Project Management Indicator Species Report

Rim Fire Recovery

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 Fire Recover Project on the habitat of the two (2) Aquatic 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 Fire Recovery Project alternatives are found in the Rim Fire Recovery Project Draft Environmental Impact Statement (DEIS) (USDA Forest Service 2014, Chapter 2 pages 2-27).

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 Fire Recovery 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 Fire Recovery 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. Aquatic MIS for the Sierra Nevada National Forests represent 3 major habitats (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).

- **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 (Frazier 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

Aquatic 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 aquatic 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 Fire Recovery Project (4th column).

Table 1. Selection of MIS for Project-Level Habitat Analysis for the Rim Fire Recovery 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
Wet Meadow	Wet meadow (WTM), freshwater emergent wetland (FEW)	Pacific tree (chorus) frog *Pseudacris regilla*	2

[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.

Pacific tree frog will not be discussed further in this document. Within the project boundary are just over 2006 acres of wet meadow habitat; 783 acres on private land, 42 acres on tribal land, 39 acres in Yosemite National Park, and 1143 acres on National Forest Lands. Of this, each of the proposed action alternatives include a little over 17 acres of wet meadow habitat. Although located within proposed units, no equipment will operate within these wet meadows and dead trees will only be removed from around the edges of the meadows. Of the four habitat factors identified for analysis for tree frog there will be no changes in (1) acres of wet meadow habitat, (2) CWHR herbaceous height classes, (3) herbaceous ground cover, or (4) meadow hydrology.

The aquatic MIS whose habitat would be either directly or indirectly affected by the Rim Fire Recovery 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 aquatic MIS selected for project-level MIS analysis for the Rim Fire Recovery Project are: aquatic macroinvertebrates.

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 Fire Recovery 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 Fire Recovery Project.

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).

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 Recovery Project proposes salvage of dead trees, removal of hazard trees along level 2 roads, fuels treatments and associated road work. A full description of the proposed actions is found in the Draft Environmental Impact Statement in Section 2.01 (Rim Fire Recovery Project DEIS 2014). Table 2 summarizes the proposed actions by alternative.

Table 2. Summary of Treatments

Proposed Treatments	Alternative 1	Alternative 3	Alternative 4
Ground based salvage	24,127 acres	26,252 acres	24,176 acres
Ground based/skyline swing salvage	16 acres	16 acres	16 acres
Aerial based salvage	2,930 acres	3,035 acres	2,568 acres
Cable system salvage	1,253 acres	1,096 acres	1,066 acres
Biomass removal fuels	7,626 acres	8, 379 acres	7,975 acres
Machine piling and burning fuels	24,143 acres	22, 036 acres	20,320 acres
Jackpot burning fuels	4,199 acres	4,147 acres	3.650 acres
Mastication fuels		1,309 acres	1,309 acres
Drop and lop fuels		2,228 acres	1,798 acres
Removal of Hazard Trees- Level 2 roads	341.0 miles (16,315 acres)	314.8 miles (15,253 acres)	324.6 miles (15,692 acres)
Road management - reconstruction	319.9 miles	323.6 miles	315.0 miles
Road management - maintenance	216.1 miles	200.6 miles	209.3 miles
Road management – temporary road	21.6 miles	35.5 miles	33.8 miles
Road management - new road construction	5.4 miles	1.0 miles	0 miles

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 macroinvertebrates. The analysis of the effects of the Rim Fire Recovery Project on the MIS habitat for the selected project-level MIS is conducted at the project scale. The analysis used the following habitat data: Geographic Information Systems (GIS) NHD (National Hydrography Data) layer showing perennial and intermittent streams and lakes; Stanislaus Streamscape Inventory program. 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).

Lacustrine/Riverine Habitat (Aquatic Macroinvertebrates)

Habitat/Species Relationship.

Aquatic or Benthic Macroinvertebrates (BMI) were selected as the MIS for riverine and lacustrine habitat in the Sierra Nevada. They have been demonstrated to be very useful as indicators of water quality and aquatic habitat condition (Resh and Price 1984; Karr et al. 1986; Hughes and Larsen 1987; Resh and Rosenberg 1989). They are sensitive to changes in water chemistry, temperature, and physical habitat; aquatic factors of particular importance are: flow, sedimentation, and water surface shade.

Project-level Effects Analysis – Lacustrine/Riverine Habitat

Habitat Factor(s) for the Analysis: Flow; Sedimentation; and Water surface shade.

Current Condition of the Habitat Factor(s) in the Project Area: The Rim Fire Recovery Watershed Management Report thoroughly discusses the existing conditions in the project area. That information is summarized here. There have been multiple large scale fires in the project area, as well as vegetation and road management actions, recreation and grazing. The Rim Fire was a mixed severity fire that burned upland areas at higher severity than near the streams in the 18 HUC 6 watersheds that encompass the fire perimeter (see Watershed Management Report page 29 and Table 6).

In the first year after a fire, water flow typically increases due to a reduction in soil water storage, interception and evapotranspiration when vegetation is killed. (Watershed Management Report, page 46) As vegetation recovers, the water yield will decrease.

Post fire erosion and sedimentation increases are expected. Table 10 of the Watershed Management Report displays the results of erosion modeling in the fire area by watershed. In an undisturbed watershed erosion rates average 0.5 tons per acre. The HUC 6 watersheds encompassing the Rim Fire are modeled to have from 0.7 to 3.6 tons

per acre. The actual magnitude is dependent upon the timing and severity of winter weather events and to date the fire area has received below average precipitation. Observations after the 1987 Stanislaus Complex Fire, that occurred in some of the same watersheds as the Rim Fire (Watershed Management Report, Figure 2), indicated that increased sediments were essentially gone from streams within 3 to 5 years (Watershed Management Report, page 16).

Water surface shade was reduced by the Rim Fire, particularly in areas where the vegetation burn severity was higher. Table 6 of the Watershed Management Report displays the soil and vegetation burn severity by watershed within the Riparian Conservation Areas (RCAs) along intermittent and perennial streams in the project area. There is a notable loss of stream shade from conifers and riparian obligate trees and shrubs in many watersheds. Riparian trees and shrubs will recover and provide shade within 5 years, while conifers trees will recover in a longer time frame. (Watershed Management Report, page 29).

Alternatives 1, 3 and 4

Direct and Indirect Effects to Habitat. The Rim Fire Recovery Project proposes to remove dead trees, as well as hazard trees along level 2 roads. Stream flow would not be altered by the project as dead trees do not contribute to soil water storage, interception, or evapotranspiration and their removal does not contribute to the changes brought by the Rim Fire. Hazard trees along Level 2 roads will be removed adjacent to approximately 38 miles of stream, with no more than 8 miles in any one HUC6 watershed. Live trees will only be removed if they are a hazard, and the quantity of trees would not be enough to alter flow rates. (Watershed Management Report, page 46).

Sedimentation levels can increase as a result of salvage operations. This is primarily a result of soil compaction and disturbance (see Soils Reports), and in areas with hydrologically connected segments of roads. Erosion modeling (Watershed Management Report, Table 9, Table 17 and Table 23) indicates that the action alternatives would either have no effect on or reduce post-fire erosion in every HUC6 watershed considered. Alternative 3 would result in the greatest decrease in erosion. Modeling also shows an increase in the smaller HUC7 Granite Creek drainage under Alternative 1. Granite Creek was burned with 30 percent high soil burn severity and 62 percent moderate soil burn severity. The increase in erosion is slight (0.1 ton/acre) and is attributed to a reduction in ground cover from hazard tree treatment in lightly burned areas (Watershed Management Report, page 38). The Watershed Management Report describe the erosion and sedimentation effects expected from the action alternatives in detail. Also described are the effectiveness of Best Management Practices. In general, erosion is expected to increase somewhat in the first year after activities, and decrease within 2 to 5 years as vegetation recovers. Erosion will result in sediment input to the river systems. The bedrock controlled stream reaches will generally transport sediment, with fine sediments accumulating in pools and pool tails in the less steep stream sections.

Removal of dead trees under the action alternatives would not reduce water surface shade. Removal of hazard trees along Level 2 roads adjacent to approximately 38 miles of stream will not result in measurable changes in stream shading. Riparian vegetation recovery will increase stream shading within 5 years.

Cumulative Effects to Habitat in the Analysis Area. Cumulative Effects were analyzed at the level of the 18 HUC6 level watersheds that encompass the Rim Fire. Activities considered are described in Appendix B. Cumulative Effects, of the Rim Fire Recovery DEIS. The Watershed Management Report used the Equivalent Roaded Acres (ERAs) methodology to analyze the risk of cumulative effects, as described in Appendix A: Cumulative Watershed Effects Analysis Methodology. The effects are compared to a threshold of concern, set at 12-14%. Tables 13, 14, 20 and 26 in the Watershed Management Report display the Era values by watershed over time. Under the action alternatives 2 HUC6 watersheds (Jawbone Creek – Tuolumne River and Lower Middle Fork Tuolumne River) exceed the threshold of concern. Additional analysis was conducted on smaller HUC7 watersheds where Rim Fire effects were greater. Five HUC 7 drainages (Corral Creek, Lower Jawbone Creek, Bear Springs Creek, Lower Reed Creek and Granite Creek) exceed the threshold of concern (see Watershed Management Report). Further evaluation in the watershed report indicates that Lower Jawbone Creek and Bear Springs Creek have low acreages of proposed treatment on high risk areas and it is "likely any increases in sedimentation would be minimal" (Watershed Management Report pages 53 and 54). Corral Creek, Lower Reed Creek, Granite Creek and the Lower Middle Fork Tuolumne River are areas which have the greatest potential for stream sedimentation following treatment. Management recommendations within these waters, implementation of Best Management Practices, and monitoring to identify and correct problem areas indicate the action alternatives are not anticipated to result in adverse off-site cumulative effects to sediment-related water quality parameters or to watershed condition (i.e. degradation of stream channel morphology, accelerated erosion or loss of soil productivity) (See Watershed Management Report).

Cumulative Effects Conclusion: Changes in flow and water surface shade will be too small to be measured. Sedimentation will increase slightly as a result of proposed actions, however the amount of increase will be indiscernible compared to the increased sediment from the Rim Fire.

Summary of Aquatic Macroinvertebrate Status and Trend at the Bioregional Scale

The Stanislaus NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale Index of Biological Integrity and Habitat monitoring for aquatic macroinvertebrates; hence, the lacustrine and riverine effects analysis for the Rim Fire Recovery Project must be informed by these monitoring data. The sections below summarize the Biological Integrity and Habitat status and trend data for aquatic macroinvertebrates. 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 and Index of Biological Integrity Status and Trend. Aquatic habitat has been assessed using Stream Condition Inventory (SCI) data collected since 1994 (Frasier et al. 2005) and habitat status information from the Sierra Nevada Ecosystem Project (SNEP) (Moyle and Randall 1996). Moyle and Randall (1996) developed a watershed index of biotic integrity (IBI) based on distributions and abundance of native fish and amphibian species, as well as extent of roads and water diversions. According to this analysis, seven percent of the watersheds were in excellent condition, 36 percent were in good condition, 47 percent were in fair condition and nine percent were in poor condition.

Sierra Nevada MIS monitoring for aquatic (benthic) macroinvertebrates (BMI) was conducted in 2009 and 2010 (Furnish 2011). Benthic macroinvertebrates were collected from stream sites during both the 2009 and 2010 field seasons according to the Reachwide Benthos (Multihabitat) Procedure (Ode 2007). The initial BMI data from 2009 and 2010 found 46% (6 of 13) of the surveyed streams indicate an impaired condition and 54% (7 of 13) indicate a non-impaired condition (see USDA Forest Service 2010a, Table BMI-1). This is similar to the IBI conditions estimated by Moyle and Randall (1996). Therefore, current data from the Sierra Nevada indicate that status and trend in the RIVPACS scores appears to be stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Aquatic Macroinvertebrates Habitat Trend As the change in flow, and shade are too small to be measured and the increase in sedimentation above the levels resulting from the Rim Fire are indiscernible, the Rim Fire Recovery Project will not alter the existing trend in the habitat or aquatic macroinvertebrates across the Sierra Nevada bioregion.

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