TOTAL EARLY SERAL	5,904	1,705	1,705
Mid-Seral			
EPN4D	107	42	42
EPN4M	928	325	325
EPN4P	1961	1861	1861
EPN4S	284	1094	1094
PPN4D	171	5	5
PPN4M	1358	176	176
PPN4P	575	757	757
PPN4S	199	427	427
RFR4D	6	0	0
RFR4M	136	41	41

RFR4P	51	102	102
RFR4S	2	33	33
SMC4D	1313	149	149
SMC4M	12529	1674	1674
SMC4P	3469	6416	6416
SMC4S	551	3081	3081
WFR4D	1325	90	90
WFR4M	8775	938	938
WFR4P	1967	3785	3785
WFR4S	799	1204	1204
TOTAL MID-SERAL	36,507	22,202	22,202

Thus post-fire the amount of early seral acres in SMC, PPN, WFR, RFR, and EPN decreased from 5,904 to 1,705 acres, a decrease of 4,199 acres. Thus early seral coniferous habitat makes up about 2.5 percent of the existing vegetation in the analysis area.

The amount of post-fire mid-seral acres in SMC, PPN, WFR, RFR, and EPN decreased from 36,507 to 22,202 acres, a decrease of 14,305 acres. Thus mid seral coniferous habitat makes up about 32 percent of the existing vegetation in the analysis area. Combined, habitat and ecosystem components for Mountain Quail decreased 18,504 acres, or a 44% decline across the analysis area.

Action Alternatives (A, C, D, and E)

Direct and Indirect Effects to Habitat. Potential direct effects include removal of fire-killed or hazard trees, downed woody fuel, and subsequent reforestation. About 22 percent of Forest service land is proposed for salvage or roadside hazard harvest under Alternative A (14,755 acres proposed out of 68,408 FS acres in analysis area). Alternative C proposes to treat 8,536 acres (12%), alternative D 5,656 acres (8%), and alternative E 4,389 acres (6%). Dead or hazard tree removal would not change the CWHR type within any stand as dead trees do not contribute to canopy closure. The proposed dead tree removal would have no effect on the residual live tree size, canopy cover or live-tree basal area. As Table 8 indicates, there would be no change in early or mid seral as a result of removing dead or hazard trees under all alternatives.

The four action alternatives include reforestation of conifers to promote the reestablishment and development of a mature, closed canopy, mixed conifer forest. Alternatives A, D, and E each propose to reforest approximately 16,006 acres. Alternative C proposes to reforest approximately 9,306 acres. Conifer planting would occur as early as one year after dead tree removal. The Montane chaparral type would be converted to Sierra Mixed Conifer types 1 and 2 (shrub/seedling/sapling) after reforestation where conifer seedlings would be competing with brush for the next 2 to 5 decades.

Cumulative Effects to Habitat in the Project Area. Past, present, and reasonably foreseeable future actions affecting the habitat in the project area have been identified in the project RFEIS.

Reforestation of national forest lands where no salvage harvest is proposed began within the analysis area in spring 2008. A combination of wide spaced cluster planting in the Antelope Lake and Babcock Peak areas and square-spaced planting in the Camp 14 area occurred within areas of high fire severity accounting for a total of approximately 1,200 acres planted in 2008. Up to 7,000 acres of reforestation in unsalvaged areas are currently being planned for spring 2009 and 2010 across the Mt. Hough and Beckwourth Ranger Districts; these additional acres of reforestation would also occur in unsalvaged areas of the fire including old plantations and natural stands. The net cumulative effect would be the enhanced establishment of conifer seedlings across the analysis area in order to re-establish forested conditions. An additional reforestation project, the Frazier Cabin project, located on the Beckwourth Ranger District, is planned for 2009 and proposes to plant 203 acres. No fire-killed tree removal is planned with these two projects. Reforestation efforts should hasten restoration of large tree forest conditions that could provide CWHR 4M stands in approximately 90 years. Therefore, an additional 8,403 acres of MCP would be converted to SMC 1 and SMC 2, resulting in more early seral coniferous forest within the analysis area. Cumulatively, early seral coniferous forest would increase from 1,705 acres post fire to 26,114 acres (Alternatives A, D, E) or 19,414 acres (Alternative C) after all reforestation is complete.

Private timberlands account for over 19,000 acres or approximately 22 percent of the analysis area. Since fall 2007 through the summer of 2008 fire salvage harvest has been occurring on these lands. Over 11,400 have been salvage harvested to date and, although additional salvage may take place, future salvaged acres on private land is expected to be minimal. Private fire salvage projects have occurred mostly on productive, well-stocked stands that burned with moderate to high burn severity resulting in a notable reduction in densities of fire-killed and fire-injured trees within these private parcels. It is reasonably assumed based on state forest practice regulations and private timber practices that these areas would be re-planted and managed for maximizing tree growth, thus resulting in a cumulative increase in early seral coniferous stages across the analysis area.

> **Cumulative Effects Conclusion:** Removal of dead or hazard trees would not result in any decrease in early or mid seral habitat. Reforestation will convert Montane Chaparral to early seral coniferous forest on 18,388 acres within the treatment units under Alternatives A, D, and E and on 11,688 acres under Alternative C. The changes resulting from wildfire, and subsequent reforestation increase the amount of early seral vegetation within the analysis area, although mid seral habitat availability declined due to wildfire and will lag behind for several decades before recovering to pre-fire conditions. These changes in habitat will not alter the existing trend in the habitat.

Alternative B (No Action)

Selection of this alternative would not authorize any federal actions and therefore no direct or indirect effects would result. Therefore, there would be no direct or indirect impacts to early seral or mid seral habitat. As a result, existing forest conditions and mountain quail habitat conditions would be maintained. Selection of the no action alternative would contribute to no direct or indirect effects to Early and Mid Seral Coniferous Forest Habitat habitat, thus there would also be no additional cumulative effects as a result of selecting this alternative.

Reforestation of national forest lands where no salvage harvest is proposed began within the analysis area in spring 2008. A combination of wide spaced cluster planting in the Antelope Lake and Babcock Peak areas and square-spaced planting in the Camp 14 area occurred within areas of high fire severity accounting for a total of approximately 1,200 acres planted in 2008. Up to 7,000 acres of reforestation in unsalvaged areas are currently being planned for spring 2009 and 2010 across the Mt. Hough and Beckwourth Ranger Districts; these additional acres of reforestation would also occur in unsalvaged areas of the fire including old plantations and natural stands. An additional reforestation project, the Frazier Cabin project, located on the Beckwourth Ranger District, is planned for 2009 and proposes to plant 203 acres. The net cumulative effect of these reforestation projects would be the enhanced establishment of conifer seedlings across the analysis area in order to re-establish forested conditions.

Over 11,400 of private land has been salvage harvested to date within the analysis area. It is reasonably assumed based on state forest practice regulations and private timber practices that these areas would be re-planted and managed for maximizing tree growth, thus resulting in a cumulative increase in early seral coniferous stages across the analysis area.

Summary of Mountain Quail Status and Trend at the Bioregional Scale
The Plumas NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the mountain quail; hence, the early and mid seral coniferous forest effects analysis for the Wheeler 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 mountain quail. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

> **Habitat Status and Trend.** There are currently 546,000 acres of early seral and 2,766,000 acres of mid seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands in the Sierra Nevada. Within the last decade, the trend for early seral is slightly decreasing (from 9% to 5% of the acres on National Forest System lands) and the trend for mid seral is slightly increasing (from 21% to 25% of the acres on National Forest System lands).
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> **Population Status and Trend.** The mountain quail has been monitored in the Sierra Nevada at various sample locations by hunter survey, modeling, and

breeding bird survey protocols, including California Department of Fish and Game hunter survey, modeling, and hunting regulations assessment (CDFG 2004a, CDFG 2004b) and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that mountain quail continue to be present across the Sierra Nevada, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of mountain quail populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Mountain Quail Trend. The direct/indirect and cumulative effects of the Moon-Wheeler Project would change with time, the amount and distribution of early seral (SMC 1 and SMC2) habitat within the analysis area. Reforestation, cumulatively, of up to 18,388 acres under Alternatives A, D, and E and 11,688 acres under Alternative C will result in early seral coniferous forest habitat being maintained at 29 percent (Alts A, D, E) or 20 percent (Alt C) of the analysis area, which is higher than pre-fire conditions and thus trends are slightly increasing. Trends in mid-seral are slightly decreasing for the next several years. The change in the amount of early and mid seral habitat in the Moon-Wheeler Project analysis area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of mountain quail across the Sierra Nevada bioregion

Late Seral Open Canopy Coniferous Forest Habitat [Sooty (blue) grouse]

Habitat/Species Relationship.
The sooty grouse was selected as the MIS for late seral open canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) 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 less than 40%. Sooty grouse occurs in open, medium to mature-aged stands of fir, Douglas-fir, and other conifer habitats, interspersed with medium to large openings, and available water, and occupies a mixture of mature habitat types, shrubs, forbs, grasses, and conifer stands (CDFG 2005). Empirical data from the Sierra Nevada indicate that Sooty Grouse hooting sites are located in open, mature, fir-dominated forest, where particularly large trees are present (Bland 2006).

Project-level Effects Analysis - Late Seral Open Canopy Coniferous Forest Habitat

Habitat Factor(s) for the Analysis: (1) Acres of late seral open canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat [CWHR ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 5, canopy closures S and P]. (2) Acres with changes in tree canopy closure class. (3) Acres with changes in understory shrub canopy closure class.

Current Condition of the Habitat Factor(s) in the Analysis Area: Table 9 below indicates that as a result of wildfire, late seral open canopy coniferous forest habitat decreased in availability. As indicated, this habitat type makes up

very little of the vegetation within the analysis area post wildfire (1% of NF acres).

Table 9. Summary of Late Seral Open Coniferous (5S and 5P) acres within Analysis Area; from VESTRA 2002, updated with Fire Severity maps and 2007 aerial photography (all acres are approximate and all are National Forest).

CWHR Type	Pre-Fire	Post Fire (first five years)	Post Wheeler Project
EPN5P	14	29	29
EPN5S	0	59	59
RFR5P	18	0	0
SMC5P	899	403	403
SMC5S	84	187	187
WFR5P	71	46	46
WFR5S	39	4	4
Total	1,125	728	728

Action Alternatives (A, C, D, and E)

Direct and Indirect Effects to Habitat. Potential direct effects include removal of fire-killed or hazard trees, downed woody fuel, and subsequent reforestation. About 22 percent of Forest service land is proposed for salvage or roadside hazard harvest under Alternative A (14,755 acres proposed out of 68,408 FS acres in analysis area). Alternative C proposes to treat 8,536 acres (12%), alternative D 5,656 acres (8%), and alternative E 4,389 acres (6%). Dead or hazard tree removal would not change the CWHR type within any stand as dead trees do not contribute to canopy closure. The proposed dead tree removal would have no effect on the residual live tree size, canopy cover or live-tree basal area. As Table 9 indicates, there would be no change in late seral open coniferous forest as a result of removing dead or hazard trees under all alternatives.

The four action alternatives include reforestation of conifers to promote the reestablishment and development of a mature, closed canopy, mixed conifer forest. Conifer planting would occur as early as one year after dead tree removal. The Montane chaparral type would be converted to Sierra Mixed Conifer types 1 and 2 (shrub/seedling/sapling) after reforestation where conifer seedlings would be competing with brush for the next 2 to 5 decades. No reforestation would occur in CWHR 5S and 5P.

Cumulative Effects to Habitat in the Analysis Area. Past, present, and reasonably foreseeable future actions affecting the habitat in the project area have been identified in appendix B of the project RFEIS. There are no direct/indirect effects to CWHR 5S & 5P habitat as a result of implementing the Moon-Wheeler Project, thus there are no additional cumulative effects.

Cumulative Effects Conclusion: No changes to Late Seral Open Canopy Coniferous Forest would occur as a result of dead tree removal and reforestation. The wildfire resulted in a decrease in the total amount of this type of habitat and it remains a minor vegetative component within the

analysis area. The change in the amount of 5S and 5P will not alter the existing trend in the habitat.

Alternative B (No Action)

Selection of the no action alternative would contribute to no direct or indirect effects to late seral open conifer habitat, thus there would also be no cumulative effects as a result of selecting this alternative.

Summary of Sooty Grouse Status and Trend at the Bioregional Scale
The Plumas NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the sooty grouse; hence, the late seral open canopy coniferous forest effects analysis for the Wheeler 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 sooty grouse. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 75,000 acres of late seral open canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat on National Forest System lands in the Sierra Nevada. The trend is slightly decreasing (from 3% to 1% within the last decade on National Forest System lands).

Population Status and Trend. The sooty grouse has been monitored in the Sierra Nevada at various sample locations by hunter survey, modeling, and point counts, breeding bird survey protocols, including California Department of Fish and Game Blue (Sooty) Grouse Surveys; California Department of Fish and Game hunter survey, modeling, and hunting regulations assessment (CDFG 2004a, CDFG 2004b); Multi-species inventory and monitoring on the Lake Tahoe Basin Management Unit (LTBMU 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that sooty grouse continue to be present across the Sierra Nevada, except in the area south of the Kern Gap, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of sooty grouse populations in the Sierra Nevada north of the Kern Gap is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Sooty Grouse Trend. The direct/indirect and cumulative effects of the Moon-Wheeler Project would not change the amount and distribution of late seral open coniferous forest within the analysis area. Cumulatively the two fires resulted in a decrease in the amount of this habitat from 1,125 acres to 728 acres. The change in the amount of late seral open habitat in the Moon-Wheeler Project analysis area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of sooty grouse across the Sierra Nevada bioregion.

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

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% 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 (SNFPA 2001).

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% 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 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 Analysis Area:
Table 10 displays the amount of late seral coniferous forest habitat present within the analysis area prior to the two fires and the amount present after the fires. The high severity burned sites burnt at an intensity that resulted (or will result) in the sites dominated by shrub species consistent with montane chaparral. Sites that burnt at lesser intensities either resulted in a decrease in canopy cover (M to a P for example) or no change to existing CWHR types. Some projections were made, based on fire severity and aerial photo interpretation, that some additional mortality could occur between 2007 and 2010. The post fire (first five years) column in the below table reflects this projected mortality.

Table 10. Summary of Late Seral Closed-Canopy Coniferous Forest acres within Analysis Area; from VESTRA 2002, updated with Fire Severity maps and 2007 aerial photography (all acres are approximate and all are National Forest).

CWHR Type	Pre-Fire	Post Fire (first five years)	Post Wheeler Project
PPN5M	77	0	0
RFR5M	38	0	0
SMC5D	3171	91	91
SMC5M	10211	296	296
WFR5D	537	6	6
WFR5M	4827	147	147
Total	18,861	540	540

Action Alternatives (A, C, D, and E)

Direct and Indirect Effects to Habitat. Potential direct effects include removal of fire-killed or hazard trees, downed woody fuel, and subsequent reforestation. About 22 percent of Forest service land is proposed for salvage or roadside hazard harvest under Alternative A (14,755 acres proposed out of 68,408 FS acres in analysis area). Alternative C proposes to treat 8,536 acres (12%), alternative D 5,656 acres (8%), and alternative E 4,389 acres (6%). Dead or hazard tree removal would not change the CWHR type within any stand as dead trees do not contribute to canopy closure. The proposed dead tree removal would have no effect on the residual live tree size, canopy cover or live-tree basal area. Thus the 540 acres of 5M/5D remaining post wildfire would not be impacted or changed as a result of project actions.

The four action alternatives include reforestation of conifers to promote the reestablishment and development of a mature, closed canopy, mixed conifer forest. Alternatives A, D, and E each propose to reforest approximately 16,006 acres. Alternative C proposes to reforest approximately 9,306 acres. Conifer planting would occur as early as one year after dead tree removal. The Montane chaparral type would be converted to Sierra Mixed Conifer types 1 and 2 (shrub/seedling/sapling) after reforestation where conifer seedlings would be competing with brush for the next 2 to 5 decades. No reforestation would occur in CWHR 5M and 5D.

The direct/indirect and cumulative effects of the action and no action alternatives are displayed and discussed in the Moonlight and Wheeler Recovery & Restoration Project BA/BE (USDA 2009b) (pages 56-68). Please see this document for additional effects analysis. This MIS analysis addresses only impacts to late seral closed canopy coniferous forest.

Cumulative Effects to Habitat in the Analysis Area. Past, present, and reasonably foreseeable future actions affecting the habitat in the project area have been identified in Appendix B of the project RFEIS. Cumulative effects on owl PACs/HRCAs/ etc are discussed in the Project BA/BE (USDA 2009b). Briefly, the Moonlight and Antelope Complex fires reduced the amount of 5M/5D within the analysis area by 97 percent due to high severity burn. Dead tree removal and subsequent reforestation within treatment units would not reduce this habitat further.

Reforestation of national forest lands where no salvage harvest is proposed began within the analysis area in spring 2008. A combination of wide spaced cluster planting in the Antelope Lake and Babcock Peak areas and square-spaced planting in the Camp 14 area occurred within areas of high fire severity accounting for a total of approximately 1,200 acres planted in 2008. Up to 7,000 acres of reforestation in unsalvaged areas are currently being planned for spring 2009 and 2010 across the Mt. Hough and Beckwourth Ranger Districts; these additional acres of reforestation would also occur in unsalvaged areas of the fire including old plantations and natural stands. An additional reforestation project, the Frazier Cabin project, located on the Beckwourth Ranger District, is planned for 2009 and proposes to plant 203 acres. No fire-killed tree removal is planned with these two projects. Reforestation efforts should hasten restoration of large tree forest conditions that could provide CWHR 4M stands in approximately 90 years. Size class 5 trees are not expected for 120+ years.

Cumulative Effects Conclusion: No changes to late seral closed canopy coniferous forest would occur as a result of dead tree removal and reforestation. The wildfire resulted in a decrease in the total amount of this type of habitat. The change in the amount of 5M and 5D as a consequence of the two wildfires resulted in the removal of twenty spotted owl PACs from the Plumas National Forest network (USDA 2009b, pg. 53) which reflects the potential long term decrease in the existing trend in this habitat.

Alternative B (No Action)

Dead tree removal would not occur. Reforestation in proposed treatment units would not occur. This would have no effect on the canopy cover or live-tree basal area. This alternative does not treat the 21 acres of remaining 5M/5D, similar to action alternatives. Thus the 21 acres of 5M/5D remaining post wildfire would not be impacted or changed as a result of no actions.

Reforestation of national forest lands where no salvage harvest is proposed began within the analysis area in spring 2008. A combination of wide spaced cluster planting in the Antelope Lake and Babcock Peak areas and square-spaced planting in the Camp 14 area occurred within areas of high fire severity accounting for a total of approximately 1,200 acres planted in 2008. Up to 7,000 acres of reforestation in unsalvaged areas are currently being planned for spring 2009 and 2010 across the Mt. Hough and Beckwourth Ranger Districts; these additional acres of reforestation would also occur in unsalvaged areas of the fire including old plantations and natural stands. An additional reforestation project, the Frazier Cabin project, located on the Beckwourth Ranger District, is planned for 2009 and proposes to plant 203 acres. The net cumulative effect of these reforestation projects would be the enhanced establishment of conifer seedlings across the analysis area in order to re-establish forested conditions.

Cumulative Effects Conclusion: No changes to late seral closed canopy coniferous forest would occur as a result of no action. The wildfire resulted in a decrease in the total amount of this type of habitat. The change in the amount of 5M and 5D as a consequence of the two wildfires resulted in the removal of twenty-one spotted owl PACs from the Plumas National Forest network. which reflects the potential long term decrease in the

existing trend in this habitat. Less long term restoration/recovery occurs with this alternative than with the action alternatives.

Summary of Status and Trend at the Bioregional Scale

California spotted owl and Northern flying squirrel. The Plumas NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the California spotted owl 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 Wheeler 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 SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

> **Habitat Status and Trend.** There are currently 994,000 acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands in the Sierra Nevada. The trend is slightly increasing (from 7% to 9% within the last decade on National Forest System lands).
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> **Population Status and Trend - California spotted owl.** California spotted owl has been monitored in California and throughout the Sierra Nevada as part of general surveys, monitoring of nests and territorial birds, and demography studies (Verner et al. 1992, USDA Forest Service 2001, 2004, USFWS 2006, Sierra Nevada Research Center 2007). Current data at the rangewide, California, and Sierra Nevada scales indicate that, although there may be localized declines in the rate of population change 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.
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> **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 and radiotelemetry since 2002 (Sierra Nevada Research Center 2007), 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. The direct/indirect and cumulative effects of the Moon-Wheeler Project would not change the amount and distribution of late seral closed canopy coniferous forest within the analysis area. The wildfires resulted in a loss of 18,321 acres of late seral closed canopy coniferous forest habitat that will not recover for over 125

years. Therefore the change in the amount of late seral closed canopy coniferous forest as a result of the Moonlight and Antelope Complex fires may alter the existing trend in the habitat and local distribution of spotted owls locally, but not lead to a change in the distribution of the spotted owl across the Sierra Nevada bioregion.

Northern flying squirrel. The direct/indirect and cumulative effects of the Wheeler Project would not change the amount and distribution of late seral closed canopy coniferous forest within the analysis area. The wildfires resulted in a loss of 18,321 acres of habitat that will not recover for over 125 years. Therefore the change in the amount of late seral closed canopy coniferous forest as a result of the Moonlight and Antelope Complex fires may alter the existing trend in the habitat and local distribution of flying squirrel locally, but not lead to a change in the distribution of the 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 Analysis Area: Table 11 provides information regarding the amount of green forest within the project area supporting medium (CWHR size class 4) and large (CWHR size class 5) snags.

Table 11. Summary of green forested acres potentially supporting medium and large snags within Analysis Area; from VESTRA 2002, updated with Fire Severity maps and 2007 aerial photography (all acres are approximate and all are National Forest).

CWHR Type	Pre-Fire	Post Fire (first five years)	Post Wheeler Project
SMC4 (S, P, M, D)	17,863	11,321	11,321
SMC5 (S, P, M, D)	14,365	978	978
WFR4 (S, P, M, D)	12,866	6,017	6,017
WFR5 (S, P, M, D)	5,475	203	203
RFR4 (S,P,M,D)	195	177	177
RFR5 (S,P,M,D)	56	0	0
PPN4 (S,P,M,D)	2,303	1,365	1,365
PPN5 (S,P,M,D)	264	43	43
EPN4 (S, P, M, D)	3,280	3,322	3,322
EPN5 (S,P,M,D)	156	1,990	1,990

Total	56,823	25,416	25,416

As table 11 indicates, 31,407 acres of green forest supporting medium and large snags was burned up by the wildfire and converted to some other CWHR type; primarily montane chaparral if burned at high severity, early seral stages (CWHR 1, 2, or 3) if burned at high or moderate severity, or a more open canopy forest if burned at moderate or low severity.

Based on data derived from common stand exam plots within the Moon-Wheeler Project, snags over 15" dbh exist at 16.4 per acre within the 2,364 acre treatment units. Small dead trees (>9" dbh to 15.9 dbh) appear to be over 34 dead trees/acre. Most all plot data was collected in stands that burned at high severity, which is not supporting a green forest ecosystem. But at least three plots fell within areas that either did not burn, were burnt at low or moderate severity (<50% basal area mortality); these plots are reflective of a green forest ecosystem supporting snags. Table 12 displays dead tree availability within this green forest within the analysis Area.

Table 12: Snag densities within unburned or low severity forest within Analysis Area

All species Diameter Class of Dead Tree	Number of dead trees/acre
1-9.9 inch dbh	180
10-14.9 dbh	4
15- 29.9 dbh (medium sized)	2
>30" dbh (large sized)	1

Based on data displayed in Table 12, green forest within the project area supports snags over 15" dbh at about 3 per acre. Table 11 indicates that there is 25,416 acres of green forest in the project area capable of supporting medium and large snags at about 3/acre.

Action Alternatives (A, C, D, and E)

Direct and Indirect Effects to Habitat. Potential direct effects include removal of fire-killed or hazard trees, downed woody fuel, and subsequent reforestation. About 22 percent of Forest service land is proposed for salvage or roadside hazard harvest under Alternative A (14,755 acres proposed out of 68,408 FS acres in analysis area). Alternative C proposes to treat 8,536 acres (12%), alternative D 5,656 acres (8%), and alternative E 4,389 acres (6%). Dead or hazard tree removal would not change the CWHR type within any stand as dead trees do not contribute to canopy closure. The proposed dead tree removal would have no effect on the residual live tree size, canopy cover or live-tree basal area. The majority of the 25,416 acres of CWHR types identified as green forest supporting snags within the analysis area (Table 11) would not be treated under this project; the exception being areas along road corridors where hazard trees have been identified and scheduled for removal.

The four action alternatives include reforestation of conifers to promote the reestablishment and development of a mature, closed canopy, mixed conifer forest. Conifer planting would occur as early as one year after dead tree removal. The Montane chaparral type would be converted to Sierra Mixed Conifer types 1 and 2

(shrub/seedling/sapling) after reforestation where conifer seedlings would be competing with brush for the next 2 to 5 decades. **The action alternatives do not** occur within this habitat, thus it will not result in a change in the amount of snags present within unburned or low severity burned stands (green forest ecosystem). Green Forest ecosystem supporting medium and large snags make up approximately 37% of the 68,408 acres of FS land in the analysis area.

Cumulative Effects to Habitat in the Analysis Area. Past, present, and reasonably foreseeable future actions affecting the habitat in the project area have been identified in appendix B of the project RFEIS.

Reforestation of national forest lands where no salvage harvest is proposed began within the analysis area in spring 2008. A combination of wide spaced cluster planting in the Antelope Lake and Babcock Peak areas and square-spaced planting in the Camp 14 area occurred within areas of high fire severity accounting for a total of approximately 1,200 acres planted in 2008. Up to 7,000 acres of reforestation in unsalvaged areas are currently being planned for spring 2009 and 2010 across the Mt. Hough and Beckwourth Ranger Districts; these additional acres of reforestation would also occur in unsalvaged areas of the fire including old plantations and natural stands. An additional reforestation project, the Frazier Cabin project, located on the Beckwourth Ranger District, is planned for 2009 and proposes to plant 203 acres. No fire-killed tree removal is planned with these two projects. Reforestation efforts should hasten restoration of large tree forest conditions that could provide CWHR 4M stands in approximately 90 years. Size class 5 trees are not expected for 120+ years.

Cumulative Effects Conclusion: The action alternatives would only minimally impact snags within green forest ecosystem because dead trees are to be removed primarily from areas that burned at high/moderate severity that do not support green forest ecosystem. Snags within green forest ecosystems that are along road corridors and are deemed hazardous would be removed under all alternatives (except the no action). Reforestation would not occur in these CWHR types. Thus there is no direct habitat reduction as a result of action alternatives and there would be no alteration to the existing trend in the ecosuystem component.

Alternative B (No Action): The no action alternative is essentially the same affect as the action alternatives on this habitat. There will be no change to this type of habitat with any alternative. Thus it will not result in a change in the amount of snags present within unburned or low severity burned stands. These type of stands make up approximately 25,416 acres (Table 11) or 37 percent of FS lands in the analysis area.

Reforestation of national forest lands where no salvage harvest is proposed began within the analysis area in spring 2008. A combination of wide spaced cluster planting in the Antelope Lake and Babcock Peak areas and square-spaced planting in the Camp 14 area occurred within areas of high fire severity accounting for a total of approximately 1,200 acres planted in 2008. Up to 7,000 acres of reforestation in unsalvaged areas are currently being planned for spring 2009 and 2010 across the Mt. Hough and Beckwourth Ranger Districts; these additional acres of reforestation would also occur in unsalvaged areas of the fire including old plantations and natural stands. An additional reforestation project,

the Frazier Cabin project, located on the Beckwourth Ranger District, is planned for 2009 and proposes to plant 203 acres. No fire-killed tree removal is planned with these two projects. Reforestation efforts should hasten restoration of large tree forest conditions that could provide CWHR 4M stands in approximately 90 years. Size class 5 trees are not expected for 120+ years.

Summary of Hairy Woodpecker Status and Trend at the Bioregional Scale
The Plumas 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 Wheeler 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 SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

> **Ecosystem Component Status and Trend.** The current (based on 2001-2004 inventory sources) 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 1.4 per acre in eastside pine to 8.3 per acre in white fir. Detailed information by forest type, snag size, and snag decay class can be found in the SNF Bioregional MIS Report (USDA Forest Service 2008).
>
> Data from the mid-to-late 1990s 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 (+0.80), white fir (+1.98), and red fir (+0.68) and decreased within ponderosa pine (-0.17), productive hardwoods (-0.17), and eastside pine (-0.16).
>
> **Population Status and Trend.** The hairy woodpecker has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including 1997 to present – Lassen National Forest (Burnett and Humple 2003, Burnett et al. 2005); 2002 to present - Plumas and Lassen National Forests (Sierra Nevada Research Center 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that the hairy woodpecker continues to be present at these sample sites, and 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. The direct, indirect and cumulative effect of the Moon-Wheeler Project in terms of changes in medium-sized and large-sized snags per acre within green forest habitat will not change from the existing condition, as green forested habitat supporting snags would only be minimally impacted by dead or hazard tree removal

within the burn areas. The actions will not alter the existing trend in the ecosystem component, nor will it lead to a change in the distribution of hairy woodpecker across the Sierra Nevada bioregion.

That being said, it is logical to think that the loss of green forest habitat due to wildfire would result in a decrease in habitat trend bioregionally. But site specific surveys indicate that hairy woodpecker is the most abundant woodpecker species within wildfire areas in the Antelope Lake area (limited surveys in Stream, Boulder and Antelope Fires). It is suspected that this species actually takes advantage of the increase availability of prey within dead trees and buffers loss of green tree habitat by utilizing burned areas supporting snags. Kotliar, et al (2002) identified the hairy woodpecker as a species typically more abundant in burns than in unburned forest and Smucker et al (2005) found the hairy woodpecker increased in relative abundance at burned sites in each of the first three years after fire. Covert-Bratland et al (2006) found that hairy woodpecker used edges of high severity burn areas more than the interior and concluded that high severity burned areas provide important but ephemeral foraging areas for this species. Vierling, et al (2008) found that high severity fire effects were important for multiple woodpecker species, including the hairy woodpecker, as long as greater numbers and larger snags are retained throughout the landscape. Thus, at least in the short term, habitat available for use may have increased.

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

Habitat/Species Relationship.
The black-backed woodpecker (BBWO) was selected as the MIS for the ecosystem component of snags in burned forests. Detailed information on MIS is documented in the Sierra Nevada National Forests Bioregional MIS Report (USDA 2008), which is hereby incorporated by reference. Recent data indicate that BBWO's are dependent on snags created by stand-replacement fires (Hutto 1995, Kotliar et al. 2002, Smucker et al. 2005, Hanson and North 2008).

Black-backed woodpeckers are territorial. Densities in burned forests in the Sierra Nevada were estimated at 3.2 pairs/100 acres (Bock and Lynch 1970). In unburned Sierra Nevada forests densities were estimated from 0.2 pairs/100 acres (Raphael and White 1984) to 0.5 pairs/100 acres (Bock and Lynch (1970). Studies strongly suggest greater breeding densities in burned than in unburned forests (Hutto 1995, Kotliar al. 2002, Smucker et al. 2005) but varied survey methods and reporting units complicate comparisons (Dixon and Saab 2000). It was recommended that 6 snags (greater than 41 cm dbh) per 67 acres (in unburned coniferous Sierra Nevada forests) is needed to support 0.7 pairs per 100 acres. (Raphael and White 1984). Use of burns appears to be restricted to the first several years following a fire, as long as wood-boring insects are present and abundant. This can vary from 1 to 3 years up to eight years post fire (Nature Conservancy 1999, Hoyt and Hannon 2002). Hutto (1995) found that the number of small trees (10 to 30 cm dbh or 4-12" dbh) present in a burn served as the best correlate of BBWO abundance. Dixon & Saab (2000) recommend that where post fire salvage logging is planned, retain snags in clumps rather than even spaced distributions and retain >104 to

123 snag/ha (42-50 snags/acre) of dbh size >23 cm (9" dbh). Vierling et al (2008) recommended that snags>26 cm (10") dbh be retained because this represented the smallest snag size used by nesting woodpeckers, specifically BBWO and hairy woodpecker, in burned pine forest. In California, BBWO used nest trees >41 cm (16" dbh) and more than 13 meters (42 feet) tall in both burned and unburned forest (Raphael & White 1984).

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 Key Habitat Factor(s) in the Analysis Area: Snags are fairly evenly distributed across the analysis area; pre-fire conditions within the analysis area was dominated by SMC 4 and 5 in various canopy closures (Table 2) The majority of this CWHR type burned at high and moderately high severity, resulting in >50% basal area mortality (BAM), with the subsequent replacement of live trees with dead trees. This burned habitat supporting snags is reflected in Table 13 and Attachment 1. Russell et al (2007), indicated that BBWO's were positively associated with burned areas that supported moderate or high pre-fire crown closure (>40%). Several published articles (Murphy and Lehnhausen 1998, Hoyt and Hannon 2002, Hutto 2008, Vierling et al. 2008) indicate that BBWO's forage in and prefer forested stands that burned at moderate to high severity. Therefore, pre-fire CWHR 4M, 4D, 5M and 5D that burned at moderately high (50-75% BAM) to high severity (> 75% BAM) is used to determined trends in BBWO habitat.

Table 13. Summary of burned forest acres potentially supporting medium and large snags within Analysis Area and within Treatment Units; from VESTRA 2002, updated with Fire Severity maps and 2007 aerial photography (all acres are approximate and all are National Forest).

CWHR Type* (pre-fires)	Created BBWO Habitat in Analysis Area (acres)
CWHR 4M/4D	17,896
CWHR 5M/5D	14,673
Total	32,569

*CWHR types include SMC, WFR, EPN, PPN

Approximately 32,569 Forest Service acres of suitable BBWO habitat is within the 87,647 acre analysis area as a result of moderately high to high severity fire within CWHR types supporting 4M, 4D, 5M, and 5D (pre-fire).

Table 14 discloses the estimated snag densities existing within the analysis area. This fire-killed tree (snag) data was collected using common stand exam plots located within

the proposed treatment units. Snag density estimates were averaged across the analysis area within all Forest Service pre-fire CWHR 4M, 4D, 5M, and 5D stands (totaling 45,895 acres). Weighted averages are displayed to more accurately represent the proportion of areas which burned at different severities on different soil site classes. Please refer to the Moonlight Wheeler Project BA/BE (USDA 2009b) Attachment 1 for additional information.

Table 14. Estimated snag densities on Forest Service lands within analysis area

All species Diameter Class of Dead Tree	Number of dead trees/acre
10-14.9 dbh	32.6
15 or greater dbh	16.8

Action Alternatives (A, C, D, and E)

Direct and Indirect Effects to Habitat. Potential direct effects include removal of burnt trees, downed woody fuel, and subsequent reforestation. Under Alternative A dead or hazard tree removal would occur on approximately 14,755 acres (22% of FS lands) within the analysis area. The other action alternatives propose to remove fire-killed or hazard trees in the following amounts: Alternative C - 8,536 acres (12%), Alternative D – 5,656 acres (8%), and Alternative E (roadside hazard treatments only) – 4,389 acres (6%). Black-backed woodpecker chicks that are present within the treatment units and have not yet fledged by July 15, 2009, the scheduled start of implementation, could be directly killed due to removal of occupied nest trees. Possible direct mortality of chicks could also occur in 2010 if harvest units remain and are scheduled to be treated during the nestling stage. There may be instances where individual live trees may be cut for safety purposes or to facilitate access to harvest fire-killed trees. These instances are expected to be rare and impacts to existing live tree stands minimal. Therefore, the project would not directly affect the following CWHR types: mid seral coniferous in all canopy covers size 4 trees, late seral closed canopy coniferous in all canopy covers size 5 trees, or medium and large snags in green forest. The four action alternatives include reforestation of conifers to promote the reestablishment and development of a mature, closed canopy, mixed conifer forest. Conifer planting would occur as early as one year after dead tree removal. The Montane chaparral type would be converted to Sierra Mixed Conifer types 1 and 2 (shrub/seedling/sapling) after reforestation where conifer seedlings would be competing with brush for the next 2 to 5 decades.Snag retention areas would be designated to provide for large snags and large down woody material recruitment to rehabilitate habitat structure. Snags would be retained in numbers appropriate for each forest type. In Sierra mixed conifer and ponderosa pine forest types, four of the largest snags per acre would be retained. Snag densities would be averaged over the analysis area. No large dead tree removal would occur on 77% of the project analysis area. Green tree and snag retention guidelines would provide for future replacement snags and down woody material over time.

Snag retention objectives would be attained by various methods in project design:

a. Snag Retention Areas:

Snag retention areas range in size from 7 to 26 acres. Under alternative A snag retention areas were designated over approximately ten percent (up to 1,060 acres) of salvage treatment areas. Alternative C and alternative D have 580 acres (14%) and 127 acres (10%) designated, respectively, as snag retention areas. Dead tree removal generally would not occur within these snag retention areas. Primary selection criteria for snag retention areas were 1) areas formerly identified as Spotted Owl PACs, 2) along treatment unit boundaries adjacent to non-burned and low severity areas, 3) within RHCAs, and 4) in stands that supported a minimum of 40% canopy cover pre-fire.

b. Small Dead Tree Availability

Within treatment units, the proposed action (alternative A) calls for the removal of dead trees 14" or 16" dbh and larger. Within helicopter and skyline units this would result in the retention of smaller dead trees (<15.9" dbh) scattered and clumped across all 6,219 acres of helicopter and skyline units. As indicated in Table 14, this small dead tree density would be around 32 dead trees/acre between 10" and 14.9" dbh. In the tractor units under all action alternatives, as a result of both sawlog and biomass proposed for harvest, there would be no small dead tree availability, except in snag retention areas, RHCA equipment restriction zones, and dead trees within 150 feet from the road prism (123 road miles to be treated) that are not deemed hazardous.

c. Within RHCAs.

For all alternatives, harvesting of dead trees would occur; however, snags would be retained to meet RMOs for down woody debris recruitment. Snags greater than 15" dbh would be retained at 4 snags/acres in all treated RHCAs. RHCAs would be incorporated into the 10 acre (average) snag retention areas where appropriate.

d. Outside treatment areas.

With alternatives A 78% of the FS lands within the analysis area has no dead or hazard tree removal planned. Under Alternative C 88% of FS lands would not be subject to dead or hazard tree removal. Alternative D would leave 92% untreated and alternative E would only treat roadside hazard trees, leaving 94% of the analysis area untreated. Untreated areas would contribute higher snag density clusters in large contiguous blocks to meet total required number of snags per acre across the analysis area. Maintaining from 78% to 94% of Forest Service lands within the analysis area in an unsalvaged condition can benefit species most-closely tied to early post-fire conditions, including the BBWO (Kotliar, et al 2002).

Cumulative Effects to Habitat in the Analysis Area. Past, present, and reasonably foreseeable future actions affecting the habitat in the analysis area have been identified in appendix B of the project RFEIS.

Prior to the Moonlight and Antelope Complex fires, there was approximately 1,488 acres of habitat classified as snags in burned forest within the analysis area (created from the

2001 Stream Fire). Within this portion of the Stream Fire area, approximately 221 acres in nine units were salvage logged in 2003. On average snags were distributed across the salvage units at 4-6 snags/acre. The remaining 1,267 acres of the Stream Fire area within the analysis area were not salvage logged (did not have dead tree removal) and now are burnt forest habitat supporting a high density of medium and large snags/acre; this habitat is six to seven years old. Due to its age, habitat in the Stream Fire has probably declined in habitat suitability for BBWO. Assuming BBWO densities @ 3.2/40 ha in burned forest (1 pair/32 acres) (Bock and Lynch 1970) or 1 pair/500 acres) (Raphael and White 1984 in NatureServe 2007), this habitat (snags in burned forest) potentially supported between 2 and 39 pair of BBWO's between 2002 to 2007.

The Moonlight and Antelope Complex fires burned over 87,000 acres, and, as a result, approximately 32,695 acres of suitable BBWO habitat was created by moderately high to high severity fire (Table 13). This provides enough habitat (snags in burned forest) to theoretically support an additional 65 to 1,020 pairs. Thus the Moonlight and Antelope Complex fires created an upward trend in BBWO habitat from pre-fire conditions that could have increased the short term trends in woodpeckers in the analysis area.

Two roadside safety and hazard tree removal projects (Antelope Complex on the Mt. Hough Ranger District and Dry Flat on the Beckwourth Ranger District) were implemented in 2008. These two projects removed roadside hazard trees from approximately 3,330 acres.

There are two additional Forest Service projects currently being planned that would remove dead trees within the analysis area. The Camp 14 and North Moonlight projects are fire salvage projects proposed by the Beckwourth Ranger District, Plumas National Forest, and the Eagle Lake Ranger District, Lassen National Forest, respectively. The Camp 14 project is completed while the North Moonlight project is currently under contract and ongoing. These fire salvage projects are limited to less than 250 acres in size, and occur in separate watersheds. Both of these projects include harvesting fire-injured trees in the interest of capturing the value of those trees which were substantially injured by the fire and likely to die in the near future; however, since these projects also primarily target areas of high to moderate burn severity where greater than 50 percent of the basal area was killed, most trees harvested would be dead, fire-killed trees. The contributions of these two projects to cumulative effects include a localized reduction in snags, in snag recruitment from fire-injured trees, and in high burn severity forest structure. These two projects would affect 0.7 percent of public lands within the analysis area and represent the smallest contribution towards cumulative effects to forest vegetation, fuel loading, fire behavior, or air quality within the analysis area. Due to the size, scale, and, in the case of Camp 14, the dispersal of such activities, these localized effects would be minimal when considering the extent of the analysis area.

Table 15: Cumulative amount of BBWO suitable habitat remaining post treatments (FS acres)*

	Existing BBWO Habitat in Analysis Area	Cumulative Acres BBWO Habitat Planned for Fire-	Post Moonlight and Wheeler Project Habitat Available for BBWO

		killed or Hazard Tree Removal	Acres Remaining	% Remaining
Alternative A	32,569	12,397	20,172	62%
Alternative C	32,569	7155	25,413	78%
Alternative D	32,569	4,598	27,971	86%
Alternative E	32,569	3,456	29,113	89%

* see also attachments 2-5

Approximately 32,569 Forest Service acres of suitable BBWO habitat is within the 87,647 acre analysis area as a result of moderately high to high severity fire within CWHR types supporting 4M, 4D, 5M, and 5D pre-fire. Table 15 shows the cumulative amount of BBWO habitat remaining on FS lands after each action alternative is implemented. Attachments 2-5 also shows these BBWO suitable acres for each alternative. All proposed or ongoing fire-killed or hazard tree removal project acreage within the analysis area (this project, two roadside hazard projects, and two smaller salvage projects) are accounted for in the above table. BBWO habitat rendered unsuitable as a result of direct removal of dead or hazard trees varies with each alternative, ranging from a high of 12,397 acres under Alternative A (38% of existing suitable acres treated) to a low of 3,456 acres under Alternative E (roadside treatment alternative – 11% of existing suitable acres treated). Table 15 shows the cumulative amount of BBWO suitable habitat left untreated post-project would range from 62% (alternative A) to 89% (alternative E).

Table 16. Cumulative Amount of high to moderately high (>50 BAM) severity fire Salvaged and Unsalvaged in the Moon-Wheeler Project (Forest Service acres).

	Total Acres Mod-High Severity in Analysis Area	Moon-Wheeler Acres Proposed for Salvage or Hazard Tree Removal	All other projects – fire-killed or hazard tree removal	Acres Un-salvaged	% of total Unsalvaged
Alternative A	47,825	13,295	1,894	32,636	68%
Alternative C	47,825	7,140	1,894	38,790	81%
Alternative D	47,825	4,278	1,894	41,652	87%
Alternative E	47,825	3,013	1,894	42,918	90%

* snag retention areas excluded

Table 16 indicates that, under Alternative A, 68 percent of the analysis area classified as high severity to moderately high severity burn would not be salvage logged. Alternative C would leave 81 percent in these same severity classes untreated. Alternative D would leave 87 percent untreated and alternative E would leave 90% untreated. Areas untreated

would continue to be available as BBWO habitat somewhere between 5 and 7 years. After this time period, the quality of foraging habitat declines because the dead wood habitat no longer supports prey species BBWO consume.

Snag density estimations post treatment on Forest Service pre-fire CWHR 4M, 4D, 5M, and 5D lands within the analysis area has been done. Snag numbers reflect cumulative effects, that is, all FS projects ongoing or proposed that are/would remove fire-killed trees, and are **averaged** across the landscape (on FS pre-fire forested acres within the analysis area – 45,895 acres).

Implementation of all projects under alternative A results in an estimated post harvest snag density (greater than 15 inches dbh) across the 68,408 acres of public land of 11.7 snags/acre. Implementation of all projects under each of the other action alternatives (C, D, and E) results in an estimated post harvest snag density (greater than 15 inches dbh) across the 68,408 acres of public land of 13.3 snags/acre.

Reforestation of national forest lands where no salvage harvest is proposed began within the analysis area in spring 2008. A combination of low density wide spaced cluster planting in the Antelope Lake and Babcock Peak areas and low density square-spaced planting in the Camp 14 area occurred within areas of high fire severity accounting for a total of approximately 838 acres planted in 2008. During the summer of 2008, the Frazier Cabin Reforestation Project included 141 acres of mechanical site preparation which accounts for 0.16 percent of the analysis area and consequently results in a negligible contribution to cumulative effects. Approximately 10,500 acres of high severity, unsalvaged areas were planted in Spring 2009 across the Mt. Hough and Beckwourth Ranger District portions of the Moonlight and Antelope Complex fires utilizing a combination of low density planting arrangements. These additional acres of reforestation occurred in unsalvaged areas of the fire including old plantations and natural stands. Manual release treatments would occur within one to two years following planting. The net cumulative effect would be the enhanced establishment of conifer seedlings across the analysis area in order to re-establish forested conditions.

Over 11,400 of the 19,238 acres of private land has been salvage harvested to date within the analysis area. It is reasonably assumed based on state forest practice regulations and private timber practices that these areas would be re-planted and managed for maximizing tree growth, thus resulting in a cumulative increase in early seral coniferous stages across the analysis area.

Future Herger-Feinstein Quincy Library Group projects that may occur within the analysis area include the Wildcat Project (2009) and the Keddie Project (2009). These projects would include Defensible Fuel Profile Zone fuel treatments, area thinning treatments, and group selection treatments which would involve timber harvesting and include silvicultural prescriptions which involve thinning from below to reduce hazardous accumulations of ladder and canopy fuels and promoting shade intolerant species. These projects would focus on harvesting green trees and would likely be modified to avoid areas affected by the fire; particularly areas that burned with moderate to high severity. Contribution to cumulative effects would include localized reduction of

stand densities through timber harvest focusing on the removal of trees less than 30 inches diameter and the removal of snags. No treatment units from either the Wildcat or Keddie projects would overlap with treatment units in any action alternatives. Approximately 155 acres of these projects (75 acres from the Wildcat Project and 80 acres from the Keddie Project) may occur within the analysis area; this would account for 0.2 percent of the project area. Consequently, the contribution of these projects to cumulative effects would be negligible since 1) treatments would occur in low severity areas, 2) prescriptions would be focused on maintaining mature forest cover and reducing hazardous fuel conditions, 3) the units are geographically disparate, and dispersed from the action alternatives, and 4) the vast majority of the units occur outside of the analysis area and the perimeter of the fires.

Cumulative Effects Conclusion: Implementation of fire-killed or hazard tree removal on 4,389 acres (Alt E) to 14,755 acres (Alt A) of 68,408 Forest Service acres as designed, in combination with past, present and reasonably foreseeable future actions would result in a decline in BBWO habitat availability, distribution, and hence population across the Plumas National Forest. That being said, there would still be short term population increase (from 2002) resulting from the suitable habitat remaining after the proposed project.

Alternative B: No Action

Direct and Indirect Effects to Habitat.

No fire-killed tree removal would occur with this alternative. Snag densities (greater than 15 inches dbh) averaged across the analysis area with the no action alternative would be approximately 16.4 snags/acre.

Cumulative Effects: Cumulatively the only fire-killed trees removed from the analysis area would be those within the two roadside hazard tree projects (Antelope Complex and Dry Flat – total of 3,330 acres) and the two salvage sales (Camp 14 and North Moonlight – total of 441 acres). Table 66 indicates that, under the no action alternative, cumulative post-fire treatments would remove fire-killed trees from 1,246 suitable BBWO acres, with 96% suitable acres left untreated. It was estimated that snag densities post hazard removal would average about 2 snags greater than 15 inches dbh/acre within the hazard tree zones, as not all fire-killed trees created by fire would be deemed hazards. No trees greater than 15 inches dbh is expected to remain within the 441 acres treated under the two salvage projects. This leaves a total of 64,637 public land acres untreated that would support all fire-killed trees created by the two fires.

Table 17. Cumulative amount of BBWO suitable habitat remaining post treatments under the no action alternative (public land).

		Alternative B (no action) Cumulative		
	Created BBWO Habitat in Analysis Area	Cumulative Acres (all projects) BBWO Habitat Planned for Fire-killed or Roadside Hazard Tree Removal under Alt B	Post Moonlight and Wheeler Project Habitat Available for BBWO	
			Acres Remaining	% Remaining

Alternative B	32,695	1,246	31,449	96%

Private timberlands account for over 19,000 acres or approximately 22 percent of the analysis area. Since fall 2007 through the summer of 2008 fire salvage harvest has been occurring on these lands. Over 11,400 have been salvage harvested to date and, although additional salvage may take place, future salvaged acres on private land is expected to be minimal. Private fire salvage projects have occurred mostly on productive, well-stocked stands that burned with moderate to high burn severity resulting in a notable reduction in densities of fire-killed and fire-injured trees within these private parcels. It is reasonably assumed based on state forest practice regulations and private timber practices that these areas would be re-planted and managed for maximizing tree growth.

Reforestation of national forest lands where no salvage harvest is proposed began within the analysis area in spring 2008. A combination of wide spaced cluster planting in the Antelope Lake and Babcock Peak areas and square-spaced planting in the Camp 14 area occurred within areas of high fire severity accounting for a total of approximately 1,200 acres planted in 2008. Up to 7,000 acres of reforestation in unsalvaged areas are currently being planned for spring 2009 and 2010 across the Mt. Hough and Beckwourth Ranger Districts; these additional acres of reforestation would also occur in unsalvaged areas of the fire including old plantations and natural stands. The net cumulative effect would be the enhanced establishment of conifer seedlings across the analysis area in order to re-establish forested conditions.

Cumulative Effects Conclusion: It is anticipated that implementation of the no action alternative, in combination with past, present and reasonably foreseeable future actions, would not have a cumulative effect to the population and habitat distribution across the Plumas National Forest. There still would be short term population increase (from 2002) resulting from the suitable habitat created by wildfire.

Summary of Black-backed Woodpecker Status and Trend at the Bioregional Scale
The Plumas NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the BBWO; hence, the snags effects analysis for the Moon-Wheeler 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 BBWO. This information is drawn from the detailed information on habitat and distribution population trends in the SNF Bioregional MIS Report (USDA 2008), which is hereby incorporated by reference.

> **Ecosystem Component Status and Trend. .** The current (based on 2001-2004 inventory sources) 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 1.4 per acre in eastside pine to 8.3 per acre in white fir. Detailed information by forest type, snag size, and snag decay class can be found in the SNF Bioregional MIS Report (USDA 2008). These data include snags in both green forest and burned forest. Between 2000 and 2007, 211,000 acres have undergone high severity wildfire in the Sierra

Nevada (this figure includes the Antelope Complex and Moonlight Fire on the Plumas NF in 2007). In addition, over 176,000 acres have burned at moderate severity (also includes Antelope and Moonlight), resulting in a mixture of effects on the structurally dominant vegetation Sierra-wide.

Data from the mid-to-late 1990s 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 (+0.80), white fir (+1.98), and red fir (+0.68) and decreased within ponderosa pine (-0.17), productive hardwoods (-0.17), and eastside pine (-0.16).

Population Status and Trend. The BBWO has been monitored in the Sierra Nevada at various sample locations by avian point counts, spot mapping, mist-netting, and breeding bird survey protocols, including: on-going monitoring through California Partners in Flight Monitoring Sites (CPIF 2002); 2002 to present - Plumas and Lassen National Forests (Sierra Nevada Research Center 2007); 1992 to 2005 – Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations (Siegel and Kaschube 2007); 1970 to present – various Sierra Nevada monitoring and study efforts (see USDA 2008, Table BLWO-IV-1); and 1971 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that BBWO's continue to be distributed across the Sierra Nevada, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of BBWO populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Black-Backed Woodpecker Trend. In 2008, a pilot study for black-backed woodpecker monitoring was conducted in the Sierra Nevada (Siegel et al. 2008). Black-backed woodpeckers were detected at 68 of 371 survey stations, in 10 of the 19 fire areas. Occupied sites were well distributed across the Sierra Nevada national forests, ranging from the Lassen NF to the Sequoia NF. This included two sites surveyed in or adjacent to the Moonlight and Wheeler Project analysis area: the Moonlight Fire (due west of Antelope Lake – 16 of 24 stations with BBWO detections and the Boulder Complex Fire (north of Antelope Lake) – 11 of 22 stations with BBWO detections. Detections occurred in every major pre-fire CWHR habitat type surveyed; occupied fire areas ranged in size from small (170 ha, 420 ac) to very large (26,159 ha, 64,639 ac) and ranged from 1 year post-fire to 7 years post-fire. Detections occurred at stations in all three fire severity classes, but more severely burned forest stands were more likely to be occupied (7.8% of the low-severity stations, 17.2% of the moderate-severity stations, and 25.2% of the high-severity stations). BBWOs still occupied fires 7 years old (3 of the 4 seven-years post-fire sites surveyed were occupied). The two sites surveyed where only 1 year had elapsed since fire were occupied, which supports other studies regarding the ability of this species to quickly find and colonize new habitat patches.

The pilot study results indicate that the black-backed woodpecker is "widely distributed across recently burned forest stands in the 10 Sierra Nevada national forests." Black-

backed woodpeckers were detected at numerous fire areas where at least some degree of post-fire logging had occurred (e.g., Boulder Complex Fire, Bassetts Fire) or was in process. Most of these sites had nearby patches of unlogged habitat. However, in two of the fires surveyed (Kibbie and Vista), black-backed woodpeckers were abundant in areas that had not been salvage logged, but absent from the areas that clearly had been salvaged logged.

A query of wildfires between 2000 and 2008 that burned in and around the Tahoe, Plumas, Lassen, and Modoc National Forests and were greater than 1,000 acres was done to obtain a ballpark figure of how much potential habitat is available in the northeast California region (Yasuda, pers. comm. 2009). Of the 51 fires queried, 107,566 acres on forested National Forest lands burned at high severity. The Forest Service Activity Tracking System (FACTS) showed that 9,050 acres were salvaged in these fire areas, leaving 98,516 acres (92%) in an unsalvaged state. After the estimated BBWO suitable acreage to be removed under each alternative is deducted (3,456 acres to 12,397 acres – see Table 15) from this unsalvaged amount, from 86,119 acres (80%) to 95,060 acres (96%) of forested (conifer) areas in this region which burned at high severity between 2000 and 2008 would still support potential BBWO suitable habitat.

The cumulative effect of the Moonlight and Wheeler Project in terms of changes in medium-sized and large-sized snags per acre within burned forest habitat would change from the existing condition. With implementation of the Moonlight and Wheeler Project, there would be a reduction in burned forest habitat supporting snags thus potentially reducing habitat that could support BBWO. Thus the potential for the analysis area to support the BBWO declines post project with implementation of any of the action alternatives. But overall, the analysis area still provides habitat (snags in burned forest) that would support higher densities of BBWO over 2002 levels. The Moon-Wheeler Project, under all alternatives, would not alter the existing trend in the ecosystem component, nor would it lead to a change in the distribution of black-backed woodpecker across the Sierra Nevada bioregion.

Conclusion: All action alternatives, combined with ongoing and planned fire-killed tree removal projects, leave more area unharvested than harvested within the analysis area. The cumulative amount under alternative A (18,526 total estimated acres treated) would leave approximately 73 percent of public land unharvested. The other alternatives would leave the following amount of public lands untreated – Alternative C – 82%, Alternative D - 86%, and Alternative E – 91%. Thus, from 49,882 to 60,248 acres (Alt A and Alt E, respectively) of the 68,408 acre fire land base located on Forest Service land would not be treated for fire-killed or hazard tree removal. Hutto (2006) recommends as a management priority retention of some burned forest 0-5 years after a fire because that is the narrow window of time during which the biologically unique early postfire conditions become established and persist. Leaving the majority of the burn in an unharvested condition maintains an important component of biological diversity identified by Hutto (2006): “all the unique plants and animals that depend on those first few years of natural (postfire) succession. This includes the BBWO.

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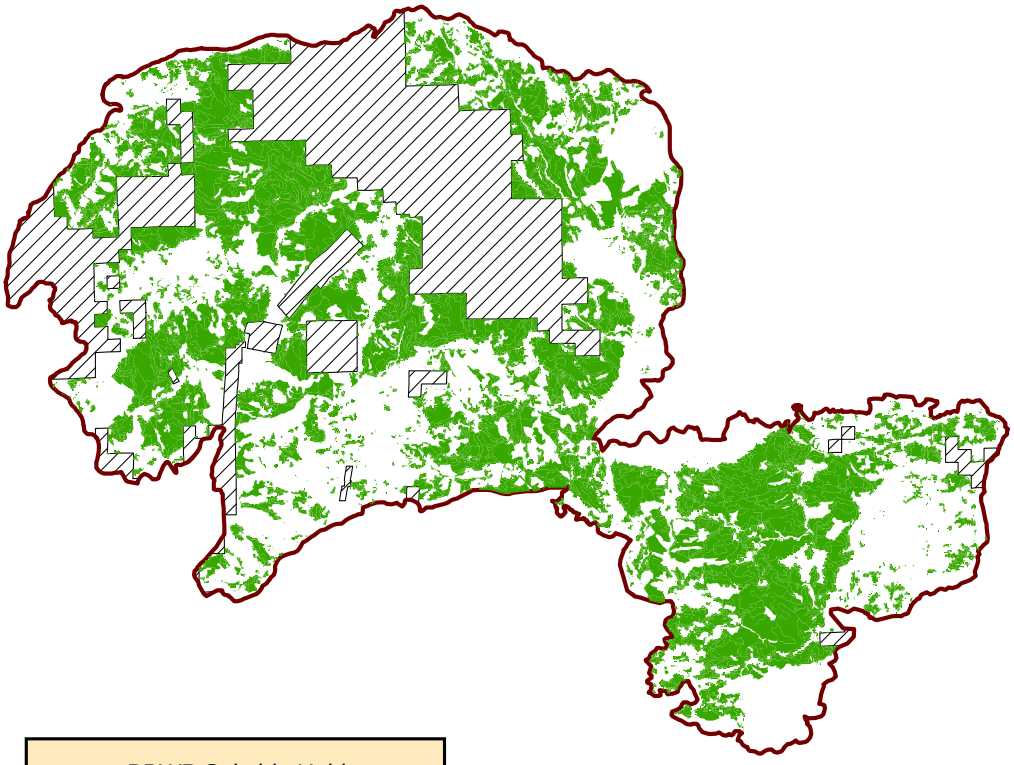
Attachment 1.
BBWP Suitable Habitat
Pre-Moonlight-Wheeler Project

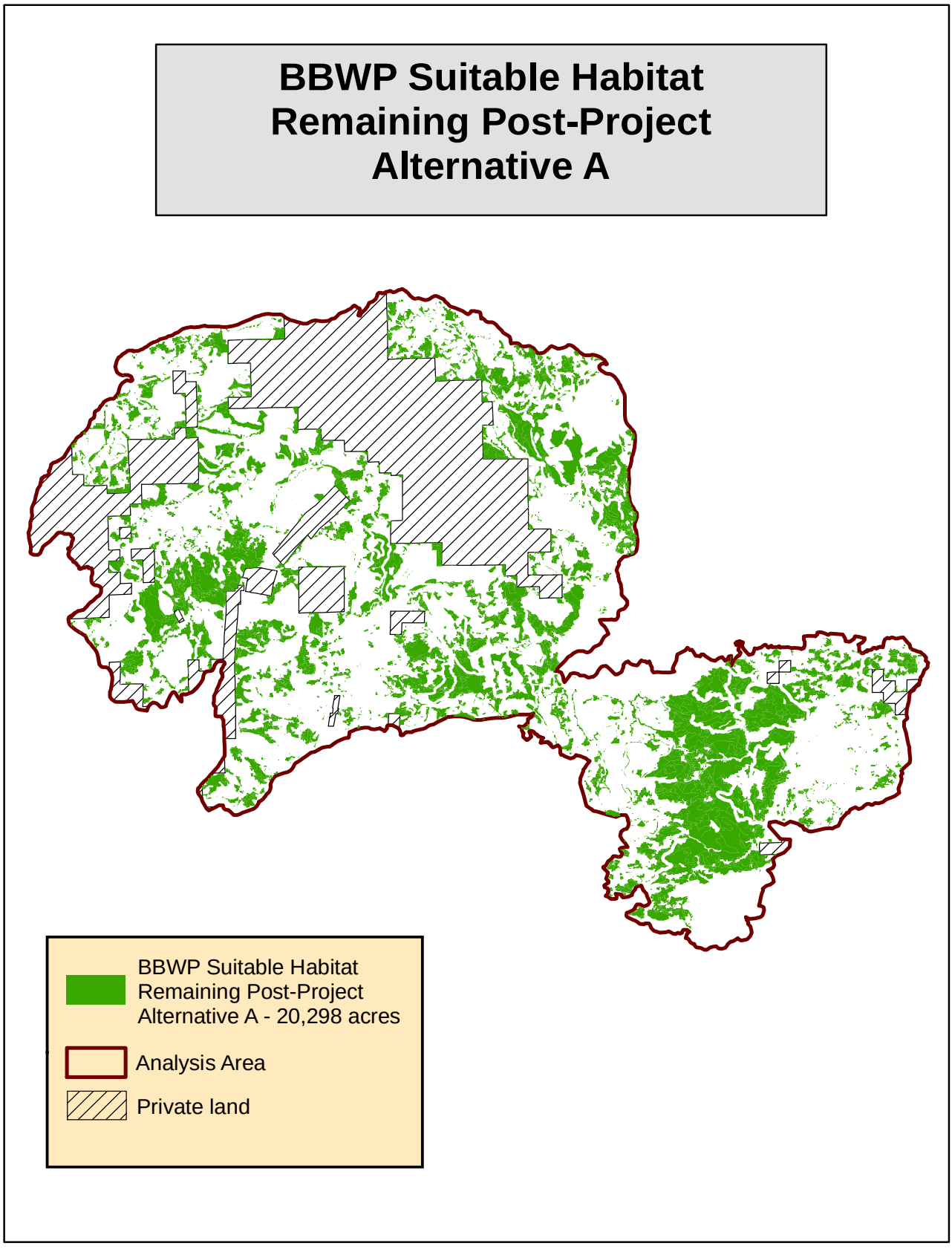


BBWP Suitable Habitat
Existing in Analysis Area
32,695 acres

Analysis Area

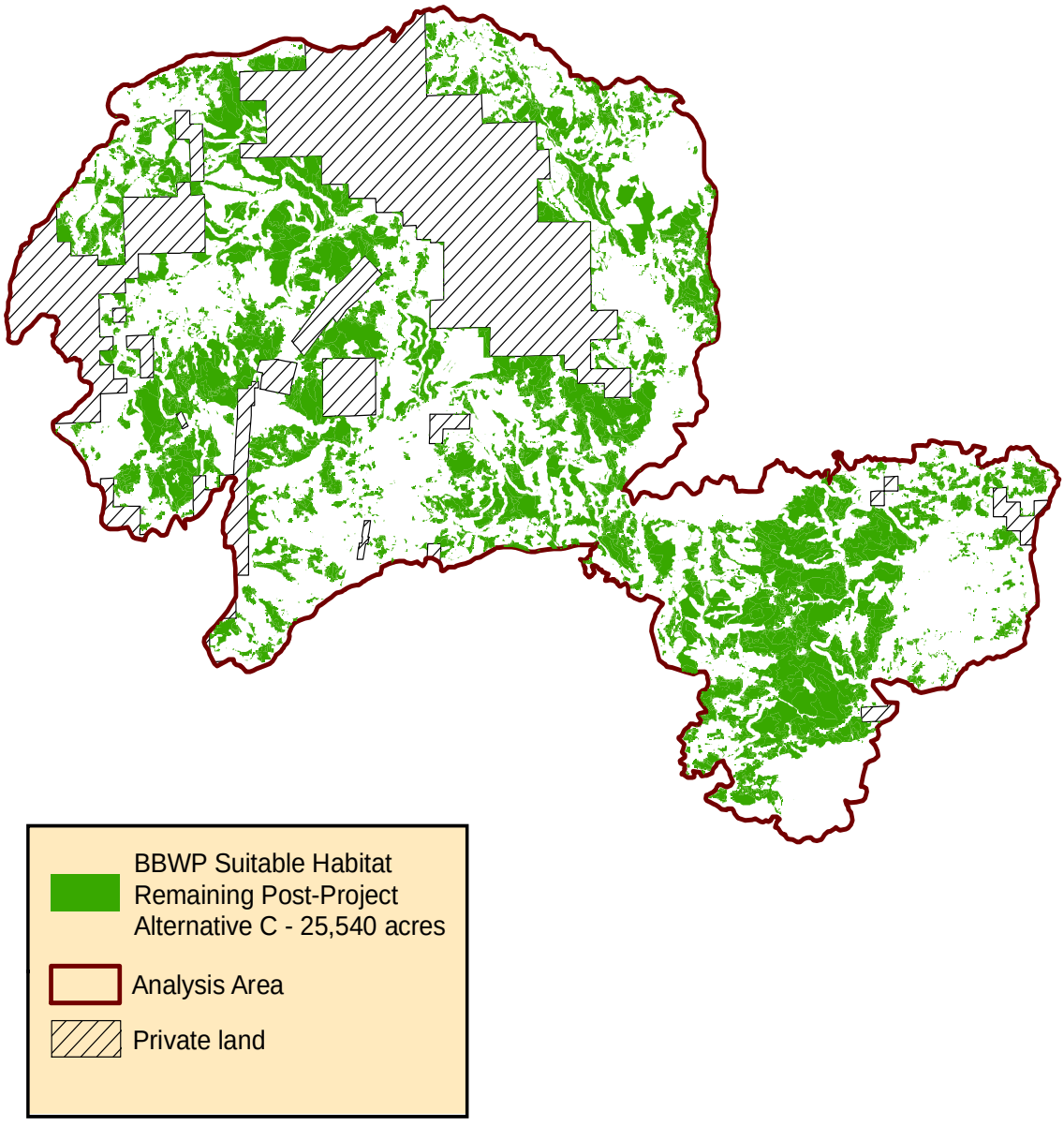
Private land

Attachment 2

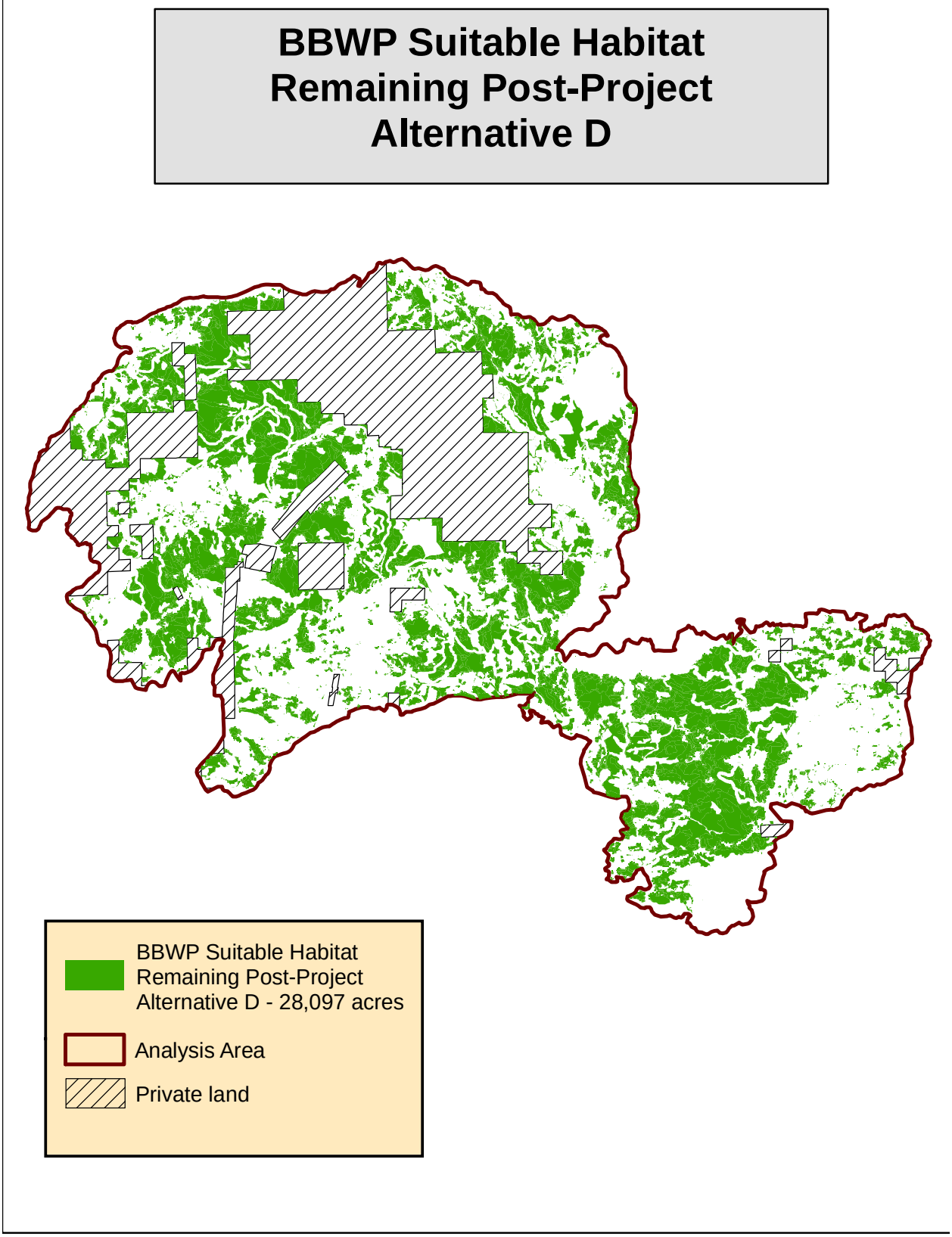


Attachment 3

BBWP Suitable Habitat Remaining Post-Project Alternative C



Attachment 4



Attachment 5