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Inyo National Forest

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Aspen stand on the Inyo National Forest

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Introduction

The Regional Forester approved the Inyo National Forest Land and Resource Management Plan (LRMP or Plan) and Environmental Impact Statement (EIS) on August 12, 1988 (USDA 1988). Chapter V of the Forest Plan includes a monitoring program. As stated in the Forest Plan (pg. V-1) “the purpose of monitoring is to assess the success of Plan implementation and determine whether the Plan needs to be amended or whether management activities need to be revised.”

In addition to monitoring, the LRMP requires evaluation of results. Evaluation is the analysis and interpretation of monitoring data to determine whether changes in the LRMP or in project implementation are necessary. Together, monitoring and evaluation ensure that the Plan remains a dynamic and responsible tool for managing the Forest’s land and resources in a changing social and economic climate.

This report, prepared by an Interdisciplinary Team (see List of Preparers) for the Forest Supervisor, documents the results of monitoring and evaluation activities accomplished on the Inyo National Forest during federal fiscal years 2008 and 2009 (October 1, 2007 to September 30, 2009).

Land Management Plan Monitoring Activities

The LRMP, as amended, includes monitoring of 20 broad resource categories ranging from air quality to wilderness (Table 1). As shown, many of the resource categories identified in the 1988 LRMP are also identified as part of the monitoring strategy for the Sierra Nevada Forest Plan Amendment (SNFPA), which amended the 1988 LRMP in 2004. The Monitoring Strategy for the 2004 SNFPA is described in Appendix E of the 2001 SNFPA FEIS (USDA 2004; USDA 2001).

There is considerable overlap in monitoring direction. In some cases, the monitoring objectives for the 2004 SNFPA are very similar to those of the 1988 LRMP. In others, however, monitoring is focused on answering different questions about different resources.

Table 1. Summary of monitoring direction by resource category, 1988 Inyo National Forest LRMP, as amended

Resource Category	Source of Monitoring Direction
Air Quality	1988 LRMP/2004 SNFPA
All Resource Elements	1988 LRMP
Diversity (of Vegetation)	1988 LRMP
Fish/Aquatic, Riparian, and Meadow Ecosystems	1988 LRMP/2004 SNFPA
Heritage/Cultural and Fire and Fuels	1988 LRMP/2004 SNFPA
Noxious Weeds	2004 SNFPA
Pest Management	1988 LRMP
Protection (Fire Suppression)/Fire and Fuels	1988 LRMP/2004 SNFPA
Range	1988 LRMP
Rare Plants/ Aquatic, Riparian, and Meadow Ecosystems	1988 LRMP/2004 SNFPA
Recreation	1988 LRMP
Riparian/Aquatic, Riparian, and Meadow Ecosystems	1988 LRMP/2004 SNFPA
Socioeconomic Effects	2004 SNFPA
Soils/Soil Productivity and Fire	1988 LRMP/2004 SNFPA

Resource Category	Source of Monitoring Direction
and Fuels	
Timber/Fire and Fuels and Old Forests and Associated Species	1988 LRMP/2004 SNFPA
Visuals	1988 LRMP
Water/Aquatic, Riparian, and Meadow Ecosystems	1988 LRMP/2004 SNFPA
Wild and Scenic Rivers	1994 North and South Forks of the Kern Wild and Scenic River Plan (Amendment #4)
Wildlife/Old Forests and Associated Species; Aquatic, Riparian, and Meadow Ecosystems	1988 LRMP, Deer Herd Management Direction Amendment #5/2004 SNFPA
Wilderness/Old Forests and Associated Species	1988 LRMP, 2001 Wilderness Plan (Amendment #7), and 2005 Trail and Commercial Pack Stock Management (Amend. #10)/2004 SNFPA

Note: Soils and water are presented as one resource category in the 1988 LRMP Monitoring Plan

This report presents a subset of the fiscal years 2008 and 2009 monitoring and evaluation efforts related to five of the resource categories: recreation, diversity of vegetation, sensitive plant species, water quality, and wildlife. This report is not intended to document all monitoring activities conducted on the Forest during 2008 and 2009. Additional monitoring for various resource categories may have been completed and documented as part of reporting requirements for specific program areas.

Each monitoring overview begins with a summary of relevant goals, objectives, and monitoring established in the 1988 LRMP and 2004 SNFPA for that resource category. Some of the monitoring actions completed in 2008 and 2009 are discussed, including a summary of results and a brief evaluation. Evaluation is the analysis and interpretation of monitoring data to determine whether changes in the LRMP or project implementation are needed.

Fire and Fuels - Reforestation

Goals and Objectives

Although it calls for monitoring of reforestation, the 1988 LRMP does not include any goals related specifically to post-wildfire reforestation on the forest. The goal for wildfire protection is:

The forest has a cost-effective fire management program that minimizes resource losses and serious or long-lasting adverse effects from wildfire. The Forest Service mission in fire management is to use fire as a resource management tool.

Monitoring Actions

As shown in the table below, the 1988 LRMP calls for continued monitoring of reforestation activities. The 2004 Sierra Nevada Forest Plan Amendment does not include specific monitoring direction related to reforestation activities.

Table 2. Summary of monitoring direction for reforestation

Activity to be Measured (LRMP)	Summary of LRMP Objective	LRMP Monitoring Technique	Related 2001/2004 Framework Monitoring
Reforestation	Determination of success of regeneration practices	Described in FSH 2470. Includes sampling of species, survival, planting stock density.	Not Applicable

Monitoring Action 1: Crater Fire Reforestation

From 2002 through 2004, Jeffrey pine seedlings were planted on approximately 450 acres within the area burned by the 2001 Crater Fire (T1S, R27E, Sec. 2 MDB&M; Crater Fire Tree Planting Decision Memo, 2/22/02). In 2007, survival surveys were completed in Stand 0030023 (28 acres) within the Railroad Timber Compartment. The objective of the monitoring was to assess the percentage of area stocked with planted and natural trees and determine the number of trees per acre within the planted area. Since 2007, stocking surveys were completed on approximately 290 acres. The objective of the monitoring was to assess the success of the 2002-2004 reforestation efforts.

Results and Evaluation

The desired (pre-European settlement) Jeffrey pine forest condition would average 15-25 large trees (> 24 inch dbh) per acre, occurring in patches or groups. Although actual survival numbers in the Crater Fire area are below that average, they are within an acceptable range. These survivors are expected to provide a future seed source to help restore this burned area to a forested condition. No additional activities are planned at this time.

Reforestation efforts were initiated post-wildfire and were not related to timber harvest activities. Because the planting was not subject to reforestation requirements, any number of successfully regenerated trees would be considered acceptable in that it will enhance natural regeneration by reducing the amount of time trees would reoccupy the site through natural recovery.

Recreation

Goals and Objectives

The 1988 LRMP includes the following goal for recreation on the forest:

A broad range of developed and dispersed recreation opportunities in balance with identified existing and future needs is provided.

Related annual objectives are:

- 1,914,000 recreation visitor days of developed private use
- 1,578,000 recreation visitor days of developed public use
- 1,191,000 recreation visitor days of dispersed use
- 644,000 recreation visitor days of designated Wilderness use

A recreation visitor day (RVD) is defined as 12 hours of recreation use in any combination of persons and hours, such as one person for 12 hours or three persons for four hours.

Monitoring Actions

As shown in the table below, the 1988 LRMP calls for continued monitoring of recreation use levels and the effects of OHV use on land and other resources. Overlapping monitoring direction from the 2004 Sierra Nevada Forest Plan Amendment is also displayed.

Table 2. Summary of monitoring direction for recreation

Activity to be Measured (LRMP)	Summary of LRMP Objective	LRMP Monitoring Technique	Related 2001/2004 Framework Monitoring
Recreation use	Determine total recreation use	RIM system and other sampling techniques	NA
OHV use on land and other resources	Determine if adverse effects are occurring or likely to occur	Photograph and/or field measurements	Key Old Forest Information Gaps (p. E-70 and 71): What are the effects of OHV use on the abundance and distribution of fishers? What are the effects of OHV use on the abundance and distribution of martens?

Monitoring Action 1: National Visitor Use Monitoring (NVUM)

The National Visitor Use Monitoring (NVUM) program provides information about recreation visitors to national forest system managed lands at the national, regional, and forest level. Information about the quantity and quality of recreation visits is required for national forest plans, Executive Order 12862 (Setting Customer Service Standards), and implementation of the National Recreation Agenda.

NVUM results are used to assess current recreation use levels and activities for all national forests, including the Inyo. Data collected include demographics, visit characteristics (e.g., duration, group size, etc.), activity participation, and use of sites and facilities (U.S. Forest Service NVUM National Summary Report, 2008).

The Inyo National Forest participated in the National Visitor Use Monitoring (NVUM) project from October 2005 through September 2006. Results were released in January 2009. The full Inyo National Forest NVUM report is available on the web through the Natural Resource Information System (NRIS) Human Dimensions Module at:

http://fsweb.nris.fs.fed.us/products/Human_Dimensions_NVUM/HD-NVUM_12/index.shtml.

Results

A total of 2,170 individuals were contacted during the NVUM sampling in fiscal year 2006, of which 1,818 agreed to be interviewed. NVUM has standardized measures of visitor use to ensure that all national forest visitor measures are comparable. Visitors must pursue a recreation activity physically located “on” Forest Service managed land in order to be counted. They cannot be passing through; viewing from non-Forest Service managed roads, or just using restroom facilities. The NVUM basic use measurements are national forest visits and site visits. NVUM provides estimates of both types of visits and statistics measuring the precision of the estimates. These statistics include the confidence interval width at the 90 percent confidence level. The NVUM methodology categorizes recreation facilities and areas into specific site types and use levels in order to develop the sampling frame.

The following table shows the annual visitor use estimates for the Inyo National Forest, based on data collected during the fiscal year 2006 NVUM sampling. For comparison, FY2006 results are compared to data collected during the first round of NVUM sampling in FY 2002.

Table 3. Annual visitation estimate (thousands) for Inyo National Forest (National Visitor Use Monitoring FY 2002 data and FY 2006 data)

Visit Type	Round 1, FY 2002		Round 2, FY 2006	
	Visits (thousands)	90% confidence interval width(%) ^d	Visits (thousands)	90% confidence interval width (%) ^d
Total Estimated Site Visits	5,665.42	20.4	5,022.3	9.2
Designated Wilderness Visits ^b	123.57	35.7	141.9	25.0
Special Events and Organizational Camp Use ^c	2.19	0.0	3.9	0.0
Total Estimated National Forest Visits	4,205.62	24.9	3,921.7	8.1

^b Designated Wilderness visits are included in the Site Visits estimate.

^c Special events and organizational camp use are not included in the Site Visit estimate, only in the National Forest Visits estimate. Forests reported the total number of participants and observers so this number is not estimated; it is treated as 100% accurate.

^d This value defines the upper and lower bounds of the visitation estimate at the 90% confidence level, for example if the visitation estimate is 100 +/-5%, one would say "at the 90% confidence level visitation is between 95 and 105 visits."

The table below presents participation rates by activity for the Inyo National Forest during the NVUM survey period. The Total Activity Participation (%) column of the table presents the participation rates by activity. Participation rates will exceed 100% because visitors can participate in multiple activities. The Percent as Main Activity column presents the participation rates in terms of primary activity.

Some caution is needed when using this information. Because most national forest visitors participate in several recreation activities during each visit, it is more than likely that other visitors also participated in this activity, but did not identify it as their main activity. For example, 37 % of visitors to the Inyo National Forest identified viewing wildlife as a recreational activity that they participated in during this visit, however only 1% identified that activity as their main recreational activity. The information on average hours viewing wildlife is only for the 1% who reported it as a main activity.

Evaluation

Based on the NVUM sampling, the most popular activities for visitors to the Inyo National Forest were: viewing natural features and scenery (52% of visitors participated), relaxing (46% of visitors participated), downhill skiing or snowboarding (43% of visitors participated), and hiking or walking (41% of visitors). Results indicate most visitors participate in multiple activities during their visit. Downhill skiers and snowboarder appear to be an exception, with 39% of respondents indicating that skiing or snowboarding were the primary activities during their visit. In contrast, approximately 14% of visitors stated they came to the Inyo National Forest primarily to view natural features and scenery, while 12% stated the primary purpose for their visit was hiking or walking.

**Table 4. Activity participation on Inyo National Forest
(National Visitor Use Monitoring FY 2002 and FY 2006 data)**

Activity	Round 1, FY 2002		Round 2, FY 2006		Average hours spent in primary activity
	% of visitors who participated in this activity	% who said it was their primary activity	% of visitors who participated in this activity	% who said it was their primary activity	
Camping in developed sites	9.62	1.37	13.8	2.6	66.5
Primitive camping	2.65	0.26	2.4	0.1	53.2
Backpacking	2.88	1.09	3.9	2.0	57.1
Resort Use	5.82	0.53	9.1	0.1	40.3
Picnicking	9.27	0.27	11.2	0.7	22.5
Viewing wildlife, birds, fish, etc	27.11	1.50	37.2	1.0	20.0
Viewing natural features (scenery)	40.52	11.14	52.2	13.6	9.3
Visiting historic/prehistoric sites	6.01	0.17	12.4	0.2	2.4
Visiting a nature center	12.17	1.45	13.2	0.4	1.9
Nature Study	8.47	0.61	8.7	0.0	.
Relaxing	35.77	6.39	46.2	6.4	33.3
Fishing	16.14	10.50	14.9	8.1	20.2
Hunting	0.37	0.27	0.7	0.6	11.5
OHV use	3.49	0.46	1.8	0.3	4.7
Driving for pleasure	20.64	1.53	24.8	0.9	2.5
Snowmobile travel	2.58	0.31	1.1	1.1	1.7
Motorized water travel	2.90	0.06	2.5	0.0	10.0
Other motorized activities	0.82	0.25	0.2	0.0	.
Hiking or walking	30.05	8.39	41.3	12.3	8.9
Horseback riding	1.15	0.32	2.1	0.3	6.5
Bicycling	4.00	1.56	6.9	3.3	4.6
Non-motorized water travel	1.95	0.13	2.8	0.6	4.8
Downhill skiing or snowboarding	28.46	26.25	43.4	39.4	4.3
X-C skiing, snow shoeing	18.82	18.15	4.6	4.5	3.6
Other non-motor activity (swim, etc.)	7.00	1.56	5.0	0.9	3.7
Gathering forest products mushrooms, berries, firewood, etc.	1.31	0.26	2.7	0.1	0.6
Motorized Trail Activity	NA	NA	1.0	0.0	10.0
No Activity Reported	14.11	14.43	18.6	17.8	.

It is tempting to compare the activity participation rates between the 2002 and 2006 surveys. While this may provide the forest with some interesting trend analysis, one must be cautious of interpreting any significant changes. The allocation of sample days changed between the first and second round of data collection. The second round of data addressed seasonal distribution of sample days in order to better capture activity participation that is highly seasonal in nature, such as big game hunting. Therefore, some differences between activity participation between 2002 and 2006 may be attributed to the change in sample day allocation and not a change in actual participation rates. The extent of this effect is unknown at this time, but may become more evident as additional rounds of monitoring are conducted in the future.

Monitoring Action 2: Effects of Off-Highway Vehicle (OHV) Use on Land and Other Resources

The Forest has nine areas in which OHV patrol, route maintenance, and conservation efforts are concentrated. These areas include the following:

- Monache
- Poleta Open Area
- Bishop/Coyote
- White Mountains and Ancient Bristlecone Pine Forest
- Mazourka and Inyo Mountains
- McGee Creek and Sagehen Meadow area/Taylor Canyon
- Glass Creek/Deadman/Crater Flats
- East Craters
- Mono Basin Scenic Area

These areas represent a cross section of different soil types and conditions found throughout the Forest. For instance, in the Monache and Bishop/Coyote areas system routes traverse through wet and dry meadows. In the McGee Creek, Glass Creek/Deadman/Crater Flats, East Craters and Mono Basin Scenic Area routes traverse through ashy/pumiceous soil types.

As part of OHV management on the Forest, approximately 230 miles of roads and trails within the OHV focus areas are monitored using the 1991 California Department of Parks and Recreation Soil Conservation Standards and Guidelines. The majority of the monitoring is focused on system roads used for off-highway vehicle recreation. Generally, routes are rated annually.

The Soil Conservation Standards and Guidelines are used to rate the condition of route segments as Green, Yellow, or Red (G, Y, R). The green condition class means that the route is in stable condition and is generally functional with minimal resource issues. Yellow condition relates to routes that need minor erosion control and/or tread work that should be prioritized for maintenance. The red rating is used for routes in need of restoration and/or heavy maintenance work.

Results

In 2008, approximately 99% of the 233 miles of inventoried routes were found to be stable with minimal resource issues (green rating). Segments of four routes totaling approximately 1.4 miles were rated as yellow (5S01, R19S11, R205101a, R20S101/102). Resource issues identified for these routes included rutting, sedimentation, multi-trailing, and lack of proper drainage features.

Maintenance of these routes was completed during the 2009 field season, and subsequent monitoring indicated that all routes within the OHV focus area were stable and functional (green) in 2009.

Evaluation

Restoration and maintenance activities implemented since 2003 have increased the percentage of green-rated routes in the OHV focus areas from 82% to 100%. The Soil Conservation Standards and Guidelines monitoring results will continue to be used to identify and prioritize routes for corrective action, including heavy maintenance, stabilizing stream crossings, repair of drainage/erosion control features or damaged tread surfaces.

Diversity of Vegetation

Goals and Objectives

The 1988 LRMP includes the following goal:

The Forest has achieved diversity of plant and animal communities by providing a threshold level of vegetation types and seral stages.

There are no objectives specific to vegetation diversity.

Monitoring Actions

The LRMP includes the following monitoring actions for vegetative diversity. The table includes related monitoring to be conducted under the 2004 Sierra Nevada Forest Plan Amendment (from Appendix E of the 2001 SNFPA).

Table 5. Summary of monitoring direction for vegetation diversity

Activity to be Measured (LRMP)	Summary of LRMP Objective	LRMP Monitoring Technique	Related 2001/2004 Framework Monitoring
Vegetative Diversity	Ensure that the Forest-wide distribution of all successional stages meet Forest Service Guidelines and Prescriptions [and] that spatial and structural diversity is maintained in riparian areas	Compare existing low and longterm minimum levels. Sample...projects to determine the cumulative effects on successional stage, spatial and diversity	N/A

Monitoring Action 1: Aspen Stand Condition Assessments

In 2008, the Inyo National Forest began an inventory to determine the location and condition of its quaking aspen (*Populus tremuloides*) stands. This inventory serves a few purposes. First, it provides data for the Aspen Delineation Project, a multi-agency collaborative effort dedicated to gathering aspen data. Second, it provides an evaluation of aspen for the Forest’s inventory and monitoring program. Third, data from this inventory may help to identify aspen stands which are at risk and which may benefit from prescribed burning or other management treatments.

The aspen inventory provides an overview of aspen stands and their condition, with specific data collected regarding the location, general health of the trees, overall stand canopy structure, and any

conditions which may put the stand at risk. Inventoried stands were assigned the following Loss-Risk ratings:

- **None:** None of the risk factors described below are present, mature trees vigorous, regeneration 5-15' tall with more than 500 stems per acre.
- **Low:** Clone essentially healthy, either mature trees and/or regeneration for the most part healthy and vigorous, no obvious signs that the clone has receded, <15% of the clone affected by risk factors.
- **Moderate:** One or more risk factors below is present, but clone not in immediate danger. May include one or more of the following: 1) conifer closure >25%, but <50%, 2) aspen cover <40%, 3) dominant aspen are decadent, 4) aspen regeneration 5-15' tall is less than 500 stems per acre, 5) regeneration being excessively shaded by conifers, 6) browsing is limiting extent and numbers of successful regeneration.
- **High:** The stand is being lost from above (overtopped by conifers) or is not being replaced from below (insufficient aspen regeneration).
- **Highest:** The stand is being lost from above and is not being replaced from below

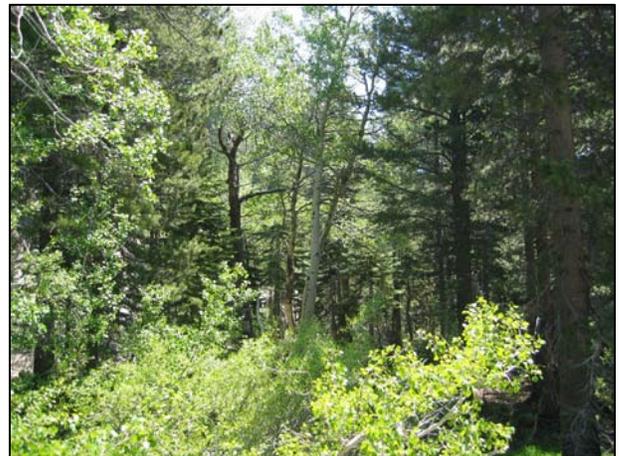


Figure 1. The photo on the left shows an aspen stand with no risk factors present, on the right is a stand at the highest risk-loss rating.

Results

During the initial survey period in 2008, a total of 138 aspen stands were surveyed for a total of 2,076 acres. The surveyed stands occupied an elevation range from 6,690 to 10,380 feet. Basic results are summarized in the table below.

Table 6. Risk ratings for aspen stands inventoried in 2008 and 2009

		Risk of Loss Rating					Total
		None	Low	Moderate	High	Highest	
2008	Number of aspen stands, by risk rating	6 4%	54 39%	56 40%	21 15%	1 1%	138
	Acres of aspen stands, by risk rating	521 25%	959 46%	597 28%	252 12%	27 1%	2,076
	Inventoried stands with record of fire/burning	2 17%	6 50%	4 33%	0	0	12 (9%)
	Inventoried stands showing evidence of disease	0	12 31%	18 46%	9 23%	0	39 (28%)
2009	Number of aspen stands, by risk rating	2 6%	19 63%	7 23%	1 3%	1 3%	30 ^a
	Acres of aspen stands, by risk rating	20 7%	169 55%	69 23%	17 6%	35 11%	305

^a An additional four timber stands were inventoried in 2009, but were not comprised of aspen. Loss-Risk assessments were not completed on these stands.

Of 138 stands inventoried in 2008, records indicated that 12 had been disturbed by fire in the past. Of those, two stands (17%) had a loss risk rating of none, six stands (50%) were rated as being at low risk, and 4 stands (33%) were at moderate risk. Some of the inventoried stands (39) showed evidence of disease. Of these, twelve stands (31%) were found to be at low risk of loss, 18 stands (46%) were at moderate risk of loss, and 9 stands (23%) were at high risk of loss.

In 2009, 305 acres of aspen stands were inventoried. Of those, more than half (55%) were assigned a risk rating of low, while 23% were rated as being at moderate risk and 7% at low risk. Almost 20% of the stand acreage inventoried in 2009 was found to be at high or highest risk, compared to 13% of the acres inventoried in 2008.

Evaluation

The results seem to indicate that stands that have been disturbed by fire are generally in better condition than those that have not. For the previously burned stands, 17% had a risk rating of none and 50% a risk rating of low, compared to 4% and 39% for all inventoried stands. These results are consistent with current understanding of aspen stand morphology. In the absence of disturbances such as fire, aspen stands are often overtopped by fast-growing, shade tolerant conifer species (*Pinus* sp. and *Abies* sp.) (Bartos & Campbell, 1998), increasing the risk that the stand will be replaced by conifers. The assessments identified several stands at moderate to highest risk of loss due to overtopping conifers; these stands will be considered for possible treatment with prescribed fire or mechanical thinning to eliminate the undesirable conifer component and allow aspen to re-sprout from its extensive root system.

Of the 138 aspen stands surveyed on the Inyo National Forest in 2008, 39 (28%) were found to be suffering from disease. Without microscopic examination, or discovery of fruiting bodies, the exact agent of the disease could not be determined. However, symptoms in many aspen stands are

consistent with those caused by the fungus *Cytospora* canker (*Cytospora chrysosperma*). Infection of aspen trees by this fungus is characterized by orange discoloration of bark, irregularly shaped cankers, and eventually dead bark hanging from the tree (Johnson et.al, 1995). These symptoms were seen in many stands across the Forest, most notably west of Gull Lake, in the Dexter Allotment on the north side of the Glass Mountains, and in stands containing heavily used campgrounds such as Four Jefferies in Bishop Creek. Because *Cytospora* canker is known to attack stressed trees (Johnson et.al, 1995), extensive recreational use (including camping) and grazing in aspen stands could be contributing factors.

Using the results of the stand condition assessments, the Forest Service is currently developing a landscape-level aspen treatment proposal. The aspen treatment proposal is expected to identify treatment options, including the removal of overtopping conifers and prescribed burning, for specific aspen stands at risk of loss. Once developed, the proposal will be analyzed under the National Environmental Policy Act. Analysis of the proposal is expected to begin in fiscal year 2011.

Status of Sensitive Plants

Goals and Objectives

The 1988 LRMP includes the following goal:

Sensitive plant species are protected to ensure that they will not become threatened or endangered.

There are no objectives related to sensitive plants.

Monitoring Actions

The LRMP includes the following sensitive plant monitoring actions. The table includes related monitoring to be conducted under the 2004 Sierra Nevada Forest Plan Amendment (from Appendix E of the 2001 SNFPA).

Table 7. Summary of monitoring direction for Forest Service sensitive species

Activity to be Measured (LRMP)	Summary of LRMP Objective	LRMP Monitoring Technique	Related 2001/2004 Framework Monitoring
Sensitive Plant Species Habitat	Detect changes in key populations of each species and assess impacts on selected populations of occupied habitats	Population trend censuses; baseline and past-project surveys for input into EAs. Use applicable techniques identified in Interim or Species Management Guides	Aquatic, Riparian, and Meadow ecosystem Status and Change Monitoring (p. E-104): Populations of nonvascular plant and fungi species at risk?

Monitoring Action 1: Monitoring Density of Ramshaw Abronia (2008 and 2009)

Abronia alpina (Ramshaw abronia), a Forest Service sensitive species, is known only from Ramshaw and Templeton Meadows in the Golden Trout Wilderness of the Inyo National Forest. One population of the species (previously considered two populations) is spread along the sandy margins of those meadows. Thirty-four sub-populations have been mapped within that population.

In 2008 and 2009, Forest botanists conducted population monitoring on all 34 subpopulations. Surveyors recorded plant density and age class in multiple 5 meter x 6 decimeter plots within each sub-population, as well as 5 meter x 5 meter permanent plots in three selected subpopulations. Standard statistical methods were used to analyze the population monitoring data collected in 2008 and 2009.



Figure 2. Ramshaw abronia, a Forest Service sensitive species

Results

Population size was estimated for all 34 subpopulations sampled, and selected populations. As shown in the figure below, population estimates in 2008 for all sampled populations (approximately 67,000 plants) were lower than in all previous years except 2006. The following year, in 2009, population estimates for all sampled populations increased by more than 30,000 plants.

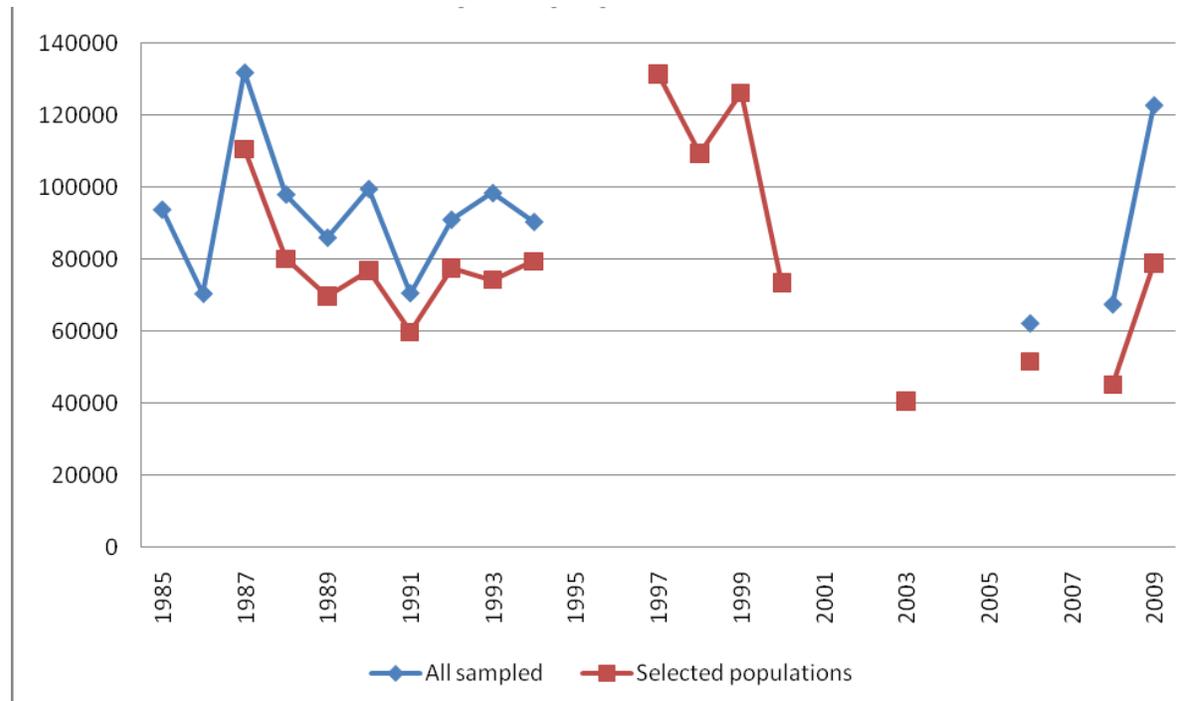


Figure 3. Population estimates for Ramshaw Abronia, 1985 – 2009.

Evaluation

The number of plants has been monitored closely since 1982, but numbers vary widely from year to year and no obvious trend has been found. Results from this data have been incorporated into a draft Conservation Agreement with US Fish and Wildlife Service to provide for the long term conservation of this species. The Conservation Agreement is currently awaiting approval by US Fish and Wildlife Service.

In 2009, the US Fish and Wildlife Service prepared a Spotlight Species 5 Year Action Plan for 2010-2014 (http://ecos.fws.gov/docs/action_plans/doc3000.pdf). The plan identifies the following actions:

- Completion of the Conservation Agreement with USDA Forest Service.
- Continued monitoring, every three years, in collaboration with the Forest Service, of extant populations documenting:
 - Species distribution.
 - Abundance.
 - Age class.
 - Extent of trampling damage.
- Watershed-level evaluation of grazing and resultant impacts on water table and meadow drying.
- Development and implementation of comprehensive conservation strategy for *Abronia alpina*.

Monitoring Action 2: Monitoring grey-leaved violet in Monache Meadow for status and trend information

Grey-leaved violet (*Viola pinetorum*, ssp. *grisea*) is listed on the Region 5 Forest Service Sensitive Plant Species list. In 2009, sampling or census was conducted at four locations in three populations of grey-leaved violet in Monache Meadow. All locations are in areas where motor vehicle use occurs. These locations were selected for monitoring in order to improve understanding of possible effects of motor vehicle use on grey-leaved violet populations.

Consistent with previous monitoring conducted in 2006, the 2009 monitoring was conducted using 1 x 0.25 m quadrats. Quadrats were set along three 50 meter lines, alternating on either side of the lines.



Figure 4. Grey-leaved violet (*Viola pinetorum*, ssp. *grisea*), a Forest Service Sensitive Species

Results

The following table shows the population estimates for each of the populations for 2009 and previous sampling years. To estimate the population size, the area of the populations (meters²) was determined using spatial datasets for rare plants or information provided on datasheets.

Table 8. Population estimates for four sub-populations of grey-leaved violet in Monache Meadow. Three sub-populations were monitored in 2009.

Sub-population	2000	2001	2002	2003	2006	2009
2	X	2,930	3,125	X	4,981	3,516
8	1,141	X	X	1,559	1,676	X
11f	X	41,000	20,081	X	X	26,160
11m	X	2,861	2,488	X	X	7,651
16e	X	475,227	100,347	X	727,040	715,680

Evaluation

All populations were either within or above the previous range of plant numbers; no change in management was recommended. For Population 2, several meters of the transects used during previous sampling efforts were found to be outside of suitable habitat for grey-leaved violet. Different transect locations have been recommended based on the maps of the population polygons prepared using GPS data collected in 2009. The transects could be shorter or have a non-parallel arrangement.

Monitoring Action 3: Monitoring revegetation success at Pine Creek Tungsten Mine

In June of 2009, vegetation monitoring was conducted at four tailings ponds and the borrow pit at the Pine Creek Tungsten Mine. The Pine Creek Tungsten Mine Reclamation Plan, as amended, established the following re-vegetation objectives for the area:

- Native vegetation cover 30-50%
- Non-native cover <5%
- Native species diversity of at least 3 species with 3 hits (6% cover)

The ponds and borrow pit were seeded in 2001; 100 foot long point-intercept transects were established in 2002. Monitoring was conducted in 2002 and 2009. Data collected included the species of the tallest plant present, bare ground, or litter.



Figure 5. In 2009, vegetation monitoring was conducted at the borrow pit and four tailings ponds at the Pine Creek Mine.

Results

Native vegetation cover along the transects ranged from 10-72%, with an average of 33% overall. The native cover goals were not met at two of the tailings ponds (27% and 28% average native cover, respectively). Vegetation was found to be patchy throughout the site, with most plants growing in the furrows. Local differences in soil and water availability appear to account for the variation.

Table 9. 2009 vegetation monitoring results for revegetation of the Pine Creek Avocet Mine

	Number of Transects	Average native cover (%)	Average non-native cover (%)	Average # native species	Average # native species with > 3 hits
Overall	47	33	1	4	2
Pond 1	12	35	1	5	2
Pond 2	12	36	0	4	2
Pond 3	6	27	1	4	2
Pond 4	10	28	0	5	1
Borrow Pit	7	35	0	3	2

The non-native cover goals were met on all ponds with an average of 1% cover. Non-native cover exceeded 5% on only three of the 47 transects.

The specific native diversity goal of three native species per transect with three or more hits was only met on nine transects. However, because species diversity in general exceeded the goal (average four species per transect) and the native cover goals were met, the trend is toward acceptable native diversity.

Evaluation

The native vegetation cover goals were met overall with an average 33% cover. Given that the native vegetation and non-native vegetation cover goals were met and the native species diversity is trending toward the goal, we believe the re-vegetation goals have been met and the site will continue to recover without further seeding. This monitoring indicates that weed removal projects conducted in 2003 and 2007 effectively controlled non-native weed species, particularly Russian thistle. Cheatgrass was the most commonly encountered weed; future disturbance in the area could lead to an increase in density.

Monitoring Action 4. Kern Plateau Milk Vetch (*Astragalus lentiginosus* var. *kernensis*) Population Estimates

The Kern Plateau milk vetch is a perennial herb found in subalpine meadows; all known populations on the Inyo National Forest are located on the Kern Plateau. The Kern Plateau milk vetch is currently listed as Sensitive in the Pacific Southwest Region of the Forest Service. In 2009, sampling was conducted in two populations in Monache Meadow where motor vehicle use occurs. For comparison, sampling was also conducted at one location in Ramshaw Meadow in the Golden Trout Wilderness where no vehicle use occurs. Monitoring was conducted following previously established methodology.

Results

The following table shows the population estimates for each of the populations for 2009 and previous sampling years. To estimate the population size, the area of the populations (meters²) was determined using spatial datasets for rare plants or information provided on datasheets.

Table 10. Kern Plateau milk vetch population estimates, 2000-2009

Population	2000	2001	2002	2003	2005	2006	2009
1j	1,584	1,129	510	X	X	1,779	2,765
2c	X	15	100	X	X	X	X
2h+j	X	31	23	X	X	X	X
3r+k+g	X	3,800	1,535	X	X	X	2,368
3y	X	465	2,555	X	X	X	X
12b	10,716	X	X	6,336	X	6,920	2,768

Evaluation

Population 1j in Monache Meadow showed an increase in population over previous years. Many seedlings were included in this count. The smaller quadrat size (5 x .25 m) used in this population in 2009 resulted in a much lower standard deviation than the 10 x .5 m quadrat used previously, meaning that data points were more closely clustered around the mean than previous data sets.

The estimate for Monache population 3rkg was within the range of previous estimates, and the Ramshaw population (12b) showed a decrease. This may have been a result of a difference in

locating the sampling sites. These are not permanently marked plots and are difficult to relocate exactly. GPS points of the sampling sites were taken in 2009 to help resolve this problem. No change in management was recommended as a result of the monitoring; future monitoring will help determine if there is an actual trend in population size.

Water Quality Management

Goals and Objectives

The 1988 LRMP established the following goal related to watershed management:

National Forest management activities are conducted to maintain or improve soil productivity, to maintain favorable conditions of waterflow, and to comply with water quality goals as specified in state and federal clean water legislation for the sustained benefit of consumptive and nonconsumptive users of water.

The LRMP includes the following annual watershed objectives:

- Improvement of 350 acres annually, compared to the base year (1982) output of 100 acres.
- Water quantity yield at standard of 1,050,000 acre-feet annually, and
- Increased quantity of 7,000 acre-feet annually

Monitoring Actions

The 1988 LRMP includes direction to monitor water quality management and watershed improvement. Objectives of the LRMP program, along with monitoring techniques and a summary of related monitoring elements from the 2004 Sierra Nevada Forest Plan Amendment, are displayed in the table below.

Table 11. Summary of monitoring direction for water quality management

Activity to be Measured (LRMP)	Summary of LRMP Objective	LRMP Monitoring Technique	Related 2001/2004 Framework Monitoring
Water Quality Management	Assess compliance with BMP direction and continue to evaluate the effectiveness of BMPs	Review of prepared EAs, review of contract provisions, field activity reviews, water quality analysis field observations	Status and Change and Cause/Effect Monitoring for Aquatic, Riparian, and Meadow ecosystems (p. E-102): Water quality in streams? (Goal 1) Water quality and community composition in lakes? (Goal 1,3)
Watershed Improvement	Evaluate effectiveness of watershed improvement measures	Observations and measurements	Cause and Effect Monitoring, p. E-113: Does implementation of the recommendations in a landscape/watershed analysis result in maintenance and or restoration of watersheds and soil health/productivity? Status and Change and Cause/Effect Monitoring for Aquatic, Riparian, and Meadow ecosystems (p. E-102): Watershed condition? (Goal 7)

Monitoring Action 1: 2008 and 2009 Best Management Practices

Best Management Practices (BMPs) are an integral component of all management activities conducted on National Forests in Region 5. Monitoring of BMP implementation and effectiveness through the BMP Evaluation Program (BMPEP) is necessary to meet the requirements of a Management Agency Agreement with the State of California. The Inyo National Forest documented the results of its 2008 and 2009 BMP monitoring programs in Best Management Practices Evaluation Reports dated January 9, 2009 and February 5, 2010.

The Regional Office has developed BMPEP evaluation protocol, including visual inspections and comparison with established objectives for each site, along with repeat photography. Onsite Evaluations are used to assess both BMP implementation and effectiveness. Implementation evaluations determine the extent to which planned, prescribed and/or required water quality protection measures were actually put in place on project sites. Effectiveness evaluations gauge the extent to which the practices met their water quality protection objectives.

Onsite Evaluation protocols are applied to both randomly and non-randomly selected project sites. The number of random evaluations to be completed each year are assigned to the National Forests by the Regional Office, based on: 1) the relative importance of the BMP in protecting water quality in the Region; and 2) those management activities most common on the individual Forest (e.g., range management on the Modoc National Forest, recreation on the Angeles National Forest). Forests supplement these randomly selected sites with additional sites based on local monitoring needs, such as those prescribed in an environmental document. Only data from onsite evaluations made at randomly selected sites are used to assess BMP implementation and effectiveness at a programmatic level, and are included in this report.

The following table summarizes the BMP targets assigned to and completed by the Inyo National Forest in 2008 and 2009.

Table 12. Summary of BMP targets assigned and met in fiscal years 2008 and 2009.

Year	Targets Assigned	Targets with Sample Pool	Targets Met	Targets not Met (with Available Sample Pool)
2008	40	33	29 (88%)	4
2009	39	31	26 (84%)	5

Results and Evaluation

BMPs are rated according to the following four categories: implemented and effective (I-E); implemented, but not effective (I-NE); not implemented, but effective (NI-E); and not implemented and not effective (NI-NE). For sites with poor implementation or effectiveness scores, evaluators are asked to identify the reasons and suggest corrective actions. For those sites with poor effectiveness, evaluators are asked to estimate the degree, duration, and magnitude of any existing or potential impacts to water quality. However, because this type of “monitoring” uses indirect measures to evaluate BMP effectiveness, poor scores represent potential, rather than actual, impairment of beneficial uses by a given activity.

Table 13. Onsite evaluation results evaluations for 2008 and 2009.

BMP Effectiveness Rating	2008		2009	
	Number of Site Evaluations	Percent of Total	Number of Site Evaluations	Percent of Total
Implemented and effective (IE)	15	52%	17	65%
Not implemented, but effective (NIE)	8	28%	5	19%
Implemented but not effective (INE)	2	7%	2	7%
Not implemented and not effective (NINE)	4	14%	2	7%
TOTAL	29		26	

BMPs Implemented and Effective

In 2008, 52% of the sites evaluated were both implemented and effective. Sites that were both implemented and effective include timber related project sites (T02, T04 and T05); two of six road-maintenance BMPs (E08, E09 and E11); road decommissioning (E10); snow removal (E17); commercial pack stock in wilderness evaluation (R23); mining operations (M26); common variety minerals (M27); vegetation manipulation (V28); and revegetation of surface disturbed areas (V29). Because these sites met both implementation and effectiveness criteria, no further action was taken.

In 2009, 65% of the sites evaluated were both implemented and effective. These include timber related BMPs (T02, T04 and T05); three of six road-maintenance BMPs (E08, E09 and E11); rip-rap placement (E15); snow removal (E17); developed recreation sites (R22); three of four commercial pack stock in wilderness evaluations (R23); grazing management (M26); one of two prescribed fire (F25); and vegetation manipulation (V28). Because these sites met both implementation and effectiveness criteria, no actions were taken.

BMPs Not Implemented, but Effective

In 2008, eight sites (28%) did not have BMPs implemented in 2008, but the sites were not causing any water quality problems. In comparison, five sites (19%) were assigned this rating in 2009. Results are summarized in the following table.

Table 14. Summary of Not Implemented, but Effective BMP evaluation results, 2008-2009

BMP Category	Evaluation Site	Evaluation Findings	Rationale for Rating
2008			
Road maintenance	Forest Road 01N13	One E08 BMP (road surface, drainage and slope protection) and one E11 BMP (control of sidecast material) were not implemented	Minor rilling, and no cut slopes or cross drains
	Forest Road 02N03	One E08 and one E09 BMP (control of sidecast materials) were not implemented	Sediment not entering water
Developed recreation site	Inyo Craters Interpretive Site	Insufficient ground cover, rilling and erosion, and numerous user-developed trails	No surface water in vicinity
Prescribed fire	Casa Diablo Unit 000 and Caboose Unit 9	Specific objectives for groundcover, hydrophobic soils and rilling were not included in the burn plans	All watershed goals were met post-burn
Dispersed recreation site	Buttermilk bouldering area	Site was expanding in size due to lack of defined boundaries, and lacked sanitation facilities.	Site is more than 100 feet from the creek; no connectivity
	Barrel Springs campsite	Garbage and debris (e.g., concrete and 50-gallon drum) have been dumped at the site	No downstream water within 10 miles.
2009			
Road maintenance - E08 (road surface, drainage and slope protection)	Red's Meadow Road	Small piles of soil were left near the inlets of some of the culverts during maintenance	Affected culverts were not at stream crossings and could not deliver sediment to stream channels
Road maintenance - E09 (stream crossings)	Forest Road N1967	Road diverts water from the creek onto the road for a short distance before it returns the flow back to the creek via the floodplain.	Flood plain area is well vegetated and filters most or all of the minor sediment derived from the road surface
Road maintenance - E11 (control of sidecast materials)	Red's Meadow Road and Road 3S11	Some sidecast materials were directly deposited adjacent to culverts and streams.	Sidecast materials not entering water
Prescribed fire - F25	Crestview Broadcast Burn	The burn plan did not specify that the creation of new roads should be avoided or that access roads should be decommissioned after use.	No streams within the evaluation site
Common variety minerals - M27	Windmill Gravel Pit (Owens River Road)	No site development plan for the site or permit (Forest Service site)	No streams or water within the evaluation site

BMPs Implemented but Not Effective

In 2008 and 2009, a total of four sites had BMPs implemented, but they were not effective. Results are summarized below.

Table 15. Summary of Implemented, but Not Effective BMP evaluation results, 2008-2009

BMP Category	Evaluation Site	Evaluation Findings	Rationale for Rating
2008			
In-channel construction practice targets (E13)	Soda Creek in Monache Meadow, at road crossing	Small amount of sediment persisted over 20 channel widths below project locations	Sediment did not persist for more than a few hours, and the project had a greater positive than negative effect to beneficial uses. For small in-stream construction projects such as these, diverting the stream would likely have greater impact on water quality.
	Ruby Lake tributary to Bishop Creek, at a trail crossing		
2009			
In-channel construction practice targets (E13)	Stream crossing improvements in Silver Canyon	Small amount of sediment persisted over 20 channel widths below project locations	Sediment did not persist for more than a few hours, and the project had a greater positive than negative effect to beneficial uses
	Stream crossing improvements in Crooked Creek (White Mountains)		

Unless a stream is diverted during construction activities, it is almost impossible to prevent a small amount of sediment from moving at least 20 channel widths downstream. At all of the sites evaluated in 2008 and 2009, the sediment did not persist for more than a few hours, and the project had a greater positive than negative effect to beneficial uses. For small in-stream construction projects such as these, diverting the stream would likely have greater impact on water quality.

BMPs Not Implemented and Not Effective

Four (14%) of the 29 evaluated sites did not have BMPs implemented in 2008, and also did not have effective protection of water quality. In 2009, two (7.7%) of the 26 evaluated sites did not have BMPs implemented, and also did not have effective protection of water quality. Results are summarized below.

BMP Evaluations Not Completed

One of the two snow removal targets was not completed in 2008. To ensure snow removal evaluation targets are met in the future, dates for evaluation will be scheduled well in advance to coincide with the snowmelt period of 2009. In addition, three of the four targets for evaluating pack stock facilities in wilderness were not completed in 2008. In the future, the Forest Hydrologist will contact Wilderness Rangers in May or June, to ensure evaluations are scheduled for the field season.

In 2009, a total of five BMP targets were not completed: two of two dispersed recreation site (R30) targets, two of the three range management (G24) targets, and one of the three developed recreation site (R22) targets. The Forest Hydrologist will schedule an additional training session in 2010 to better integrate permit administrators and other staff into the program, so that they can better complete evaluations and improve upon BMP implementation and effectiveness.

Table 16. Summary of Not Implemented and Not Effective BMP evaluation results, 2008-2009

BMP Category	Evaluation Site	Evaluation Findings	Rationale for Rating
2008			
One road-stream crossing (E09)	Pizona Road (Forest Road 01N13)	The road crosses the creek numerous times, and the crossings are not improved or hardened.	The road runs through a meadow, where the crossing is mucky and deep, so users have created a new crossing, causing rutting in the meadow and conversion of meadow to road surface.
Developed recreation site BMPs (R22)	Mammoth Lakes Pack Outfit	Within 100 feet of a stream	Water quality analysis showed that fecal coliform levels were always within the standard. Effects to water quality are very minor due to effective management to reduce the amount of manure and sediment entering water.
	Table Mountain Group Camp	Within 25 feet of Bishop Creek.	A trail, rather than the campsite, appears to be the only obvious source of sediment to the creek. Therefore, this campsite is a low priority for corrective action other than moving the picnic table to a location farther from the stream.
Range management (G24)	Monache Meadows grazing allotment	Streambanks are raw and collapsing, and stream incision appears to have caused some conversion from meadow into sagebrush.	Conditions are primarily attributed to stream incision and widening which occurred in the early 1980s. Current grazing appears to play a role in preventing the degraded condition from improving.
2009			
Location of stock facilities in wilderness (R23)	Duck Creek Pack Stock Camp	Primary stock holding site is 100 feet from water, but stock are being held at times within 100 feet of water and an ephemeral stream. Animal waste is left unattended and was found to be reaching surface water. The camp latrine is located too close to water as well.	Water quality protection measures were identified in the 2001 Wilderness Plan and special use permit, but these measures have not yet been implemented effectively. Forest watershed staff will notify the District Ranger of the need to apply corrective actions and properly implement water quality protective measures.
Mining operations (M26)	Black Point Cinder Mine	Plan of Operations to identify site specific water quality protection measures is currently under development. Off site transport of sediment/contaminants is unlikely as there are no stream channels and very low gradients.	A plan of operations for the mine will be in effect once the required environmental analysis is completed and a decision is made.

Wildlife

Goals and Objectives

The 1988 LRMP established the following goals related to wildlife:

Wildlife habitat is maintained to provide species diversity, to ensure that viable populations of existing native vertebrates and invertebrates are maintained, and that the habitats of management emphasis species are maintained or improved.

The habitats of threatened or endangered animals are protected or improved to assist the recovery of the species in cooperation with State and other Federal agencies.

Monitoring Actions

The 1988 LRMP and Sierra Nevada Forest Plan Amendments (2004 and 2007) identify numerous monitoring activities for many different species of wildlife. To summarize, the 1988 LRMP includes species-specific monitoring direction for goshawk, mule deer, peregrine falcon, bald eagle, and Sierra Nevada and Nelson bighorn sheep (LRMP, pp. 254-255). The LRMP also calls for monitoring related to sensitive species like the willow flycatcher and sage-grouse, and quantity and distribution of snags and downed logs (pp. 256-257). Because this report presents monitoring results for just one of those species (northern goshawk), the following table presents only the monitoring direction specific to that species rather than attempting to summarize all wildlife monitoring direction in the LRMP and amendments.

The following table summarizes monitoring direction for the northern goshawk. It shows the overlap in direction between the 1988 LRMP as amended and the 2004 SNFPA Adaptive Management Strategy described in Appendix E of the 2001 SNFPA. As shown, the LRMP focuses on monitoring of habitat capability, while the SNFPA emphasizes both population and habitat monitoring.

Table 17. Summary of monitoring direction for willow flycatcher, a Forest Service sensitive species

Activity to be Measured (LRMP)	Summary of LRMP Objective	LRMP Monitoring Technique	Related SNFPA Monitoring
Goshawk	Ensure project compliance with Forest-wide Standards and Guidelines. Determine population and habitat trends.	Survey all known nest sites within areas managed for timber annually. Survey 50% of known nest sites outside of areas managed for timber annually.	Old Forest Issue (p. E-47) Implementation Monitoring: Were northern goshawk protected activity centers (PACs) delineated and were activities within them restricted according to standards and guidelines in the selected alternative? (p. E-67) (Reported in R5 SNFPA Monitoring Report) Status and Change Monitoring: The abundance and reproductive success of the northern goshawk in the Sierra Nevada? (p. E-69) The quantity, quality, and distribution of northern goshawk habitat? (p. E-69)
Threatened, endangered, and sensitive species management	Ensure that management activities afford protection of these species as prescribed in the Plan	Sample EAs and conduct field surveys of completed project.	NA

Monitoring Action 1: Goshawk Population Monitoring

The northern goshawk (*Accipiter gentilis*) is of current management and conservation focus in the Sierra Nevada because of concern regarding declines in habitat and uncertainty regarding population trends (2001 SNFPA, Appendix E, p. E-51). Northern goshawks are top-trophic level predators that occur in relatively low population densities and that nest in mature forests (Reynolds et al. 1992, Squires and Reynolds 1997, Keane 1999). Northern goshawk nest sites are characterized by large trees, dense canopy cover, and open understories (Hargis et al. 1994, Keane 1999). The species has been petitioned for federal protection under the Endangered Species Act, with the current listing proposal under court appeal. Northern goshawks are listed as Sensitive in the Pacific Southwest Region (R5) of the USDA Forest Service.

Protected activity centers (PACs) are delineated around all known and newly discovered goshawk breeding territories detected on National Forest System lands in the Sierra Nevada. PACs are delineated to include the known and suspected nest stands, and encompass the best available 200-acres of forested habitat based on tree size, canopy cover, and other factors (2004 SNFPA ROD, p. 38). A total of forty PACs are currently delineated on the Inyo National Forest.

The Inyo National Forest conducts annual monitoring of northern goshawk distribution and demographics, tracking the presence, number, and reproductive success of goshawks on the forest. Surveys are conducted by wildlife researchers and land managers to address a number of different objectives. These objectives most commonly include:

- Inventory or census of a study area to estimate density and distribution of goshawks.
- Monitoring previously known goshawk territories to determine occupancy and reproductive success.
- Inventory of specific project or treatment areas to meet NEPA and NFMA mandates for species management.
- Early confirmation of occupancy at nest sites.

In 2008, seven PACs were monitored. Ten PACs were monitored in 2009. Monitoring followed broadcast survey and stand search protocol as described in the Survey Methodology for Northern Goshawk in the Pacific Southwest Region (August 2000).

Results

A total of seven PACs were monitored in 2008, with five juveniles and one adult female observed in three of the PACs. These three PACs are considered to be “occupied territories”. Occupancy is defined by the presence of territorial adult goshawks within a nesting area, regardless of reproductive status. Types of evidence used to determine occupancy include goshawks seen or heard in the survey area, and the presence of goshawk molts (feathers) in the survey area, as well as evidence of more consistent use such as nests and prey remains. Monitoring indicated the remaining four territories were not occupied.

In 2009, ten PACs were monitored, three of which were found to be occupied by northern goshawk. Two juveniles and one adult were observed in one PAC; birds were not observed in the other two occupied PACs. Seven of the 10 PACs monitored were not occupied in 2009.

Table 18. Summary of goshawk monitoring, 2008-2009

		2008	2009
Total number of PACs monitored		7	10
Number of unoccupied territories		4	7
Number of occupied territories	Active nest with goshawk sightings	3 (total of 5 juveniles and 1 adult female)	1 (total of 2 juveniles and 1 adult)
	Active nest but no sightings	0	1
	No active nest	0	1

Evaluation

The 2004 SNFPA includes direction to review and adjust PAC boundaries as additional nest location and habitat data become available in order to include known and suspected nest stands and to encompass the best available 200 acres of forested habitat. Monitoring conducted in 2008 and 2009 did not lead to the adjustment of PAC boundaries.

Forest Plan Amendments and Corrections

There were four amendments to the 1988 LRMP during fiscal years 2008 and 2009.

- **Amendment #14:** Sierra Nevada Forests Management Indicator Species Amendment (2008). This amendment changed the list of Management Indicator Species and associated monitoring specified in the 2004 Sierra Nevada Forest Plan Amendment, which itself amended the 1988 Inyo National Forest LRMP. Amendment 14 applies to the Inyo National Forest and the other national forests in the Sierra Nevada bioregion.
- **Amendment #15:** Designation of Section 368 Energy Corridors on National Forest System Land in 10 Western States (January 2009). This amendment designated energy corridors on the Inyo National Forest and several other national forests in ten western states.
- **Amendments #16 and 17:** Inyo National Forest Travel Management Project Record of Decision (8/2009).
 - Amendment #16 changed the Recreation Opportunity Spectrum (ROS) classes established in the 1988 based on the designation of 28 miles of motorized routes within Primitive (PNM) and 56 miles in Semi-Primitive Non-Motorized (SPNM) ROS classes. The ROS class was changed for the area within ½ mile of the added routes to Semi-Primitive Motorized (SPM) and the ROS class for the area greater than ½ mile but less than 3 miles from the added routes to Semi-Primitive Non-Motorized (SPNM).
 - Amendment #17 changed 1988 Inyo National Forest LRMP direction for the Mountain Sheep Habitat prescription (Rx 3; 1988 LRMP, p. 116, as amended in

1993). Amendment #17 amended this direction to confine motorized use to designated roads and trails as follows:

- Allow for the dispersed recreation activities appropriate in Primitive and Semi-Primitive ROS classes. Allow no motorized use off designated roads and trails.

Update on Research Needs

The following recommendations follow from the results of monitoring conducted in 2008-2009 and summarized in this report. They are focused on improving forest-wide programs, projects, and activities by increasing our knowledge and understanding of forest ecosystems.

- In 2010, the forest's geospatial staff began developing a spatial database to track completion of Forest Plan level monitoring commitments. During the development process, the forest identified a need to increase the representation of disturbed forest sites and transitional shrubland-forest areas in the set of FIA and R5 Ecology monitoring plots established on the forest. Increasing the representation of disturbed and transitional sites would improve understanding of the drivers of change in these systems.
- Also in 2010, geospatial staff began ecological classification of Inyo National Forest System lands using the Terrestrial Ecological Unit Inventory (TEUI) program. TEUI mapping units uniquely characterize a spatial region based on climate, geology, geomorphology, soil regime, and vegetation. Completion of the TEUI will allow us to examine the spatial distribution of ongoing monitoring efforts across different ecological types, to identify types in need of additional monitoring focus and/or prioritize limited funding.

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Public Disclosure Plan

The Fiscal Year 2008-2009 Monitoring and Evaluation Report will be posted to the Inyo National Forest website (<http://www.fs.usda.gov/inyo>: Land & Resources Management > Planning > Monitoring and Evaluation). Copies will be provided to interested individuals upon request.

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