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Forest Plan Monitoring Report

Fiscal Years 2011-2012

Plumas National Forest
Plumas, Lassen, Yuba, Butte and Sierra Counties; California

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INTRODUCTION

The Regional Forester signed the Record of Decision and approved the Plumas National Forest Land and Resource Management Plan (Forest Plan) and Environmental Impact Statement (EIS) on August 26, 1988. In that decision, he also made a commitment to conduct a monitoring and evaluation program. Since that time, the Forest Plan has been modified by Forest plan amendments, including the 1999 Herger Feinstein Quincy Library Group (HFQLG) Record of Decision (ROD) and the 2004 Sierra Nevada Forest Plan Amendment (SNFPA) ROD. These decisions changed forest management direction and monitoring needs. For some activities and resources, the implementation teams for the HFQLG and SNFPA began monitoring efforts at multi-Forest scales, effectively replacing some of the monitoring efforts envisioned by the 1988 Forest Plan. Reports on HFQLG monitoring are posted at http://www.fs.fed.us/r5/hfqlg/monitoring/. Reports on SNFPA monitoring are posted at http://www.fs.fed.us/r5/snfpa/.

While monitoring of major Forest programs has been ongoing throughout these past decades, formal Forest Plan monitoring reports have been limited. An accomplishment report was published in 1991. In 1997, monitoring and evaluation information was compiled for 1989 through 1996, but a report was not completed. A brief Forest Plan Monitoring Report for Fiscal Year 2005 was completed in September 2006. A Forest Plan Monitoring Report for Fiscal Years 2006-2010 was completed in December 2011.

MONITORING ACTIVITIES

Land Management Plan Monitoring

Air Quality

Monitoring Activities

As part of the Herger-Feinstein Quincy Library Group (HFQLG) monitoring program, a report was completed in February 2012 for fiscal year 2011 Air Quality monitoring based on the following monitoring questions.

- Question 9: Were provisions of the Smoke Management Plan implemented?
- Question 26: Do prescribed fire activities meet air quality standards?
- Question 27: Do prescribed fires create a nuisance in terms of air quality?

This monitoring is consistent with the 1988 Plumas Forest Plan monitoring plan. The Forest Plan includes monitoring for air quality on page 5-17, which involves determining whether the prescribed fire program is in compliance with air quality regulations and requires taking action if there is any variation from the burn plan that allows significant smoke in populated areas or causes significant air quality deterioration.

Monitoring included the Plumas National Forest along with the rest of the HFQLG Pilot project area. Smoke Management Plan monitoring involved post burn evaluations to assess how Smoke Management Plan provisions were followed for all burns. Air quality monitoring used data from Air Quality Management District recorders or portable recorders. Air quality nuisance was assessed by tracking complaints and number of projects discontinued due to complaints.

Evaluation of Monitoring Results and Conclusions

In Fiscal Year 2011 there were no reported violations of provisions of Smoke Management Plans for prescribed burning activities. No Class I airsheds were impacted and the Forest Service received no official smoke complaints. There were no reported violations of air quality standards due to prescribed burning activities.

Much of the reduction in complaints is likely due to close coordination with the California Air Resources Board, local air district managers, meteorologists from the Predictive Services Centers, and increased public contact before and during prescribed burning. The Forest uses phone calls, press releases, door-to-door visits and public information booths set up near burn project sites to directly answer questions and address concerns from the public.

Action Plan or Recommendations

Continue to follow current practices following Smoke Management Plans and coordinating with the California Air Resources Board, local air district managers, meteorologists from the Predictive Services Centers, and the public before and during prescribed burning.

Bald Eagle

Monitoring Activities

The 1988 Plumas Forest Plan monitoring plan includes bald eagle reproductive surveys and habitat capability (Forest Plan, pg. 5-7).

Bald eagle nesting habitat was monitored annually for nesting activity, and eagle winter roost sites also were monitored in both 2011 and 2012. Further, bald eagle habitat availability and condition were assessed for individual projects during this period. In 2011, 20 eagles were detected in suitable nesting habitat during 15 survey days. Seven eagle pairs attempted reproduction in 2011. In 2012, 24 eagles were detected in suitable nesting habitat during 16 survey days. Ten eagle pairs attempted reproduction in 2012. During winter 2010-2011, nine roosting eagles were detected during six survey days and six wintering eagles were detected on two survey days during winter 2011-2012. The Chips Fire burned in five eagle territories surrounding Butt Valley Reservoir (Mt. Hough Ranger District) during 2012 (USDA 2013). On average, 95% of these nesting territories burned, but burn severity was relatively low in eagle territories compared to adjacent areas. The Chips Fire reduced the amount of suitable nesting habitat in eagle nesting territories by approximately 344 acres. Three of four pairs of eagles utilizing territories that burned during the Chips Fire attempted reproduction in 2012 (chicks observed in the nest); however, the fates of these nestlings were not determined.

Evaluation of Monitoring Results and Conclusions

The numbers of eagles observed during annual breeding season surveys were similar from 2008-2012 (range = 16-24). Nesting habitat appears to be stable on the Forest, and surveys documented 10 pairs of eagles attempting reproduction in 2012. Although, large portions of five eagle nesting territories burned during 2012, there was not a large amount of eagle nesting habitat destroyed during the Chips Fire (89% of suitable nesting habitat remained post-fire). However, pre-fire snags that provided perching and roosting sites in eagle nesting territories were rendered no longer suitable by the fire.

Action Plan or Recommendations

Continue to monitor reproductive trends in the breeding population as well as habitat quantity and quality in nesting and wintering habitats. Continue to assess bald eagle habitat availability and condition at the project level in the future.

Northern Goshawk

Monitoring Activities

The 1988 Plumas Forest Plan monitoring plan includes goshawk habitat and reproductive surveys (Forest Plan, pg. 5-7).

In 2011, 16 goshawks were detected in suitable nesting habitat during 10 survey days, and surveys documented six goshawk pairs attempting reproduction in 2011. In 2012, 48 goshawks were detected in suitable nesting habitat during 23 survey days. We documented 20 goshawk pairs attempting reproduction in 2012.

Evaluation of Monitoring Results and Conclusions

The current number of goshawk territories on the Forest (N=165) exceeds Forest minimum objective (N=60) by more than double, and the predicted capacity for the Forest (N=100) by 65. Thus, it is believed that current density of goshawk territories on the Forest is adequate to maintain goshawk population viability. Goshawk surveys conducted on the Mt. Hough Ranger District (1998-2002) indicated that nesting occurred at approximately 36% of monitored sites annually. During 2004-2007, the mean number of offspring produced during 62 nesting attempts on the Plumas National Forest ranged between 1.1-1.9 offspring/nest. Considered as a whole, these data indicate that the goshawk population on the Forest appears relatively secure. During 2012, approximately 8,445 acres of potentially suitable goshawk nesting habitat was rendered unsuitable on the forest as a result of the Chips Fire burned (USDA 2013).

Action Plan or Recommendations

Continue to monitor reproductive trends in the breeding population as well as habitat quantity and quality in nesting habitats. Further, northern goshawk habitat availability and condition should continue to be assessed at the project level in the future.

California Spotted Owl

Monitoring Activities

The 1988 Plumas Forest Plan monitoring plan includes California spotted owl reproductive surveys (Forest Plan, pg. 5-7).

There were 432 California spotted owls detected during surveys in 2011. Owl observations in 2011 overlapped 92 Protected Activity Centers (PACs), and surveys showed reproductive activity among six pairs in 2011 on Feather River Ranger District, at relatively low elevations. During 2012, surveys detected 86 spotted owls overlapping 20 PACs. Three pairs of owls exhibited reproductive behavior in 2012, but the nesting territory of one pair was severely burned during the Chips Fire. During 2012, high severity fire overtly modified spotted owl habitat within the Chips Fire perimeter (25% of PAC and 22% of Home Range Core Area (HRCA) acres burned at moderate and high severity, i.e. >50% basal area mortality; USDA 2013).

During both 2011 and 2012 surveys were completed over 29,000 acres of potentially suitable owl habitat (broadcast surveys and stand searches) within the Storrie Fire footprint to estimate California spotted owl density and distribution. During broadcast surveys, biologists broadcasted recordings of spotted owl vocalizations from a pre-marked network of 98 survey stations (N=51 in 2012). Three broadcast surveys were conducted at each survey station, spaced as evenly throughout the breeding season as possible. Intensive stand searches were used to refine information about the abundance and distribution of territorial owls, determine the social statuses of territorial owls, locate and mark nests and roost sites, capture and uniquely color-band all territorial individuals, and determine the nesting and reproductive success of each pair. Within the Storrie Fire footprint, surveys detected 12 California spotted owls, and no barred owls (*Strix varia*), or spotted-barred owl hybrids. Only one of these owls met protocol for residence status (a male in 2011). At another site, a female and male owl were detected in relative close proximity (1.5 miles apart) during 2012; however, these two birds were not detected simultaneously (i.e., they were detected during distinct surveys of the area), and the Chips Fire precluded clarification of the status of either of the owls.

Evaluation of Monitoring Results and Conclusions

After the Chips Fire, the Forest evaluated owl habitat conditions in and around PACs, and re-mapped 11 PACs and 16 HRCAs to incorporate the best available habitat remaining on the landscape (USDA 2013). Reproduction was low during both years, and it is unclear how owl habitat loss and modification within the Chips Fire perimeter may impact future reproduction on the post-fire landscape.

Action Plan or Recommendations

Continue to conduct field review of project planning and implementation with Regional Standards and Guidelines, monitoring population and habitat trend. Continue to monitor spotted owl post-fire space use and productivity within the Chips Fire perimeter (cooperative study with USDA Pacific Southwest Research Station).

Peregrine Falcon

Monitoring Activities

The 1988 Plumas Forest Plan monitoring plan includes peregrine falcon surveys (Forest Plan, pg. 5-8).

Prior to 2011, there were three known peregrine falcon eyries on the forest (two on Feather River and one on Mt. Hough Ranger Districts). A fourth falcon eyrie was located on the Beckwourth Ranger District in 2012. Both falcon pairs on Feather River Ranger District attempted reproduction in 2011. One of the Feather River pair did not attempt reproduction in 2012, and the other pair was unsuccessful in their efforts to produce offspring that year. Both falcon pairs occupying eyries on Mt. Hough and Beckwourth Ranger Districts attempted reproduction in 2012.

Evaluation of Monitoring Results and Conclusions

Additional monitoring is necessary to determine whether the recently discovered eyrie on Beckwourth Ranger District continues to be occupied in the future. The Chips Fire burned through the Mt. Hough Falcon eyrie during 2012.

Action Plan or Recommendations

Monitor peregrine falcon eyries across the Forest annually.

Golden Eagle

Monitoring Activities

The 1988 Plumas Forest Plan monitoring plan includes field review of selected nest sites for golden eagles (Forest Plan, pg. 5-9).

The Forest has identified ten golden eagle territories spread across all three ranger districts. Only one golden eagle nest has been identified on Feather River Ranger District, and eagles have not been detected at this site since 1981.

Evaluation of Monitoring Results and Conclusions

No golden eagle nests were detected during 2011 or 2012. Five golden eagles were detected on the forest at three distinct sites during 2012. For the Mt. Hough Ranger District detection, a single eagle was observed during July within two miles of a historic nest site. On Beckwourth Ranger District, two golden eagles were observed in Sierra Valley in January 2012, and two eagles were reported adjacent to Sierra Valley during the following month, only 2 miles from a historic nest site.

Action Plan or Recommendations

Continue to conduct field review of project planning and implementation, and conduct direct counts of adults and young at select nest sites.

American Marten

Monitoring Activities

The 1988 Plumas Forest Plan monitoring plan includes some marten survey (Forest Plan, pg. 5-10).

Mesocarnivore surveys (track plates, bait stations and hair snares) over the past seven years indicated American marten distribution has remained relatively stable with the population locally isolated to the Lakes Basin Recreation Area of the Beckwourth Ranger District. During 2011 and 2012, remote camera monitoring (bait stations) was used to evaluate American marten habitat occupancy for individual projects across the Forest, including the Lakes Basin.

Evaluation of Monitoring Results and Conclusions

Eleven marten were detected at two bait stations during August and September 2011. These two stations were positioned less than 1 mile apart on the landscape, and both were located in the Lake Basin Recreation Area. In August 2012, a single marten was detected in the Lakes Basin, approximately 7 miles distance from the 2011 detections.

Action Plan or Recommendations

The current distribution of marten on the Forest is consistent with prior descriptions of their range. Continue to survey for marten across the forest.

Sensitive Plant and Species habitat

Monitoring Activities

The 1988 Plumas Forest Plan monitoring plan includes sensitive plant monitoring (Forest Plan, pg. 5-11).

Data on 92 sensitive plant occurrences were recorded in 2011. Surveys documented new occurrences for 15 sensitive plant species at 33 sites in 2011. The remaining 59 plant occurrences recorded in 2011 were revisits of known occurrences from 34 historic surveys (64% of sensitive plant occurrences monitored in 2011). Data on 97 sensitive plant occurrences were recorded in 2012. Surveys documented new occurrences for 13 sensitive plant species at 23 sites in 2012. The remaining 74 plant occurrences recorded in 2012 were revisits of known occurrences from 29 historic surveys (76% of sensitive plant occurrences monitored in 2011).

Evaluation of Monitoring Results and Conclusions

Twenty-three sites marked as protection areas for sensitive plants were revisited in 2011 to determine if protection measures were successful (USDA 2011). All protection areas were successful at protecting sensitive plant occurrences. Post-treatment effects are evaluated for Webber's milkvetch (*Astragalus webberi*), Layne's ragwort (*Packera layneae*), and closed-lip penstemon (*Penstemon personatus*) below.

Webber's milkvetch (*Astragalus webberi*)

Hand thinning and prescribed fire treatments significantly increased the number of small Webber's milkvetch plants within treatment units. Treatments that exposed bare ground, particularly through the construction of hand lines, were most effective at increasing Webber's milkvetch density. Prescribed fire and hand thinning treatments alone did not significantly increase seed germination; like many other legume species, Webber's milkvetch may require damage or removal of their hard outer seed coats to stimulate germination. Hand thinning did enhance Webber's milkvetch growth (as indicated by stem number) by reducing canopy cover and enhancing light conditions in the understory.

Layne's ragwort (*Packera layneae*)

There were no significant changes in the density, size or reproductive potential of Layne's ragwort after prescribed fire, suggesting that this treatment had a neutral effect. However, the increase in the number of flowering plants within control units did not occur within treatment units. This suggests that there may have been some negative effects of the treatment on Layne's ragwort such that it could not benefit from environmental conditions that promoted flowering in control units. It is possible that prescribed fire could have negatively affected Layne's ragwort and other herbaceous species through direct effects of heat and flame contact. Many plants require the conditions created by fire, but can still be killed or injured by fire

The density of Layne's ragwort was positively associated with bare ground and negatively associated with canopy closure. These results suggest that a prescribed burn, which can reduce surface fuels and reduce over story canopy closure, may benefit this species by creating optimal habitat conditions.

Closed-lip penstemon (*Penstemon personatus*)

Sampling did not detect considerable declines in *P. personatus* cover three years after treatment; therefore hand thinning, and pile burning, mechanical thinning, and group selection treatments were not considered detrimental to this species, and no management action has been deemed necessary at this time. One year post-implementation only one treatment unit to show a substantial decline in *P. personatus* cover. However, three years after treatment, the percent cover in this unit had rebounded to an estimated 21% more cover compared to pre-treatment. This finding supports previous observations that *P. personatus* cover within units may decline in the first year or two following treatment, but is likely to rebound after year three to pre-treatment levels.

Action Plan or Recommendations

Continue to maintain viable populations of sensitive plants distributed throughout their range across the forest. Continue to assess sensitive plant occurrence at the project level in the future, and monitor sensitive plant mitigations by continuing post-treatment surveys. Specific recommendations for additional sensitive plant restoration and monitoring efforts are provided for Webber's milkvetch and Layne's ragwort below.

Future management for Webber's milkvetch should focus on protecting established individuals while applying landscape level treatments that (a) expose bare ground to stimulate germination and (b) increase the amount of light that reaches the understory to promote growth of existing plants. Future reintroduction efforts should mechanically scarify the seeds (i.e. rub them between two layers of sandpaper) prior to planting in order to increase germination.

Although monitoring results are preliminary for Layne's ragwort, two general recommendations to improve habitat restoration efforts include using prescribed fire.

First, successful prescribed burning treatment should have sufficient intensity to create the kind of environmental conditions preferred by Layne's ragwort, including (a) reduced surface fuels and exposed bare ground; and (b) reduced overstory canopy closure, which might also be achieved through thinning treatments. Second, consider creating control areas to protect existing Layne's ragwort individuals from the direct effects of burning.

Amphibians

Monitoring Activities

As part of the Herger-Feinstein Quincy Library Group (HFQLG) monitoring program, a report was completed in February 2013 for Sierra Nevada yellow-legged frog monitoring that occurred during fiscal years 2009 to 2011. This monitoring was based on the following monitoring question from the HFQLG monitoring plan.

Question 22 "Do amphibians persist at currently occupied sites?"

Initial monitoring between 2000 and 2008 occurred on the Forest, but the monitoring sites were not in HFQLG treatment areas. The changes in monitoring sites intended to collect baseline and post-treatment data to determine effects to frogs from vegetation treatments and associated activities.

The 1988 Plumas Forest Plan does not include any amphibian monitoring, but the data is useful for analyzing projects that occur within riparian areas.

Monitoring activities involved surveys for amphibians and reptiles in four primary habitat sites on the Forest. Basic information on the sites is shown below in Table 1.

Table 1. Summary of Sierra Nevada yellow-legged frog habitat and population survey sites.

Survey Site	Habitat Type	HFQLG Project	Comments
Potosi Creek (HowlandFlat)	Stream	Sugarberry Project	Dropped from study due to non-presence of Sierra Nevada yellow-legged frogs
South Fork Rock Creek	Stream/Meadow	Meadow Valley Project	
Lone Rock Creek	Stream/Meadow/Beaver Ponds	Moonlight Fire Recovery Project	
Boulder Creek (Lowe Flat)	Stream/Meadow	Wildcat Project	

Initially, one of the goals of this monitoring effort was to compare habitat attributes within suitable and occupied habitat for Sierra Nevada yellow-legged frogs pre and post HFQLG project implementation. However due to various reasons, none of the proposed actions located within or adjacent to this habitat was completed within the three year period (2009-2011).

Sierra Nevada yellow-legged frogs were monitored for abundance and demography, movement patterns, and habitat usage. For all Sierra Nevada yellow-legged frogs, sex, length, weight, and coordinates of capture location were recorded. Tissue swabs were taken from some amphibians to check for chytrid fungus. Microchips were placed on frogs to identify individuals and record recaptures.

Stream reach scale data collected included channel gradient, habitat unit type (pool, run, riffle type), bank full width, wetted width, greenline width, pool water depth, residual pool depth, percent of pool tail fines, stream shading (% canopy), riparian hardwood age structure, large woody debris, and bank stability.

Microhabitat data were collected at each frog locality the first time an individual frog was found each day. A second collection of microhabitat data occurred if the same frog was found greater than 4 hours since the last sighting. Data collected described 1) the general habitat including location relative to the stream (in stream, on shore, backwater), habitat unit type (pool, run, riffle type), and distance to shore or water, 2) stream size including water depth and wetted width, 3) cover including dominant substrate and percent of cover for different cover types (herbaceous, woody, woody debris, total cover), and 4) shade. Total cover included any type of cover in which a frog could hide such as silt or cobble substrate, vegetation, or woody debris.

Evaluation of Monitoring Results and Conclusions

Sierra Nevada yellow-legged frog populations on the monitored streams were small. Abundances of all life stages were low including adults, subadults, and tadpoles. There were indications of reproduction (tadpoles or subadults) on all streams.

The declines in Sierra Nevada yellow-legged frog populations range-wide have been largely attributed to the introduction of trout to historically fishless lakes in high elevations and to the spread of Chytrid fungus. How these risk factors affect stream populations and their role in explaining the small abundances in our monitoring reaches is not known.

Fish were found in all the primary monitoring reaches. Fish species were not identified to species, however it can be assumed that species composition included both native and non-native salmonids. Additionally, these populations within stream and reservoir habitats have been sustained through active stocking practices implemented by the California Department of Fish and Wildlife. Chytrid fungus was found on only 3 frogs and at low infection levels. It is not known whether it played a role in the current small populations. Recent research has found that Sierra Nevada yellow-legged frogs can persist with low levels of Chytrid infection. It is a combination of high rates of spread and infection, typically found with large abundances, that cause extinctions of populations.

The largest abundances were in the relatively slow moving water associated with a beaver dam. Tadpoles were generally more common in the deep open pools, subadults in open shallower flooded vegetation, and adults in medium sized pools with more vegetation cover and in the adjacent stream channels. The few tadpoles found at Lone Rock Creek and Boulder Creek appeared to be associated with beaver activity.

The ecology of the Sierra Nevada yellow-legged frog in stream environments is not well known. We found multiple age classes of tadpoles in two of the streams (only one tadpole was found at Boulder Creek) confirming that, similar to the rest of the range, they require multiple years to develop. Based on knowledge from lake habitats, the multi-year tadpole stage requires breeding habitat that provides a refuge from overwinter freezing, summer drying, and fish. Nearby areas were checked for off-channel breeding areas such as deep spring pools, deep potholes, and ponds or lakes, but no tadpoles were found. All tadpoles were found in or adjacent to the streams. These areas were all exposed, relatively shallow, and with warm water.

Monitoring was not designed to address movement patterns and the sample of frogs was small, but the data generally supports earlier studies showing that adult frogs move seasonally to different areas, but move little within seasons. The data suggests a high degree of site fidelity; 58% of frogs were captured multiple years, distances among years generally were small, and the four frogs that moved large distances from June to August were found in the same areas each August.

Most of the frogs (67%) were found in the streams and when on shore, within 1 meter of water. Frogs were found basking on shore or in backwaters, tributaries or side channels. Frogs generally seemed to be selecting pool habitats, with the exception of Lone Rock Creek, which was increasingly affected by beaver activity. At Lone Rock Creek, tadpoles and subadults were found more often adjacent to the deep runs and pools behind beaver dams, whereas adults were found more often in the riffles upstream. Cover appeared to be important and generally took the form of silt, cobble, or boulder substrate. Boulders and rocks also provide basking sites.

Unfortunately, the timing of the monitoring did not line up with the implementation of HFQLG projects, so pre and post-project population and habitat conditions could not be compared on the frog monitoring sites. Instead, results from the stream condition inventory monitoring were used to assess changes in aquatic habitat conditions following project implementation. Monitoring conducted between 1997 and 2012 showed that in general, implementation of HFQLG land management activities did not result in significant adverse impacts to perennial stream channel habitat. Increases in sediment following project activities were limited to actions that occurred directly adjacent to or within stream channels, and included road decommissioning, culvert replacement, and wildfire. Implemented actions that resulted in reduced canopy cover, which has been linked to increased water and ambient air temperatures within riparian areas were limited to aspen enhancement. Defensible Fuel Profile Zones (DFPZs) and area thinning actions

did not result in significant reductions in stream channel shade, and increases in water temperature were not detected. Three out of the five stream condition inventory monitoring sites developed to assess impacts from aspen enhancement activities determined that significant decreases in channel shade did occur. Changes in floodplain connectivity were not detected in any of the condition inventory monitoring sites. Changes in this parameter would likely occur as a result of large flow events that result in downcutting of channels, extensive bank erosion, and formation of headcuts. Due to the scale of vegetation treatments on a subwatershed scale, implementation of HFQLG activities are unlikely to result in measurable increases in water yield or flow velocities. Mitigation features in the development of HFQLG projects include measures to protect or enhance bank stability within stream channels through the implementation of equipment exclusion zones, maintaining adequate bank stability trees, promoting riparian vegetation within Riparian Habitat Conservation Areas and implementation of Best Management Practices. Mitigation features were further developed to meet the Riparian Management Objectives included in the HFQLG Act of Congress to maintain or enhance riparian and aquatic habitats for native flora and fauna species.

Action Plan or Recommendations

Recommendations in the report (Foote 2013) follow:.

1. Maintain or enhance habitat diversity: the results from this study indicate that Sierra Nevada yellow-legged frogs utilize a diverse range of aquatic and terrestrial habitats.
    a) Increase aquatic habitat diversity through maintaining or enhancing not only those habitat types within the main channel (pools, riffles, runs, and backwater), but also side channels, springs, and cover substrate.
    b) When developing projects that include vegetation manipulation within riparian areas, promote a wide range of forest canopy cover adjacent to suitable habitat. This could be accomplished through leaving clumps of dense conifers and creating gaps in the canopy to increase basking opportunities for frogs.
    c) Promote growth of riparian vegetation, including hardwoods, adjacent to stream channels. Identify opportunities for planting hardwoods along stream channels.
2. Populations are very small and isolated, therefore give all occupied habitats special considerations when in proposed project areas.
3. Identify opportunities for streambank stabilization projects.
4. Implement sediment reduction actions such as storm proofing of the existing road network adjacent to and upstream of suitable and occupied habitat.
5. Prioritize aquatic organism passage projects, such that actions won't result in reintroduction of fish species to previously fish-free habitats that are currently occupied by Sierra Nevada yellow-legged frogs.

6. Conduct additional surveys during times of breeding to identify preferred habitat, and identify potential habitat improvement projects.
7. Where populations occur, ensure use of mechanical equipment and ground disturbance does not occur within occupied suitable habitat.
8. Where needed, identify potential actions to restore floodplain connectivity.
9. Development of land management activities within, or in the vicinity of occupied or potential suitable habitat, should be driven by site-specific conditions.
10. For projects implemented within or in the vicinity of occupied habitat continue pre- and post-treatment monitoring of populations and habitat conditions.

Landbirds

Introduction

Point Blue Conservation Science (formerly known as the Point Reyes Bird Observatory) has been conducting landbird monitoring in the northern Sierra Nevada since 1997. Monitoring reports were completed in 2011 and 2012 for landbirds in burned habitats and aspen and meadows. A monitoring report on landbirds in fuel treatments was completed in 2012. Monitoring included data collection on the Plumas National Forest for all habitats except for aspen.

Monitoring of Landbirds in Meadows

Monitoring Activities- Sites within the Last Chance, Red Clover, and Long Valley watersheds (referred to herein as eastern Plumas sites) were selected in 2009 or 2010 to monitor proposed or completed meadow restoration projects being carried out by the Feather River Coordinated Resource Management (CRM) group. Point count data were collected to measure relative abundance of individual bird species and species richness. This method is useful for making comparisons of bird communities across time, locations, habitats, and land-use treatments.

Evaluation of Monitoring Results and Conclusions – Monitoring continued to show that meadow sites restored by the Feather River CRM group support greater avian diversity and abundance than unrestored reaches of the same streams. The McReynolds and Demonstration project areas have the greatest abundance of birds of the meadows monitored in 2011. The decrease in meadow bird indices within the Red Clover Poco project area following restoration is likely attributable to several factors. The Poco reach of Red Clover Creek had a rather wide (about 10 meters) inset floodplain supporting greater willow cover than previously restored sections of Red Clover Creek. Thus, it supported a more diverse and abundant bird community prior to restoration than other reaches of the creek (such as Dotta, Dixie Creek, Beartooth). Poco is also the first Feather River CRM group project Point Blue has monitored in the first year following restoration.

Results from 2011 continue to suggest that ecologically functional meadows with extensive deciduous riparian shrubs harbor meadow-dependent breeding birds, whereas

ecologically dysfunctional meadows harbor few to none. The process of meadow desiccation and conversion through channel down cutting that is extensive throughout Sierra Nevada meadows is of major concern for conservation of meadow-dependent birds. A positive trend in the richness of meadow-dependent bird species at restored and/or rested sites that Point Blue has monitored since 2004 indicates that the benefits of restoration or release from grazing continue to accrue as woody meadow vegetation regenerates. In addition to providing habitat for birds, fish, and other wildlife, functional meadows offer a suite of valuable ecosystem services that are disproportionate to the <1% of the Sierra Nevada landscape that meadows comprise. Because so many of the wet meadows in the Sierra Nevada have been degraded over the past century to the point that they no longer provide such services, meadow restoration and conservation should be among the highest priorities of land managers in the region.

Recommendations from Point Blue:

- Make meadow restoration a high priority on public and private lands.
- Restore and/or preserve floodplain connectivity and promote wet meadow conditions.
- Prioritize management and restoration resources on meadows that will support a riparian deciduous plant community.
- Promote deciduous shrubs and trees in meadow habitats. Deciduous woody vegetation is the primary driver of avian abundance and richness in Sierra Nevada meadows.
- Promote dense and tall herbaceous plant community dominated by sedges and rushes.
- Carefully track impacts of grazing and adjust when important riparian resources (such as those listed above) are being compromised.
- If the primary goal is managing for meadow birds, including restoring endangered Willow flycatcher populations, consider removal of grazing to lessen impacts from Brown-headed cowbird and deleterious effects of grazing on habitat quality for this species.
- Use fencing to regulate livestock pressure near stream channels in meadows. Replace riparian watering sources with watering stations in upland habitats. Fencing width should be based on meadow size but 50 meters would be considered a minimum exclusion.
- Retain snags wherever they are present. Snags provide forage and nesting substrates for birds. Large woody debris can contribute to raising water tables and promoting habitat complexity.
- Reduce open water in active floodplain by creating deeper or more linear ponds and including islands – where feasible place ponds away from the active channel where the highest quality meadow bird habitat is likely to exist.
- Create gentle slopes on pond edges to enhance ecotones that promote small mudflat conditions that provide habitat for shorebirds (e.g. spotted sandpiper) and unique transitional wetland/meadow plant communities.

- Consider conifer removal when >15% of a meadow is covered by conifers. The abundances of all meadow-dependent bird species are negatively correlated with conifer cover >15%.
- Monitor avian communities and other important resources in meadows as part of an adaptive management strategy.

Monitoring of Landbirds in Fuel Treatment Areas

Monitoring Activities – Monitoring was done to investigate the short term response (2 – 6 years post treatment) of landbirds to shaded fuel break treatments (DFPZs), group selections, and pre-commercial understory thinning. A suite of focal bird species that serve as surrogate species for three habitat guilds (mature closed canopy forest, shrubs, and edge/open forest) was measured for abundance. Vegetation data was collected for vegetation characteristics related to bird habitat (such as snag numbers and tree and shrub cover).

Monitoring Results and Conclusions – Fuel treatments significantly reduced snag density, overstory and understory tree cover, shrub cover, and herbaceous cover. The effect of treatments on bird abundance was less obvious. The overall abundance of members of each habitat guild was not significantly different between pre and post-treatment conditions for any of the treatments. Species richness modestly increased following shaded fuel break and group selection treatments and significantly decreased after pre-commercial thinning. Species within the habitat guilds often did not respond consistently to treatments and overall effects for most species were modest. However, as predicted, mature forest canopy associated species showed the strongest negative responses while edge and open forest species showed the most positive responses to treatment. The results suggest that these fuel reduction treatments have relatively modest impacts on bird community composition and abundance. The potential of these treatments to benefit the full spectrum of disturbance-dependent species, especially those associated with moderate and high severity fire, appears limited.

Action Plan or Recommendations – The report (Burnett et al. 2012) suggests placing fuels treatments outside late successional closed-canopy habitats (e.g. spotted owl home range core areas) and designing fuel reductions to benefit disturbance dependent species. The fuel treatments did not create habitat that supported the same densities of disturbance dependent species as in areas burned in wildfires, but did attract some.

Most of the shrub-nesting species we evaluated were uncommon in shaded fuel break treatments prior to and following treatment. In order to more effectively mimic the mosaic patterns created through natural disturbance and benefit a greater number of species dependent upon those disturbances, the report suggested ,where appropriate, shaded fuel break treatments incorporate a greater variation in canopy cover. Variable canopy cover and understory retention in both pre-commercial thins and shaded fuel breaks should allow for greater structural diversity by invigorating or maintaining shade

intolerant understory plant assemblages, which are utilized by a large number of avian species in the area.

Monitoring of Landbirds in Burned Landscapes

Monitoring Activities – Monitoring was done as part of the Plumas-Lassen Administrative Study. Burned areas were added to the study in 2009 and monitoring occurred between 2009 and 2011. On the Plumas National Forest transects were selected in the Storrie and Moonlight Fire areas and included some transects on private timberland. Points were surveyed for bird communities, cavity nests, vegetation cover (shrub, live tree, and herbaceous cover), and basal area of live trees and snags.

Monitoring Results and Conclusions - Comparing the abundance of 36 bird species that breed in the study area and represent a range of habitat types and conditions, 16 were significantly more abundant in burned areas, 14 in unburned areas, and 6 showed no statistical difference. Species that were more abundant in burned areas were: mountain quail, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, olive sided flycatcher, western wood-peewee, mountain bluebird, brown creeper, house wren, Lazuli bunting, spotted towhee, green-tailed towhee, chipping sparrow, fox sparrow, dark-eyed junco, and Cassin's finch. Species that were more abundant outside the burned areas were: Hammond's flycatcher, dusky flycatcher, Cassin's vireo, mountain chickadee, red-breasted nuthatch, golden-crowned kinglet, hermit thrush, Nashville warbler, yellow-rumped warbler, hermit warbler, western tanager, black-headed grosbeak, evening grosbeak, and pie siskin. Species with no statistical difference between burned and unburned areas were: calliope hummingbird, warbling vireo, Stellar's jay, American robin, yellow warbler, and MacGillivray's warbler.

In general, species diversity and abundance were lower in burned areas than unburned areas and significantly lower on adjacent private land that was heavily salvage logged after wildfire.

Seventy-one cavity nests were found in the Moonlight Fire area and 20 in the Storrie Fire area. Some species showed a preference for nesting in areas with high snag density. The nest trees selected were variable in both size and species, though the majority of nests were found in trees greater than 20 inches diameter. There was more evidence for preference for tree decay. The vast majority of the nests were in dead trees. The majority of nests were found in five tree species/species groups: true fir (both red and white), yellow pine (includes both Ponderosa and Jeffrey), and Douglas-fir. Only one nest was found in a cedar. Black-backed woodpecker almost exclusively selected true fir and pine species. Hairy woodpecker, white-headed woodpecker, and Northern flicker were less particular with the relative frequencies of use reflecting what was available. Over a quarter of the red-breasted sapsucker nests were found in aspen, despite this tree species having an extremely small proportion of the available trees. Similarly, Lewis'

woodpecker chose Douglas-fir as a nest tree more than it was available, while none of the nine Lewis' woodpecker nests were in true fir, the most prevalent tree species.

Action Plan or Recommendations – The report (Burnett et al. 2012) includes the following post-fire habitat management recommendations.

General

- Whenever possible, restrict activities that depredate breeding bird nests and young to the non-breeding season (August - April).
- Consider post-fire habitat as an important component of the Sierra Nevada ecosystem because it maintains biological diversity.
- Consider the area of a fire that burned in high severity, as opposed to the area of the entire fire, when determining what percentage of the fire area to salvage log.
- Consider the landscape context (watershed, forest, ecosystem) and availability of different habitat types when planning post-fire management actions.
- Consider that snags in post-fire habitat are still being used by a diverse and abundant avian community well beyond the 5 to 10 year horizon often suggested.

Snags

- Manage a substantial portion of post-fire areas for large patches (10-50 acres) burned with high severity as wildlife habitat.
- Retain high severity burned habitat in locations with higher densities of larger diameter trees.
- Retain high severity patches in areas where pre-fire snags are abundant, as these are the trees most readily used in the first five years after a fire.
- Retain snags in salvaged areas far greater than green forest standards and retain some in dense clumps.
- Snag retention immediately following a fire should aim to achieve a range of snag conditions from heavily decayed to recently dead in order to ensure a longer lasting source of snags for nesting birds.
- When reducing snags in areas more than five years post fire (e.g. Storrie Fire) snag retention should favor large pine and Douglas-fir but decayed snags of all species with broken tops should be retained in recently burned areas.
- Retain snags (especially large pine trees that decay slowly) in areas being replanted as they can provide the only source of snags in those forest patches for decades to come.
- Consider retaining smaller snags in heavily salvaged areas to increase snag densities as a full size range of snags are used by a number of species for foraging and nesting from as little as 6 inches diameter, though most cavity nests were in snags over 20 inches.

Early Successional Habitat

- Manage post-fire areas for diverse and abundant understory plant community including shrubs, grasses, and forbs. Understory plant communities provide a unique and important resource for a number of species in a conifer dominated ecosystem.
- Most shrub patches should be at least 10 acres and shrub cover should average over 50% across the area in order to support area sensitive species such as fox sparrow.
- Retain natural oak regeneration with multiple stems (avoid thinning clumps) as these dense clumps create valuable understory bird habitat in post-fire areas 10–15 years after the fire.
- When treating shrub habitats, ensure some dense patches are retained. In highly decadent shrub habitat, consider burning or masticating half the area (in patches) in one year and burning the rest in the following years once fuel loads have been reduced.
- Maximize the use of prescribed fire to create and maintain chaparral habitat and consider a natural fire regime interval of 20 years as the targeted re-entry rotation for creating disturbance in these habitat types.

Shaping Future Forest

- Limit replanting of dense stands of conifers in areas with significant oak regeneration and when replanting these areas use conifer plantings in clumps to enhance the future habitat mosaic of a healthy mixed conifer hardwood or pine-hardwood stand.
- Consider managing smaller burned areas (less than 5,000 acres) and substantial portions of larger fires exclusively for post-fire resources, especially when there have been no other recent fires in the adjoining landscape.
- Retain patches of high burn severity adjacent to intact green forest patches as the juxtaposition of unlike habitats is positively correlated with a number of avian species including those declining such as olive-sided flycatcher, western wood-pewee, and chipping sparrow.
- Incorporate fine scale heterogeneity in replanting by clumping trees with unplanted areas interspersed to create fine scale mosaics and invigorate understory plant communities and natural recruitment of shade intolerant tree species.
- Plant a diversity of tree species where appropriate as mixed conifer stands generally support greater avian diversity than single species dominated stands in the Sierra Nevada.
- Consider staggering plantings across decades and leaving areas to naturally regenerate in order to promote uneven-aged habitat mosaics at the landscape scale.
- Consider fuel treatments to ensure the fire resiliency of remnant stands of green forest within the fire perimeter as these areas increase avian diversity within the fire and the edges between unlike habitats support a number of species (e.g. olive-sided flycatcher).
- Avoid planting conifer species in or adjacent (depends on the size of riparian corridor) to riparian areas to avoid future shading of riparian deciduous vegetation

and drying out riparian areas. Consider replanting appropriate riparian tree species (cottonwood, willow, alder, aspen) where appropriate.

Bucks Lake Wilderness

Monitoring Plan Development

During 2012, the Bucks Lake Wilderness Inventory and Monitoring Plan was written. It includes monitoring protocols for campsites and visitor use consistent with the wilderness use monitoring in the 1988 Forest Plan (Forest Plan p. 5-5). The protocols provide forms for consistent monitoring and data collection.

Action Plan or Recommendations

Continue wilderness monitoring using the campsite and visitor use forms.

Vegetation and Fuels

Monitoring Activities

As part of the Herger-Feinstein Quincy Library Group (HFQLG) monitoring program, final reports on treated stand structure for cumulative five year effects and treated stand structure short term effects were completed in 2012. The main HFQLG monitoring questions covered by the reports were:

- Did silvicultural treatments result in the desired levels of canopy cover?
- Were large trees protected?
- Did treatments produce the desired abundance and distribution of snags and logs?
- Was the amount of early seral stage vegetation enhanced as a result of treatments?
- Did treatments reduce fire hazard?

Monitoring of snags and down wood is consistent with the 1988 Plumas Forest Plan monitoring plan. The Forest Plan includes monitoring on snags and down wood on page 5-12.

Monitoring was done on the Plumas National Forest along with the rest of the HFQLG Pilot project area. Monitoring was done for various vegetation treatments including thinning live trees in small and medium diameter classes; group selection; prescribed under-burning; and hand piling and burning. Response variables included tree density, basal area, and canopy cover; the amount of standing and down dead wood; cover of shrubs and herbs; and simulated fire behavior.

Evaluation of Monitoring Results and Conclusions

The short term effects report showed treatments led to significant decreases in canopy cover and basal area; mean canopy cover decreased from 51% to 35% after treatment, and mean basal area decreased from 159 square feet per acre to 111 square feet per acre. Large (≥30 inches diameter) tree density, 3.4 per acre prior to treatment, did not change

significantly with treatment. Large down woody debris loads were smaller than in similar forests elsewhere: pre-treatment 2.7 tons/acre, post-treatment 1.6 tons/acre. Snags were also initially sparse, becoming more so after treatment (snags of ≥ 15 inches diameter; pre-treatment 3.2 per acre, post-treatment 1.6 per acre). Herbaceous understory plant cover increased significantly after treatment, but shrub cover did not change. Areas identified as potential habitat for the California spotted owl declined in most measures of habitat quality after treatment. Fire behavior simulation modeling showed that treatments were largely effective in moderating predicted fire behavior under moderate and severe weather scenarios. The report concluded that treatments generally met the primary goal of improving forest health and resilience to wildfire, and that they had mixed success in meeting secondary objectives related to maintenance of habitat quality.

The cumulative five year report showed treatments led to significant decreases in canopy cover and basal area; mean canopy cover decreased from 48% to 33% after treatment and remained essentially unchanged for the subsequent four years. Treatments successfully avoided harvesting or otherwise damaging large (≥ 30 inches diameter) trees. The density of large snags (≥15 inches diameter) was halved by treatments, but at five years after treatment the proportion of stands in compliance with retention guidelines (25%) was no different than before treatment. Large down logs also declined by half after treatment but unlike snags showed no indication of recovery; compliance with retention objectives was only 11% at five years after treatment. Understory plant forage species were either resilient to treatments (shrubs) or responded with increased growth [forbs (east side only) and grasses]. Fire simulations showed that diminishing the probability of crown fire, a major goal of the treatments, was achieved in large part; the number of stands with predicted active or conditional crown fire behavior was reduced between 55% and 74% (in 97th and 90th percentile weather conditions, respectively). Treatments generally met the primary goal of improving forest health and resilience to wildfire but had mixed success in meeting secondary objectives related to maintenance of habitat quality. Given the ever-increasing threat of high-severity wildfire, the treatments may be judged as having met their overarching goal.

Action Plan or Recommendations

- Continue thinning stands and treating fuels using 2004 SNFPA direction for new projects. Conduct Fireshed analysis to determine highest priority areas for treatment.
- Balance the need to reduce wildfire risk to maintain long term wildlife habitat against the short term habitat effects.
- Follow 2004 SNFPA direction to determine project specific down woody material and snag retention levels considering desired conditions, productivity of the site, and general guidelines.

Routine Program Monitoring

National Visitor Use Monitoring

Monitoring Activities

The National Visitor Use Monitoring program collected data on the Plumas National Forest in 2010 and produced a report in 2012. Data was obtained by interviewing visitors and using that information to estimate overall visitor use.

Evaluation of Monitoring Results and Conclusions

Total annual site visits to the Plumas National Forest were estimated to be 671,000. Of these site visits, 104,000 were to day use developed sites, 120,000 to overnight use developed sites, 439,000 general forest area visits, 7,000 Wilderness visits. Total estimated National Forest visits were estimated to be 526,000. Special events and organized camp use (based on participant counts) totaled 7,000. National Forest visits can be composed of multiple site visits.

Demographic results show that not quite 34 percent of visits are made by females. Among racial and ethnic minorities, the most commonly encountered are Hispanics (4.7%) and Asians (3.5%). The age distribution shows that the Plumas National Forest has relatively higher proportions of both children under the age of 16 (20.5%) and people over the age of 60 (22.7%) than do most forests. A good deal of visitation is local. Fifty-five percent of visits come from people who live within 50 miles of the Forest. Another 12 percent come from people in the 50–75 mile distance zone.

Most visits to the Plumas National Forest last not more than about a half day. Over half of the visits last at most 6 hours. The median length of visit to overnight sites is about 50 hours, or about 2 days. The average Wilderness visit lasts only about 4 hours, although more than half of those visits are shorter than 2.5 hours long. Just over 90 percent of visits involve recreating at just one location on the Forest. Most visits come from people who are infrequent visitors. About half of visits are made by people who visit the Forest at most 5 times per year. However, there is also a core of frequent users; about sixteen percent (one out of every six) come from people who visit more than 50 times per year.

The most frequently reported primary activity is fishing (27%), followed by viewing natural features (14%), hiking (13%), relaxing (11%) and motorized water activities (10%). Over 40 percent of the visits report participating in relaxing and viewing scenery.

Nearly half of all visits are local area residents on day trips away from home (47%). Non-local residents on day trips account for another 8 percent of visits. For about 6 percent of visits, the Plumas is a side trip on part of a trip to some other primary destination location. Because of these percentages, the spending amounts are relatively low. About half of the visiting parties spend not more than $70 per party per trip. The income

distribution results show that over 40% of all visits come from people in households who make less than $50,000 per year.

The overall satisfaction results are exceptionally high. Eighty-three percent of people visiting indicated they were very satisfied with their overall recreation experience. Another fourteen percent were somewhat satisfied. Less than 2 percent expressed any level of dissatisfaction. The results for the composite indices were somewhat lower. Satisfaction ratings for perception of safety were over ninety percent for all types of sites. Ratings for access items were above 85 percent for all types of sites. However ratings for the services composite was much lower.

Due to high satisfaction ratings, the monitoring results for most elements were to keep up the good work. The elements to concentrate on for day use sites were restroom cleanliness and value for fee paid. For overnight sites, the element to concentrate on was recreation information availability. For undeveloped areas, the element to concentrate on was restroom cleanliness. For Wilderness, the elements to concentrate on were recreation information availability and signage adequacy. There may be overkill on parking lot condition.

Action Plan or Recommendations

Overall the monitoring results were very positive and do not indicate a need to change recreation site management.

FOREST PLAN AMENDMENTS AND CORRECTIONS

2012 Expiration of Herger-Feinstein Quincy Library Group Act of Congress- When the HFQLG Act expired on September 30, 2012, the Plumas National Forest stopped implementing specific HFQLG direction for vegetation management and began implementing 2004 Sierra Nevada Forest Plan Amendment direction for all projects.

The 1988 *Plumas National Forest Land and Resource Management Plan* (commonly referred to as the "Forest Plan"), as amended by the 2004 SNFPA final supplemental EIS Record of Decision, provides direction for projects. The 2004 SNFPA Record of Decision (pp. 49-56) displays the standards and guidelines added to the 1988 Forest Plan. Land allocations in the 2004 SNFPA that apply to the Plumas include: WUI Defense Zones, WUI Threat Zones, Old Forest Emphasis Areas, California spotted owl and goshawk Protected Activity Centers, California spotted owl Home Range Core Areas, and general forest.

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PUBLIC PARTICIPATION/DISCLOSURE PLAN

The Fiscal Year 2011-2012 Monitoring and Evaluation Report will be posted to the Plumas National Forest website http://www.fs.usda.gov/land/plumas/landmanagement.

Copies will be provided to interested individuals upon request.

SUPPORTING DOCUMENTATION

Bigelow, S.; Dillingham, C.; Payne, L. 2012. Fuels Reduction and Group Selection in Sierran Mixed Conifer Forest: Effects on Stand Structure, Understory Plants and Simulated Fire Behavior. Pacific Southwest Research Station, Davis, California. 37 p.

Bigelow, S.; Dillingham, C.; Payne, L. 2012. Fuels Reduction and Group Selection Silviculture in Sierran Mixed-Conifer Forest: Short-term Effects on Environmental Attributes. Pacific Southwest Research Station, Davis, California. 51 p.

Burnett, R.; Preston, M.; Seavy, N. 2012. Plumas-Lassen Administrative Study 2011 Post-fire Avian Monitoring Report. Contribution Number 1869. PRBO Conservation Science. Petaluma, California. 50 p.

Burnett, R.; Seavy, N.; Salas, L.; Humple, D. 2012. Avian Community Response to Mechanical Fuel Treatment in the Sierra Nevada, USA. PRBO Conservation Science. Petaluma, California. 35 p.

Campos, B; Burnett, R. Avian Monitoring in Aspen and Meadow Habitats in the Northern Sierra Nevada 2011 Annual Report. Contribution Number 1881. PRBO Conservation Science. Petaluma, California. 65 p.

Coppoletta, M. 2012. Bucks Lake Wilderness Inventory and Monitoring Plan. Mount Hough Ranger District, Plumas National Forest. 23 p.

Duncan, P. 2012. FY 2011 Report on HFQLG Pilot Project Monitoring Effects of the Pilot Project Fuel Treatments on Air Quality. Plumas National Forest, Quincy, CA. 3 p.

Foote, R. 2013. Sierra Nevada Yellow-legged Frog Monitoring, HFQLG Pilot Project Area, Plumas and Tahoe National Forests. 36 p.

USDA Forest Service. 1988. Plumas National Forest Land and Resource Management Plan.

USDA Forest Service. 2011. Herger-Feinstein Quincy Library Group Botany Monitoring Report – 2011.

USDA Forest Service. 2012. Visitor Use Report. Plumas National Forest. National Visitor Use Monitoring Data Collected Fiscal Year 2010. 50 p.

USDA Forest Service. 2013. Chip-munk Recovery and Restoration Project, Environmental Assessment, Mt Hough Ranger District.