Project Management Indicator Species Report

Rim Reforestation Project

Supervisor's Office

Stanislaus National Forest

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1. Introduction

The purpose of this report is to evaluate and disclose the impacts of the Rim Reforestation Project on the habitat of the thirteen (13) Management Indicator Species (MIS) identified in the Forest (NF) Land and Resource Management Plan (LRMP) (USDA 1991) as amended by the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (USDA Forest Service 2007a). This report documents the effects of the proposed action and alternatives on the habitat of selected project-level MIS. Detailed descriptions of the Rim Reforestation Project alternatives are found in the Rim Reforestation Project NEPA document (USDA Forest Service 2015).

MIS are animal species identified in the SNF MIS Amendment Record of Decision (ROD) signed December 14, 2007, which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). Guidance regarding MIS set forth in the Stanislaus NF 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 Stanislaus NF LRMP as amended.

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

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

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

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

- Identifying which habitat and associated MIS would be either directly or indirectly affected by the project alternatives; these MIS are potentially affected by the project.
- Summarizing the bioregional-level monitoring identified in the LRMP, as amended, for this subset of MIS.
- Analyzing project-level effects on MIS habitat for this subset of MIS.
- Discussing bioregional scale habitat and/or population trends for this subset of MIS.
- Relating project-level impacts on MIS habitat to habitat and/or population trends at the bioregional scale for this subset of MIS.

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

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

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

- **MIS Habitat Status and Trend.**

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

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

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

- **MIS Population Status and Trend.**

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

Population monitoring strategies for MIS of the Stanislaus NF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment ROD (USDA Forest Service 2007a). Population status is the current condition of the MIS related to the population

monitoring data required in the 2007 SNF MIS Amendment ROD for that MIS. Population trend is the direction of change in that population measure over time.

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

2. Selection of Project level MIS

Management Indicator Species (MIS) for the Stanislaus NF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA Forest Service 2007a). The habitats and ecosystem components and associated MIS analyzed for the project were selected from this list of MIS, as indicated in Table 1. In addition to identifying the habitat or ecosystem components (1st column), the CWHR type(s) defining each habitat/ecosystem component (2nd column), and the associated MIS (3rd column), the Table discloses whether or not the habitat of the MIS is potentially affected by the Rim Reforestation Project (4th column).

Table 1. Selection of MIS for Project-Level Habitat Analysis for the Rim Reforestation 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]
Shrubland (west-slope chaparral types)	montane chaparral (MCP), mixed chaparral (MCH), chamise-redshank chaparral (CRC)	fox sparrow *Passerella iliaca*	3
Oak-associated Hardwood & Hardwood/conifer	montane hardwood (MHW), montane hardwood-conifer (MHC)	mule deer *Odocoileus hemionus*	2
Riparian	montane riparian (MRI), valley foothill riparian (VRI)	yellow warbler *Dendroica petechia*	2
Early Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree sizes 1, 2, and 3, all canopy closures	Mountain quail *Oreortyx pictus*	3
Mid Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 4, all canopy closures	Mountain quail *Oreortyx pictus*	3
Late Seral Open Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 5, canopy closures S and P	Sooty (blue) grouse *Dendragapus obscurus*	2
Late Seral Closed Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), tree size 5 (canopy closures M and D), and tree size 6.	California spotted owl *Strix occidentalis occidentalis*	2
		Pacific marten *Martes caurina*	
		northern flying squirrel *Glaucomys sabrinus*	
Snags in Green Forest	Medium and large snags in green forest	hairy woodpecker *Picoides villosus*	2
Snags in Burned Forest	Medium and large snags in burned forest (stand-replacing fire)	black-backed woodpecker *Picoides arcticus*	3

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

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

For this project, reforestation and subsequent future forest development has been modeled to display changes over time. Because forest stand conditions will change from one MIS habitat type to another (e.g., 4M to 5M), it would be difficult to quantify habitat changes for various species and their associated habitats considered in this document and relate that to trends in habitat and populations. Therefore, in order to provide a quantitative analysis for habitat loss or gain (i.e., CWHR size class and density changes), I am bounding my analysis in time and will analyze changes in CWHR size class and densities over a 20 year period. Beyond 20 years, the CHWR size classes and densities continue to change, but they are still suitable and attributed to mountain quail for more than 80 years, thus 20 years is an appropriate timeframe and will provide an accurate assessment of CWHR changes related to project implementation.

Mule deer will not be discussed in detail because the Rim Reforestation Project alternatives would not change acres of oak-associated hardwood or hardwood/conifer habitat, hardwood canopy cover, or hardwood size class.

Yellow Warbler will not be discussed in detail because the Rim Reforestation Project alternatives would not change riparian habitat acres, deciduous canopy cover, total canopy cover, or CWHR size class. The project action alternatives include mitigations that apply buffers on riparian vegetation, promoting it's regrowth after the Rim Fire.

Sooty grouse will not be discussed in detail because the Rim Reforestation Project alternatives would not measurably change acres of late seral open canopy habitat.

California spotted owl, Pacific marten, and northern flying squirrels will not be discussed in detail because the Rim Reforestation Project alternatives would not measurably change acres of late seral closed forest habitat within the timeframe considered.

Hairy woodpecker will not be discussed in detail because the Rim Reforestation Project alternatives would not change the number of snags in green forest. The project action alternatives have management requirements retaining snags within existing plantations proposed for thinning.

The MIS whose habitat would be either directly or indirectly affected by the Rim Reforestation 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 Rim Reforestation Project are: fox sparrow, mountain quail, and black-backed woodpecker.

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

3.a. MIS Monitoring Requirements.

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

Habitat monitoring at the bioregional scale is identified for all the habitats and ecosystem components, including the following analyzed for the Rim Reforestation Project: shrubland; riparian; early seral coniferous forest; mid seral coniferous forest; late seral open canopy coniferous forest; late seral closed canopy coniferous forest; snags in burned forest.

Population monitoring at the bioregional scale for fox sparrow, mountain quail, Sooty grouse, California spotted owl, American marten, northern flying squirrel, and black-backed woodpecker: Distribution population monitoring. Distribution population monitoring consists of collecting presence data for the MIS across a number of sample locations over time (also see USDA Forest Service 2001, Appendix E).

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

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

4. Description of Proposed Project.

The Rim Fire Reforestation project includes planting conifers to reestablish forested habitat lost in the Rim Fire of 2013 as well as thinning existing plantations to improve stand structure and resilience to prescribed fire or wildfire in the future. Table 2 and 3 displays the proposed treatments by alternative.

Table 2. Summary of Thinning Treatments with pre- and post-treatment CWHR Type Acres

Treatment	CWHR Veg Type	CWHR Size Class And Density	Alternative				
			1, 3, 5 Pre-treatment	1, 3, 5 Post-treatment	2 No Action	4 Pre-treatment	4 Post-treatment
Thin Existing	PPN, SMC, WFR, RFR	2-3 S, P, M, D	3,880	3,880	3,880	3,880	3,880

Plantation	PPN, SMC, WFR, RFR	4 M	880	880	880	880	880
	PPN, SMC, WFR, RFR	4 D	1,889	1,889	1,889	1,889	1,889
Total			**6,649**	**6,649**	**6,649**	**6,649**	**6,649**

CWHR habitat types: PPN=ponderosa pine, SMC=sierra mixed conifer, WFR=white fir, RFR=red fir. CWHR Size Classes: 2=saplings, 3=<12" dbh, 4=12-24"dbh, 5=24-40"dbh. CWHR Density Classes (Canopy Closure): S= <20%, P=25-39%, M=40-59%, D=>60%

Because thinning existing plantations would not result in CWHR size class or density changes, no further analysis is warranted.

Table 3. Summary of Pre- and Post-treatment Terrestrial MIS Habitat Acres

Treatment	CWHR Veg Type	CWHR Size Class And Density	Alternative				
			1, 3, 5 Pre-treatment	1, 3, 5 Post-treatment	2 No Action Pre and Post Treatment	4 Pre-treatment	4 Post-treatment
Reforestation	MCP, MCH, CRC	All	59,639	35,376	53,639	53,639	50,689
	PPN, SMC, WFR, RFR	1, 2, 3, 4 (M-D)	52,882	78,882	52,882	52,882	55,832
	DFR, JPN, LPN, PPN, RFR, SCN, SMC, WFR	3, 4, 5, 6 M-D (≥ 50% Basal Area Mortality)	10,326	8,066	10,326	10,326	10,326

CWHR habitat types: MCP=montane chaparral, MCH=mixed chaparral, CRC=chamise-redshank chaparral, DFR=Douglas fir, JPN=Jeffrey pine, LPN=lodgepole pine, PPN=ponderosa pine, SMC=sierra mixed conifer, SCN=Subalpine conifer, WFR=white fir, RFR=red fir. CWHR Size Classes: 2=saplings, 3=<12" dbh, 4=12-24"dbh, 5=24-40"dbh. CWHR Density Classes (Canopy Closure): S= <20%, P=25-39%, M=40-59%, D=>60%

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: fox sparrow, mountain quail, and black-backed woodpecker. The analysis of the effects of the Rim Reforestation Project on the MIS habitat for the selected project-level MIS is conducted at the project scale. The data used in this analysis includes the following habitat data: California Wildlife Habitat Relationships (CWHR) datasets derived from the Stanislaus National Forest vegetation database in combination with RAVG basal area severity classes to create a post-fire CWHR crosswalk of MIS habitat types. Detailed information on the MIS is documented in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

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

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 (Burnett and Humple 2003, Burnett et al. 2005, 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%).

Current Condition of the Habitat Factor(s) in the Project Area: There are 59,639 acres of shrubland habitat in the project area on National Forest System lands. The Rim Fire is estimated to have increased shrubland habitat by 32,534 acres on National Forest System lands. Shrubland habitat that burned or was created by the Rim Fire, and not subsequently salvage logged, is currently suitable for fox sparrow, having two years growth since the fire. Those areas salvage logged are expected to provide suitable chaparral habitat within the next two years.

<u>Alternatives 1, 3, 5</u>

Direct and Indirect Effects to Habitat. Because the effects of these three alternatives to habitat are expected to be similar, these alternatives are analyzed together.

Under Alternatives 1, 3, and 5 reforestation of conifers is proposed to promote the reestablishment and development of forested habitat that was lost in the Rim Fire. This would result in a reduction of shrubland habitat across the project area. About 24,263 acres of post-fire chaparral habitat would be converted back to forest through reforestation. Reforestation is not proposed in areas that were chaparral (CRC, MCH, MCP) prior to the fire. Additionally, there are some areas of conifer habitat that burned at high severity that are not proposed for treatment and have converted to chaparral habitat over the past two years. About 35,376 acres or 59% of existing shrubland habitat would remain intact post treatment on National Forest System lands and is well distributed throughout the project area.

Cumulative Effects to Habitat in the Analysis Area. The Forest queried its databases, including the Schedule of Proposed Actions (SOPA) to determine present and reasonably foreseeable future actions as well as present and reasonably foreseeable future actions on other public (non-Forest Service) and private lands (Appendix B, Rim Reforestation EIS).
There are no present or foreseeable future federal or private projects that would impact shrubland habitat. All salvage and reforestation efforts on private lands are assumed to

have resulted in elimination of any shrubland habitat that may have expressed itself post-fire.

Cumulative Effects Conclusion: Therefore, no cumulative effects are expected from implementation of Alternatives 1, 3, and 5 because there are no other projects occurring in the analysis area that would affect shrubland habitat. Implementation of these alternatives would reduce the amount of chaparral habitat through reforestation within the analysis area by 29% across all ownerships. Again, no pre-fire chaparral is proposed for reforestation. These changes will not alter the existing trend in the chaparral habitat.

Alternative 2

Direct and Indirect Effects to Habitat. Under No Action, there would be no change in the amount of shrubland habitat available because no active management would occur.

Since no reforestation of conifer habitat would occur under this alternative, much of the conifer habitat that burned at high severity would remain chaparral/shrubland. As a result, about 59,639 acres of chaparral habitat would be available on National Forest System lands throughout the project area.

Cumulative Effects to Habitat in the Analysis Area. The Forest queried its databases, including the Schedule of Proposed Actions (SOPA) to determine present and reasonably foreseeable future actions as well as present and reasonably foreseeable future actions on other public (non-Forest Service) and private lands (Appendix B, Rim Reforestation EIS).

There are no present or foreseeable future federal or private projects that would impact shrubland habitat. All salvage and reforestation efforts on private lands is assumed to have resulted in elimination of any shrubland habitat that may have expressed itself post-fire.

Cumulative Effects Conclusion: Because there are no direct or indirect effects expected under this alternative, no cumulative effects are expected.

Alternative 4

Direct and Indirect Effects to Habitat. Under Alternative 4 reforestation of conifers is proposed on 2,950 acres to promote limited reestablishment and development of forested habitat that was lost in the Rim Fire. This would result in a slight reduction of shrubland habitat across the project area. About 5% of post-fire chaparral habitat would be converted back to forest through reforestation. Reforestation is not proposed in areas that were chaparral (CRC, MCH, MCP) prior to the fire. About 50,689 acres or 85% of existing shrubland habitat would remain intact post treatment on National Forest System lands and is well distributed throughout the project area.

Cumulative Effects to Habitat in the Analysis Area. The Forest queried its databases, including the Schedule of Proposed Actions (SOPA) to determine present and reasonably foreseeable future actions as well as present and reasonably foreseeable future actions on other public (non-Forest Service) and private lands (Appendix B, Rim Reforestation EIS).

There are no present or foreseeable future federal or private projects that would impact shrubland habitat. All salvage and reforestation efforts on private lands are assumed to have resulted in elimination of any shrubland habitat that may have expressed itself post-fire.

Cumulative Effects Conclusion: Therefore, no cumulative effects are expected from implementation of Alternative 4 because there are no other projects occurring in the analysis area that would affect shrubland habitat. Implementation of this alternative would reduce the amount of chaparral habitat through reforestation within the analysis area by 3% across all ownerships. Again, no pre-fire chaparral is proposed for reforestation. These changes will not alter the existing trend in chaparral habitat.

Summary of Fox Sparrow Status and Trend at the Bioregional Scale

The Stanislaus 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 Rim Reforestation 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 2010 Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 1,009,681 acres of west-slope chaparral shrubland habitat on National Forest System lands in the Sierra Nevada. Over the last two decades, the trend is slightly increasing (changing from 8% to 9% of the acres on National Forest System lands).

Population Status and Trend. . Monitoring of the fox sparrow across the ten National Forests in the Sierra Nevada has been conducted since 2009 in partnership with PRBO Conservation Science, as part of a monitoring effort that also includes mountain quail, hairy woodpecker, and yellow warbler (USDA Forest Service 2010a, http://data.prbo.org/partners/usfs/snmis/). Fox sparrows were detected on 36.9% of 1659 point counts in 2009 and 44.3% of 2266 point counts in 2010, with detections on all 10 national forests in both years. The average abundance (number of individuals recorded on passive point count surveys) was 0.563 in 2009 and 0.701 in 2010. These data indicate that fox sparrows continue to be distributed across the 10 Sierra Nevada National Forests. In addition, the fox sparrows continue to be monitored and surveyed in the Sierra Nevada at various sample locations by avian point count, spot mapping, mist-net, and breeding bird survey protocols. These are summarized in the 2008 Bioregional Monitoring Report (USDA Forest Service 2008). Current data at the rangewide, California, and Sierra Nevada scales indicate that, 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 change in availability of 24,263 acres of chaparral habitat in the Rim project area out of 1,009,681 acres of chaparral throughout the bioregion 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.

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), tree sizes 1, 2, 3, and 4, 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 Project Area: There is a total of 52,882 acres of early and mid-seral coniferous forest habitats within the project area.

Alternatives 1, 3, and 5

Because the effects of these three alternatives to habitat are expected to be similar, these alternatives are analyzed together.

Direct and Indirect Effects to Habitat. Under Alternatives 1, 3, and 5 reforestation of conifers on about 26,000 acres is proposed to promote the reestablishment and development of forested habitat that was lost in the Rim Fire. Competing vegetation, including shrubs, would be reduced on up to 80% of any given acre during the first six years after planting to allow the conifer seedlings to get established. It is assumed that some shrub cover, up to 20% of any given acre, would be available during this period time and could provide habitat for mountain quail. After the conifer seedlings have become established there would be no further suppression of understory shrubs. It is expected that shrub cover would increase throughout treatment units. Implementation of these alternatives would result in an increase in the availability of early and mid-seral conifer forested habitat and understory shrub cover across the project area over the next 20 years. An increase of about 49% of early to mid-seral forested habitat would be

available on National Forest System lands and would be well distributed throughout the project area.

Cumulative Effects to Habitat in the Analysis Area. The Forest queried its databases, including the Schedule of Proposed Actions (SOPA) to determine present and reasonably foreseeable future actions as well as present and reasonably foreseeable future actions on other public (non-Forest Service) and private lands (Appendix B, Rim Reforestation EIS).
There are no present or foreseeable future federal or private projects that would result in a change in the CWHR designation or amount of early or mid-seral conifer forest habitat or understory shrub cover available across the analysis area.

Cumulative Effects Conclusion: Therefore, no cumulative effects are expected from implementation of Alternatives 1, 3, and 5 because there are no other projects occurring in the analysis area that would affect early to mid-seral conifer habitat. Implementation of these alternatives would increase the amount of early to mid-seral conifer forest habitat through reforestation within the analysis area by 29% across all ownerships. These changes will not alter the existing trend in early to mid-seral conifer forest habitat.

Alternative 2

Direct and Indirect Effects to Habitat. Under No Action, no direct effects are expected because no active management would occur.

The indirect effects of no action are primarily related to the influence no action may have on the amount of early to mid-seral forested habitat available. Under this alternative, about 9,800 acres of forested habitat is predicted to develop naturally over the next 20 years with no active management. This would increase the amount of early to mid-seral habitat availability across STF lands by 16 percent, almost 2/3 less than that expected under Alternatives 1, 3, and 5.

Cumulative Effects to Habitat in the Analysis Area. The Forest queried its databases, including the Schedule of Proposed Actions (SOPA) to determine present and reasonably foreseeable future actions as well as present and reasonably foreseeable future actions on other public (non-Forest Service) and private lands (Appendix B, Rim Reforestation EIS).

There are no present or foreseeable future federal or private projects that would result in a change in the CHWR designation or amount of early or mid-seral conifer forest habitat or understory shrub cover available across the analysis area.

Cumulative Effects Conclusion: Therefore, no cumulative effects are expected from Alternative 2 because there are no other projects occurring in the analysis area that would affect early to mid-seral conifer habitat. Implementation of Alternative 2 would result in an increase in the amount of early to mid-seral conifer forest habitat through natural regeneration within the analysis area by 16% across all ownerships. These changes will not alter the existing trend in early to mid-seral conifer forest habitat.

Alternative 4

Direct and Indirect Effects to Habitat. Under Alternative 4 reforestation of conifers on about 2,950 acres is proposed to promote the reestablishment and development of a small amount of forested habitat that was lost in the Rim Fire. This alternative would result in an increase in the availability of early and mid-seral forested habitat across the project area over the next 20 years. Most of the increase would be attributed to natural regeneration which is predicted to add about 9,800 acres of early to mid-seral conifer forest habitat in the next 20 years. Competing vegetation, including shrubs, would be reduced on up to 80% of any given acre during the first six years after planting to allow the conifer seedlings to get established. It is assumed that some shrub cover, up to 20% of any given acre, would be available during this period time and could provide habitat for mountain quail. After the conifer seedlings have become established there would be no further suppression of understory shrubs. It is expected that shrub cover would increase throughout treatment units. A combined increase (reforestation and natural regeneration) of about 21% of early to mid-seral conifer forest habitat and understory shrub cover would be available on National Forest System lands and it is assumed this habitat would be somewhat distributed throughout the project area.

Cumulative Effects to Habitat in the Analysis Area. The Forest queried its databases, including the Schedule of Proposed Actions (SOPA) to determine present and reasonably foreseeable future actions as well as present and reasonably foreseeable future actions on other public (non-Forest Service) and private lands (Appendix B, Rim Reforestation EIS).
There are no present or foreseeable future federal or private projects that would result in a change in the CWHR designation or amount of early or mid-seral conifer forest habitat or understory shrub cover.

Cumulative Effects Conclusion: Therefore, no cumulative effects are expected from implementation of Alternative 4 because there are no other projects occurring in the analysis area that would affect early to mid-seral conifer forest habitat. Implementation of this alternative would increase the amount of conifer forest habitat through reforestation and natural regeneration within the analysis area by 15% across all ownerships. These changes will not alter the existing trend in early to mid-seral conifer forest habitat.

Summary of Mountain Quail Status and Trend at the Bioregional Scale

The Stanislaus 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 Rim Reforestation 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 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 530,851 acres of early seral and 2,776,022 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. Over the last two decades, the trend for early seral is decreasing (changing from 9% to 5% of the acres on National Forest System lands) and the trend for mid seral is increasing (changing from 21% to 25% of the acres on National Forest System lands).

Population Status and Trend. Monitoring of the mountain quail across the ten National Forests in the Sierra Nevada has been conducted since 2009 in partnership with PRBO Conservation Science, as part of a monitoring effort that also includes fox sparrow, hairy woodpecker, and yellow warbler (USDA Forest Service 2010a, http://data.prbo.org/partners/usfs/snmis/). Mountain quail were detected on 40.3 percent of 1659 point counts (and 48.6% of 424 playback points) in 2009 and 47.4% of 2266 point counts (and 55.3% of 492 playback points) in 2010, with detections on all 10 national forests in both years. The average abundance (number of individuals recorded on passive point count surveys) was 0.103 in 2009 and 0.081 in 2010. These data indicate that mountain quail continue to be distributed across the 10 Sierra Nevada National Forests. In addition, mountain quail continue to be monitored and surveyed in the Sierra Nevada at various sample locations by hunter survey, modeling, and breeding bird survey protocols. These are summarized in the 2008 Bioregional Monitoring Report (USDA Forest Service 2008).Current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of mountain quail populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Mountain Quail Trend. There will be an increase in early to mid-seral conifer forest habitat and understory shrub cover under all alternatives. The change in understory shrub canopy closure of up to 26,000 acres out of 3,306,873 acres of early to mid-seral coniferous forest habitat in the Rim Reforestation Project 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.

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

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

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

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

Current Condition of the Habitat Factor(s) in the Project Area: Several studies have suggested that Black-backed Woodpecker distribution is most associated with areas that

burned at the high end of the fire severity spectrum (Russell et al 2007, Hanson and North 2008, Vierline et al. 2008, Hutto 2008). I restricted this CWHR acreage analysis to burned forest, with suitable habitat defined as ≥ 50% Basal Area Mortality in conifer forest. I considered the following CWHR forest types: Douglas-Fir, Jeffrey Pine, Lodgepole Pine, Montane Hardwood- Conifer, Ponderosa Pine, Red Fir, Subalpine Conifer, Sierran Mixed Conifer, and White Fir in CWHR size classes greater or equal to 3 (size class 3 corresponds to 6-11 inch dbh) and where the CWHR tree canopy was moderate or dense. These criteria correspond to the habitat preferences of BBWOs as outlined in the Conservation Strategy (Bond et al. 2012). There is a total of 10,326 acres of burned forest within the project area on National Forest System lands.

Alternatives 1, 3, and 5

Because the effects of these three alternatives to habitat are expected to be similar, these alternatives are analyzed together.

Direct and Indirect Effects to Habitat. Under Alternatives 1, 3, and 5 about 2,260 acres of burned forest is proposed for treatments to promote the reestablishment and development of forested habitat that was lost in the Rim Fire. About 900 of the 2,260 acres of high quality burned conifer forest habitat would not be treated until 2021, specifically set aside as black-backed woodpecker habitat. Treatments would result in the removal of most burned snags that are currently present. Snag retention guidelines under these alternatives would provide 12 to 30 square feet basal area of snags or roughly 4-6 snags per acre. These alternatives would result in a decrease of about 22% of burned conifer forest habitat on National Forest System lands within the project area. Conversely, about 8,066 acres or 78% of the burned conifer forest habitat would be retained and remain available on National Forest System lands.

Cumulative Effects to Habitat in the Analysis Area. The Forest queried its databases, including the Schedule of Proposed Actions (SOPA) to determine present and reasonably foreseeable future actions as well as present and reasonably foreseeable future actions on other public (non-Forest Service) and private lands (Appendix B, Rim Reforestation EIS).
There are no present or foreseeable future federal or private projects that would result in a change in the CWHR designation or amount of snags in burned conifer forest available across the analysis area.

Cumulative Effects Conclusion: Therefore, no cumulative effects are expected from implementation of Alternatives 1, 3, and 5 because there are no other projects occurring in the analysis area that would affect snags in burned conifer forest. Implementation of these alternatives would slightly decrease the acreage of snags in burned conifer forest habitat within the analysis area by 8%. The change in the number of medium snags per acre on up to 2,260 acres will not alter the existing trend in the ecosystem component.

Alternative 2

Direct and Indirect Effects to Habitat. Under No Action, no direct effects are expected because no active management would occur.

The indirect effects of no action would result in the greatest retention of snags in burned conifer forest. Under this alternative, 10,326 acres (100%) of snags in burned forest would remain available across the project area.

Cumulative Effects to Habitat in the Analysis Area. The Forest queried its databases, including the Schedule of Proposed Actions (SOPA) to determine present and reasonably foreseeable future actions as well as present and reasonably foreseeable future actions on other public (non-Forest Service) and private lands (Appendix B, Rim Reforestation EIS).

There are no present or foreseeable future federal or private projects that would result in a change in the CWHR designation or amount of snags in burned conifer forest available across the analysis area.

Cumulative Effects Conclusion: Therefore, no cumulative effects are expected from Alternative 2 because there are no other projects occurring in the analysis area that would affect early to mid-seral conifer habitat. Implementation of Alternative 2 would result in the greatest number of snags in burned conifer forest habitat within the analysis area. This alternative is not expected to alter the existing trend in the ecosystem component (i.e., number of medium snags per acre in snags in burned conifer forest).

Alternative 4

Direct, Indirect, and Cumulative Effects to Habitat. Under Alternative 4, there are zero acres of burned conifer forest proposed for treatment; therefore, effects are expected to be the same as under No Action.

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

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

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

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

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

These data include snags in both green forest and burned forest. Between 2000 and 2007, 211,000 acres underwent severe burn and 176,000 acres underwent moderate burn in the Sierra Nevada.

Population Status and Trend. Monitoring of the black-backed woodpecker across the 10 National Forests in the Sierra Nevada has been conducted since 2008 in partnership with the Institute for Bird Populations (IBP) (USDA Forest Service 2010a, http://www.birdpop.org/Sierra/bbwo.htm). In 2008, black-backed woodpeckers were detected at 68 survey stations distributed across 10 of the 19 fire areas surveyed. In 2009, black-backed woodpeckers were detected at 169 survey station distributed across 28 of the 51 fire areas surveyed. In both years, occupied sites were well distributed across the Sierra Nevada national forests, included burned areas of a variety of sizes, and included areas 1 to 10 years post-fire. These data indicate that black-backed woodpeckers continue to be distributed across the 10 Sierra Nevada National Forests. Additionally, mean occupancy probability for stations surveyed during 2009 was 0.253 (95% credible interval: 0.222 – 0.289); applying this probability across the 10 national forests yields an estimate that approximately 81,814 ha (25.3%) (range of 71,921 – 93,610 ha) the 323,358 ha of burned forest (burned between 1999 and 2008) on the ten national forest units within monitoring area was occupied by Black-backed Woodpeckers in 2009. In addition, the black-backed woodpeckers continue to be surveyed in the Sierra Nevada at various sample locations by avian point count, spot mapping, mist-net, and breeding bird survey protocols. These are summarized in the 2008 Bioregional Monitoring Report (USDA Forest Service 2008). Current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of black-backed woodpecker populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Black-Backed Woodpecker Trend. The direct, indirect and cumulative effects of the Rim Reforestation Project in terms of medium and large-sized snags per acre within burned forest would change from the existing condition. With the implementation of this project, there would be a small reduction in burned forest habitat supporting snags, thus reducing habitat availability. However, up to 25,553 acres or 92% of snags in burned conifer forest would be retained and would remain available across the landscape. The action alternatives would not significantly alter the existing trend in the ecosystem component, nor would it lead to a change in the distribution of BBWO across the Sierra Nevada bioregion.

References Cited

Bland, J.D. 1993. Forest grouse and mountain quail investigations: A final report for work completed during the summer of 1992. Unpubl. report, Wildl. Mgmt. Div., Calif. Dept. Fish & Game, 1416 Ninth St., Sacramento, CA.
Burnett, R. D., and D. L. Humple. 2003. Songbird monitoring in the Lassen National Forest: Results from the 2002 field season with summaries of 6 years of data (1997-2002). PRBO Conservation Science Contribution Number 1069. 36pp.
Burnett, R.D., D.L. Humple, T.Gardali, and M.Rogner. 2005. Avian monitoring in Lassen National Forest 2004 Annual Report. PRBO Conservation Science Contribution Number 1242. 96pp.
CDFG (California Department of Fish and Game). 2004a. Resident Game Bird Hunting Final Environmental Document. August 5, 2004. State of California, The Resources Agency, Department of Fish and Game. 182 pp + appendices.
CDFG (California Department of Fish and Game). 2004b. Report of the 2004 Game Take Hunter Survey. State of California, The Resources Agency, Department of Fish and Game. 20pp.
CDFG (California Department of Fish and Game). 2005. California Department of Fish and Game and California Interagency Wildlife Task Group. California Wildlife Habitat Relationships (CWHR) version 8.1. personal computer program. Sacramento, California. On-Line version. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.asp. (Accessed: January 3, 2008).
Hutto, R.L. 1995. Composition of bird communities following stand-replacement fires in Northern Rocky Mountain (U.S.A.) conifer forests. Conservation Biology 9(5):1041-1058.
Hutto, R.L., and S.M. Gallo. 2006. The effects of postfire salvage logging on cavity-nesting birds. The Condor 108:817-831.
Kotliar, N.B., S.J. Hejl, R.L. Hutto, V.A. Saab, C.P. Melcher, and M.E. McFadzen. 2002. Effects of fire and post-fire salvage logging on avian communities in conifer-dominated forests of the western United States. Studies in Avian Biology No.25:49-64.
Lake Tahoe Basin Management Unit. 2007. Lake Tahoe Basin Management Unit Multi Species Inventory and Monitoring: A Foundation for Comprehensive Biological Status and Trend Monitoring in the Lake Tahoe Basin. Draft Report.
Mayer, K.E., and W.F. Laudenslayer, eds. 1988. A Guide to Wildlife Habitats of California. California Department of Forestry and Fire Protection, Sacramento, CA. 166pp. http://www.dfg.ca.gov/biogeodata/cwhr/wildlife_habitats.asp
Moyle, P.B. and P.J. Randall. 1996. Biotic Integrity of Watersheds. Pages 975-985 in Sierra Nevada Ecosystem Project: Final Report to Congress, Assessments and scientific basis for management options, Vol II, chp 34. University of California, Centers for Water and Wildland Resources, Davis, CA 95616. http://ceres.ca.gov/snep/pubs/web/PDF/VII_C34.PDF
Sauer, J. R., J. E. Hines, and J. Fallon. 2007. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2006. Version 10.13.2007. USGS Patuxent Wildlife Research Center, Laurel, MD.*
Siegel, R.B. and D.F. DeSante. 1999. Version 1.0. The draft avian conservation plan for the Sierra Nevada Bioregion: conservation priorities and strategies for safeguarding Sierra bird populations. Institute for Bird Populations report to California Partners in Flight. Available on-line: http://www.prbo.org/calpif/htmldocs/sierra.html.
Sierra Nevada Research Center. 2007. Plumas Lassen Study 2006 Annual Report. USDA Forest Service, Pacific Southwest Research Station, Sierra Nevada Research Center, Davis, California. 182pp.

Sierra Nevada Research Center. 2008. Plumas Lassen Study 2007 Annual Report. USDA Forest Service, Pacific Southwest Research Station, Sierra Nevada Research Center, Davis, California. 310pp. http://www.fs.fed.us/psw/programs/snrc/forest_health/plas_annual_report_2007.pdf
Sierra Nevada Research Center. 2009. Plumas Lassen Study 2008 Annual Report. USDA Forest Service, Pacific Southwest Research Station, Sierra Nevada Research Center, Davis, California. 223pp. http://www.fs.fed.us/psw/programs/snrc/forest_health/plas_annual_report_2008.pdf
Sierra Nevada Research Center. 2010. Plumas Lassen Study 2009 Annual Report. USDA Forest Service, Pacific Southwest Research Station, Sierra Nevada Research Center, Davis, California. 184pp. http://www.fs.fed.us/psw/programs/snrc/forest_health/plas_annual_report_2009.pdf
Smucker, K.M., R.L. Hutto, B.M. Steele. 2005. Changes in bird abundance after wildfire: importance of fire severity and time since fire. Ecological applications 15(5):1535-1549.
USDA Forest Service. 2001. Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement. Forest Service, Pacific Southwest Region. January 2001. http://www.fs.fed.us/r5/snfpa/library/archives/feis/index.htm
USDA Forest Service. 2004. Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement. Forest Service, Pacific Southwest Region. 2004. http://www.fs.fed.us/r5/snfpa/final-seis/
USDA Forest Service. 2005. Sierra Nevada forest plan accomplishment monitoring report for 2004. USDA Forest Service, Pacific Southwest Region R5-MR-026. 8pp.
USDA Forest Service. 2006a. Draft - MIS Analysis and Documentation in Project-Level NEPA, R5 Environmental Coordination, May 25, 2006. Pacific Southwest Region. 3pp.
USDA Forest Service. 2006b. Sierra Nevada forest plan accomplishment monitoring report for 2005. USDA Forest Service, Pacific Southwest Region R5-MR-000. 12pp.
USDA Forest Service. 2007a. Record of Decision, Sierra Nevada Forests Management Indicator Species Amendment. U.S. Forest Service, Pacific Southwest Region. December, 2007. 18pp.
USDA Forest Service. 2007b. Sierra Nevada forest plan accomplishment monitoring report for 2006. USDA Forest Service, Pacific Southwest Region R5-MR-149. 12pp.
USDA Forest Service. 2008. Sierra Nevada Forests Bioregional Management Indicator Species (MIS) Report: Life history and analysis of Management Indicator Species of the 10 Sierra Nevada National Forests: Eldorado, Inyo, Lassen, Modoc, Plumas, Sequoia, Sierra, Stanislaus, and Tahoe National Forests and the Lake Tahoe Basin Management Unit. Pacific Southwest Region, Vallejo, CA. January 2008. http://www.fs.fed.us/r5/snfmisa/pdfs/2008_Sierra_Nevada_Forests_MIS_Report_January_2008.pdf
USDA Forest Service. 2009. Sierra Nevada forest plan accomplishment monitoring report for 2007. USDA Forest Service, Pacific Southwest Region. On-line version. http://www.fs.fed.us/r5/snfpa/monitoringreport2007/
USDA Forest Service. 2010a. Sierra Nevada Forests Bioregional Management Indicator Species (MIS) Report: Life history and analysis of Management Indicator Species of the 10 Sierra Nevada National Forests: Eldorado, Inyo, Lassen, Modoc, Plumas, Sequoia, Sierra, Stanislaus, and Tahoe National Forests and the Lake Tahoe Basin Management Unit. Pacific Southwest Region, Vallejo, CA. December 2010. 132pp.
USDA Forest Service. 2010b. Sierra Nevada forest plan accomplishment monitoring report for 2008. USDA Forest Service, Pacific Southwest Region. On-line version. http://www.fs.fed.us/r5/snfpa/monitoringreport2008/
USDA Forest Service. 2015. Rim Reforestation Project NEPA Document.