



**Klamath National Forest  
Fiscal Year 2007  
Monitoring and Evaluation  
Report**



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## Introduction

The Klamath National Forest Land and Resource Management Plan (Forest Plan) contains a list of monitoring projects that are intended to be conducted on a regular basis. The Fiscal Year 2007 Monitoring and Evaluation Report documents the evaluation of monitoring information related to the Forest Plan from October 1, 2006 through September 30, 2007. The objective of monitoring and evaluating Forest Plans is to determine whether programs and projects are meeting plan direction. Monitoring is the collection of information, on a sample basis, from sources identified in the plan. Evaluation of monitoring results is used to determine the effectiveness of the Forest Plan and the need either to change the plan through amendment or revision or to continue with the plan as written. Data are compared to data from past years, when appropriate. Monitoring results are emphasized rather than monitoring data. Evaluations are based on professional judgment when monitoring data are incomplete or lacking.

This report looks different from past years. The 2007 Report closely follows the format of the Monitoring and Evaluation Requirements outlined in Chapter 5 of the Forest Plan (pages 5-11 through 5-14). Specific monitoring objectives are presented, followed by the monitoring activities that were accomplished.

In some cases, monitoring was not conducted as specified in the plan. While most monitoring activities are accomplished on the prescribed schedule, some have been delayed due to funding shortfalls, lack of priority compared with other program needs, or lack of activity in that management program. Monitoring activities that are not included in Chapter 5 are listed at the end of each resource component.

Although the Klamath National Forest emphasizes integrated resource management, the Monitoring Report is organized by resource areas, following the organization of the Forest Plan. Each section identifies the activity, effect or resource to be monitored, the monitoring that was accomplished, results, and any further actions that need to be taken. All Forest Plan pages references relate to the version on the Forest web site, which includes all amendments and errata as of August 15, 2008.

## Physical Environment

### Geology

#### Monitoring Objectives (Landslides):

1. Test assumptions for landslide production rates in Forest Plan.
2. Determine effectiveness of S&Gs in reducing landslide rates.
3. Determine cost-effectiveness for landslide stabilization and erosion control projects.

#### Monitoring:

1. None conducted. This element can only be monitored after landslide-producing storms. The winter of 2007-2008 was relatively dry, and there were no landslides reported by watershed or District personnel. Consequently, no monitoring was warranted. This element was monitored in depth following the flood of 1997, and adjustments made to sediment production rates and management practices accordingly.
2. None conducted.
3. None conducted. No landslide stabilization projects were undertaken in 2007. No analysis for cost-effectiveness of past projects was done.

**Results:** N/A

**Further Action Required:** None.

**Monitoring Objectives (Geologic Hazards):**

1. Determine levels of hazardous materials (asbestos, radon, etc.) and if the Forest is meeting required standards.
2. Evaluate effectiveness of S&Gs for reducing environmental threats from geologic hazards.

**Monitoring:**

1. None conducted. No asbestos or radon monitoring was conducted, since no rock aggregate from quarries in ultramafic rock was used as road surfacing, and no new radon threats were identified. No monitoring was done on hazards from abandoned mines, landfills, or seismic, volcanic or avalanche sources because no new hazards relative to these threats came to light in 2007.
2. Application of geologic standards and guidelines was monitored by reviewing ongoing timber sale planning projects (Mt Ashland LSR and Thom-Seider projects). Effectiveness was evaluated by monitoring decommissioned roads 45N75, 18N17, 41S22, and 48N33.

**Results:** Geologic standards and guidelines (Best Management Practices) were found to be fully applied on the two timber sale planning projects. Effectiveness criteria were met for all four decommissioned roads. Implementation and effectiveness of Best Management Practices is documented in the 2007 Best Management Practices report, located on the web at <http://www.fs.fed.us/r5/klamath/projects/forestmanagement/index.shtml>.

**Further Action Required:** None.

**Monitoring Objectives (Geologic Special Interest Areas/Caves):**

Assess the condition of unique geologic areas and effectiveness of Forest Plan standards and guidelines and resource management programs in preserving and protecting these resources.

**Monitoring:** Monitoring visits were conducted to the following Geologic Special Interest Areas: Elk Lick, Murderers Bar, Bloomer, North Russian, Crater Creek Gabbro, Pumice Crater, Condrey Mountain Type Section, Condrey Mountain Blueschist, Medicine Lake Glass Flow, Little Glass Mountain, and Fourmile Hill.

Five caves (Pluto, Sand, Barnum, Wind, and Skunk Hollow) were visited.

**Results:** The Special Interest Areas were all in good condition with little to no new disturbance.

Gates at Sand and Barnum Caves had been vandalized, allowing unauthorized entrance and new graffiti was spray painted on some walls. The damaged gates were repaired. Pluto Cave appeared to have a minor amount of new graffiti.

**Further Action Required:** None

**Monitoring Objectives (Geologic Mapping):** Assess the accuracy of mapping units in the Forest Plan geologic database. Evaluate Riparian Reserves for accuracy.

**Monitoring:** The Forest has been working toward updating geomorphic mapping as part of project level work (Thom-Seider project, Mt Ashland LSR project.) Field mapping is used to refine the Forest Geomorphic layers.

**Results:** Some polygons identified as active slides in our GIS coverage have been found to be incorrect, and some new active slides have been located. Special Interest Areas were poorly mapped in the forest planning process. GIS layers show that mapping of small streams (riparian reserves) is inaccurate. The inner gorges on these streams are generally smaller than shown on the GIS layers.

**Further Action Required:** Corporate layer GIS coverages will be updated and corrected in 2009.

## **Other Monitoring Efforts – Geology**

**Wildfire Effects:** The Forest is monitoring the effects of the 2006 and 2007 wildfires in the watersheds of Rush Creek, Little North Fork, Steinacher Creek, and Independence Creek. Monitoring consists of annual visits to photo points within the fire areas, and 5 tipping bucket rain gauges. Rainfall severities as well as total precipitation were relatively low in winter 2006-2007. Accordingly, little evidence of rilling or gulying was observed in the burn areas visited. This monitoring will continue over the next 5 years. Areas burned in 2008 will be incorporated into the review.

## **Soils**

**Monitoring Objective:** To assess the implementation and effectiveness of soil standards, guidelines and thresholds to maintain soil productivity.

**Monitoring:** Monitoring of prescribed fire and machine mastication was conducted. The attributes monitored are soil cover for erosion protection, fine organic matter for nutrient cycling, coarse woody debris for biological activity, and soil disturbance for root growth. Standardized sampling methodologies developed on the Forest or Region were used to collect the data.

**Results:** Soil cover levels in managed stands subjected to prescribed fire on the Gooseneck District ranged from 94 to 99%, averaging 97% for total cover. Approximately 20-25% of the area within the three monitored units did not burn. Soil cover levels in managed stands subjected to prescribed fire on the Salmon River District was 87% for total cover. Approximately 12% of the area within the two monitored burn units did not burn. Soil cover levels in two plantations that had their brush component masticated on the Salmon River District were 83% and 85%. The area in undisturbed and lightly disturbed conditions was 86% and 97%. Total soil cover in three thinned and masticated plantations in the Colestine Thin project on the Oak Knoll District was 83%, 87% and 79%. The area in undisturbed and lightly disturbed conditions was 86%, 96% and 96%, respectively. Forest Plan soil cover guidelines were fully met on 100% of the monitored sites. Monitoring results show that the requirement for fine organic matter continues to be met in treated areas.

**Further Action Required:** None.

## **Water Quality**

**Monitoring Objective:** Assess compliance with Best Management Practices (BMPs) and evaluate effectiveness of BMPs.

**Monitoring:** The Best Management Practices program and the Aquatic Conservation Strategy are the primary mechanisms used to maintain water quality. Fiscal year 2007 represents the sixteenth year of BMP monitoring on the Forest. This program is designed to evaluate how well the Forest and the Region implement BMPs, and how effectively the BMPs control water pollution from National Forest System Lands. In 2007, 56 sites were randomly drawn from Forest activity pools and each was reviewed for BMP implementation and effectiveness. Sites were located on all ranger districts and represented a variety of land management activities, including timber harvest, road construction, prescribed fire, grazing, recreation and mining.

**Results:** BMPs were fully implemented on 100% of the sites evaluated, and were fully effective on 98% of the sites evaluated. This represents an increase in implementation and a slight decrease in effectiveness compared to fiscal year 2006 results. The Forest issues a separate report detailing the results of BMP monitoring, located on the web at:

<http://www.fs.fed.us/r5/klamath/projects/forestmanagement/forestplan/reports/resourceplanreports>.  
The report contains a number of recommendations for improving outcomes from stormproofing and decommissioning projects.

**Further Action Required:** None.

**Monitoring Objective:** Test the validity of the techniques used for determining Threshold of Concern (TOC) in the Forest Plan.

**Monitoring:** None conducted. The techniques used for determining Threshold of Concern were applied Forest-wide in 2004.

**Results:** TOCs were refined in 2004 and those values have been used since that time.

**Further Action Required:** TOCs for all Forest watersheds should be revisited in 2009.

## Air Quality

**Monitoring Objective:** Establish baseline data, and identify trends and areas of potential impairment.

**Monitoring:** None conducted. Air quality data compiled by the California Air Resources Board indicated that air quality with respect to particulate matter (PM<sub>10</sub>) improved from 1996 to 2000. With the baseline and trend established, monitoring for air quality trend has not been conducted on the Forest since 2002.

Areas of potential impairment occur in the vicinity of prescribed burns. Consistent with the 2000 Smoke Management Regulations in California, Smoke Management Plans are submitted to the Siskiyou County Air Pollution Control District in order to obtain a permit to burn for Forest projects. Evaluation of selected projects indicated that there were no smoke impacts from these management activities.

**Results:** N/A

**Further Action Required:** None

## Biological Environment

### Biological Diversity

**Monitoring Objectives:** Track changes in vegetative composition. Track changes in “old growth” meeting currently accepted definition.

**Monitoring:** None conducted.

**Results:** N/A

**Further Action Required:** The reporting frequency for this monitoring element is every 5 years. The Province Ecologist advises that the best way to generate accurate results is to compare the differences between vegetative types and distribution of “old growth” stands between the 2004 and upcoming 2009 vegetation data layers. This monitoring element will be revisited in 2009.

**Monitoring Objective:** Ensure openings are consistent with ecosystem composition, structure and function.

**Monitoring:** None conducted.

**Results:** N/A

**Further Action Required:** This monitoring element focuses on a “bell curve distribution of polygons size and shapes”. No such “bell curve” was ever established for the Klamath National Forest. The Forest Ecologist advises that this concept is unclear and recommends that it be replaced by an analysis using the recently-developed Reference Conditions, which represent the historic range of vegetation patterns within the natural disturbance regime. Current size and distribution of openings across the Forest have been compared to the reference conditions model at the 7<sup>th</sup> field watershed level. These results will be consolidated in 2008 and included in the 2009 Monitoring and Evaluation report.

## Other Monitoring Efforts – Biological Diversity

**Baker Cypress:** Forest Ecologists continued field inventories on all 5 Baker Cypress populations known on the Klamath National Forest. This is a rare conifer with distribution limited to northern California and southern Oregon.

**Vegetation seral class:** Ecologists have been using locally developed Fire Regime Condition Class assessments to track changes in vegetative seral class distribution from historic reference conditions (based on native fire regime pre-suppression) to today's current conditions. These data are being entered into a database for future analysis.

**Temporal changes in woodland distribution:** Forest personnel continue to develop digital maps of 1930s Wieslander vegetation type maps, and have been using them to monitor changes in the distribution of shrubs and oak woodlands over time. Analysis results are not yet available.

## Sensitive Plants

**Monitoring Objective:** Assure maintenance of Sensitive plant populations and/or species viability.

**Monitoring:** The Gooseneck District was the subject of Sensitive plant monitoring in 2007. Known locations of six Sensitive plant species, including three newly listed mosses, were revisited. The species monitored were:

- Calochortus greenei, CAGR, 3 populations
- Ptilidium californicum, PTCA5, 2 populations
- Meesia uliginosa, MEUL70, one population
- Meesia triquetra, METR70, one population
- Helodium blandowii, HEBL2, one population
- Cypripedium montanum, CYMO2, one population

### Results:

**CAGR:** Two populations were found to be healthy and unimpacted from grazing activities, although one subpopulation that has been excluded from grazing and highlighted for public viewing shows an acceptable level of impact from compaction of the viewing site. One population could not be relocated due to a mapping error.

**PTCA5:** One population has apparently been destroyed by woodpecker activity, which has removed the bark from the stump on which it was originally located. One population is still extant, although limited to a 1” square spot on the tree; this site is not growing or diminishing in size.

**MEUL70, METR70, and HEBL2 (mosses):** Distributions of all 3 species increased within the Shovel Creek meadow/fen complex. A total of 8 new occurrences were documented. Grazing

standards and guidelines are apparently adequate for maintenance of habitat for these species at this time.

CYMO2: One population continues to struggle to survive. This population is marginal in vigor, occurring in a very dry area where shade is lacking. The Gooseneck District is on the edge of this species' distribution in California.

**Further Action Required:** None. The change in habitat due to woodpecker activity resulted in loss of a *Ptilidium* population. This was a natural occurrence and we do not have the ability to replace the population.

## Wildlife

### Monitoring Objectives (Bald Eagle):

1. Determine trend and productivity of breeding population.
2. Evaluate trend of habitat delineated to meet Recovery Plan objectives.
3. Determine use, condition and trend of identified active and potential roost sites.
4. Assess effectiveness of Standards and Guidelines.

### Monitoring:

1. Three bald eagle nests were monitored during the peak breeding season months: Caroline Creek, Dona Creek and a nest at the mouth of Scott River. Monitoring was conducted during the peak breeding months by Forest wildlife personnel with assistance from volunteers from Shasta Audubon Chapter and Discovery High School science class.
2. Habitat trend has been historically monitored by the U.S. Fish and Wildlife Service.
3. Annual winter monitoring was conducted on 7 survey routes along the Scott, Salmon and mid-Klamath River areas using ground roost surveys methods. Monitoring was conducted by Forest wildlife personnel with assistance from volunteers from Shasta Audubon Chapter and Discovery High School science class, U.S. Fish and Wildlife Service, California Department of Fish and Game and volunteers from the local community.
4. Included in #1 above.

### Results:

1. Caroline Creek nest occupied/reproduction unknown  
Dona Creek nest occupied/reproduction 1 young  
Mouth of Scott River nest occupied/reproduction unknown  
Standards and guidelines were applied to projects in the area of eagle nests. All monitored nests were occupied, indicating that application of standards was successful regarding nest occupation.
2. The bald eagle was removed from the federal list of threatened and endangered species on August 9, 2007. One of the main factors leading to delisting was the protection of important nesting and roosting habitat provided by the Endangered Species Act. The Fish and Wildlife Service will work with state wildlife agencies to monitor eagles over the next 5 years. The Draft Bald Eagle Post-Delisting Monitoring Plan can be found on the web at <http://www.fws.gov/midwest/eagle/protect/DraftBAEAPDM.html>
3. Observed eagles from each route:

Irongate to Copco Route	10 bald eagles
Klamath River Route	6 bald eagles
North Scott Valley Route	11 bald eagles
Salmon River Route	0 bald eagles
South Scott Valley Route	3 bald eagles
Scott River Route	0 bald eagles

The Forest imposes restrictions on activities near or adjacent to eagle nests. Monitoring indicates that nests are occupied, and winter monitoring has located 30 eagles. Successful nesting and the occurrence of numerous eagles indicates that management standards are effective, as the population and habitat are stable and potentially improving. The results are part of a long-term trend of increasing eagle numbers on the Klamath National Forest.

**Further Action Required:** None.

**Monitoring Objectives (Peregrine falcon):**

1. Verify nesting and reproductive success during breeding season.
2. Assess effectiveness of Standards and Guidelines.

**Monitoring:** One peregrine falcon eyrie was monitored.

**Results:**

1. Eyrie was occupied; reproduction suspected but not confirmed. Habitat appears stable.
2. No management activities are being conducted in the area; effectiveness of standards and guidelines could not be determined.

**Further Action Required:** None.

**Monitoring Objective (Northern spotted owl):** Determine number of pairs within Late Successional Reserves (LSRs).

**Monitoring:** Two LSRs were monitored (Eddy and Mt. Ashland). Monitoring was conducted by Forest Service personnel and an independent surveyor.

**Results:** 10 pairs of owls were located in the Eddy LSR  
4 pairs of owls were located on that portion of the Mt. Ashland LSR located on the Klamath National Forest.

Population trends for the Northern spotted owl were monitored during the first ten years of implementation of the Northwest Forest Plan. Populations were estimated to decline from 0-10 percent across the owl's range, although populations in northern California were found to be stationary. These findings are documented in the report "Northwest Forest Plan—the first 10 years (1994–2003): status and trends of northern spotted owl populations and habitat", located on the web at [http://www.fs.fed.us/pnw/publications/pnw\\_gtr648/](http://www.fs.fed.us/pnw/publications/pnw_gtr648/).

**Further Action Required:** None

**Monitoring Objective (Goshawk):** Determine occupancy of suitable habitat.

**Monitoring:** Thirty-seven goshawk territories on the Gooseneck Ranger District were monitored. Twelve sites received a brief search of known nests; five territories were surveyed to Region 5 protocol (intensive search of suitable habitat with 0.5 mile of historic nests) and 20 sites received an intensive search of habitat within 100 meters of the nest. Surveys were also conducted on the Happy Camp and Scott River Districts in areas related to the Tom Seider Project, Adam Thinning Project, and Switchback Project. Monitoring was conducted by Forest personnel.

**Results:** Thirteen occupied territories on the Gooseneck District successfully fledged 20 young. No goshawk activity was noted on 24 sites. On the Happy Camp and Scott River Districts, 1320 acres of suitable/potential habitat were monitored; no goshawk activity was detected.

**Further Action Required:** None

**Monitoring Objective (willow flycatcher):** Determine occupancy of suitable habitat.

**Monitoring:** No monitoring of suitable habitat was conducted. This was not considered to be a priority for the Forest in 2007. Flycatchers were surveyed as part of the monitoring effort at the Seiad Constant Effort Mist Netting Station (see Other Monitoring Efforts, below).

**Results:** N/A

**Further Action Required:** N/A

**Monitoring Objective (great grey owl):** Determine occupancy of suitable habitat.

**Monitoring:** None conducted. There were no management activities conducted within potential great grey owl habitat, and the monitoring (conducted during the winter) is very logistically challenging. This was not a priority for the Forest.

**Results:** N/A

**Further Action Required:** None.

## **Other Monitoring Efforts – Wildlife**

**Northern Spotted Owl:** Nine areas (15,400 acres) that were proposed for management were surveyed. Monitoring was conducted by Forest personnel, contractors, Pacific Southwest Research Station crews, and volunteers from the local community.

**Results:**

<b>Area</b>	<b>Acres surveyed</b>	<b>Results</b>
Tennis Thin	2500	No Activity
Horse Heli	2500	No Activity
China Ray	1500	Nonreproductive Pair
Bolivar	500	Reproductive Pair
Switchback	400	Nonreproductive Pair
Knob	3000	Nonreproductive Pair
Point	2500	No Activity
Deep	2500	No Activity
Garden Gulch	1000	Territorial Single

### **Willow Flycatcher**

Surveys were conducted for willow flycatchers at the Seiad Valley Constant Effort Mist Netting Station. Data gathered at the Seiad Valley station contributes to regional and national songbird monitoring data sets and provides information on site productivity and long-term trends. Monitoring was conducted by Forest personnel, Redwood Sciences Lab, Klamath Bird Observatory, U. S. Fish and Wildlife Service, Shasta Audubon, and volunteers from the local community.

**Results:** A total of 12 willow flycatchers were netted and banded.

### **Swainson's Hawk and Butte Valley National Grassland avian monitoring**

Monitoring in Butte Valley National Grassland is part of an ongoing program that has provided data on Swainson's Hawk survival, reproduction and recruitment for over 20 years. Approximately 100 hawk territories were visited. During these visits, personnel also monitored several other avian species.

**Results:**

**Swainson's Hawk:** Seventy nest territories were occupied, and 63 nests were located. Fifty nestlings were banded in the nest. Two new Swainson hawk territories were found. Photos are located on the web at [www.ggro.org/photoalbum06.html#closeups](http://www.ggro.org/photoalbum06.html#closeups).

**Loggerhead shrike:** Three pairs were observed to be active, and 2 nests were located.

**Golden eagle:** Three nests were active out of five known territories.

**Ferruginous hawk:** One adult was observed early in the season on the Butte Valley National Grasslands and intensive nest surveys were conducted. No nest was found, indicating possible abandonment of Butte Valley as a breeding area.

### **Barred Owls**

Barred owls have recently colonized portions of the Goosenest Late Successional Reserve (LSR) and have displaced northern spotted owls. In 2006, the Klamath National Forest partnered with

the U.S. Fish and Wildlife Service and California Academy of Sciences to evaluate the effectiveness of barred owl removal as a tool for conserving Northern spotted owls. Seven barred owl pairs were located, one with 2 young. Five barred owls were removed from the LSR.

**Results:** Five spotted owl territories where barred owls were removed were monitored for Northern spotted owl presence. One pair of spotted owls was located.

### **Burrowing Owls**

Known territories were monitored through brief visits (monitoring was not to protocol). No owls were located.

## **Fisheries Management**

**Monitoring Objective (Sensitive Species):** Determine population trends and habitat conditions for summer steelhead and spring and fall Chinook salmon.

### **Monitoring:**

1. Population censuses for summer steelhead and spring Chinook were conducted on the Salmon River system. This is part of an effort that has been ongoing since 1980.
2. A summer steelhead population census was been conducted on tributary streams to the Klamath River (Happy Camp Ranger District). This is part of an effort that has been ongoing since 1980.
3. Fall Chinook salmon spawning escapement was monitored for the Klamath River Basin in coordination with the California Department of Fish and Game (CDFG) and other federal, tribal and local stakeholders using methods developed by CDFG and the Forest Service, including visual documentation of redds. Early winter storms during November raised water levels in the Salmon and Scott Rivers, limiting the number of surveys.

### **Results:**

1. Summer steelhead: Surveys counted 262 adult summer steelhead and 151 half-pounder steelhead trout in the Salmon River Watershed.

The numbers of half-pounder summer steelhead increased significantly in the north and south fork of the Salmon River from 1993 to 2005, but analysis of the data has not detected a statistically valid population trend<sup>1</sup>. Data from 2007 have not yet been incorporated into this analysis.

Spring Chinook salmon: Surveys counted 829 spring Chinook and 80 jack Chinook. These numbers are near the average.

Of the past 27 years, 16 experienced increases and 11 experienced decreases from the previous year's numbers. The most obvious downward trends in run size numbers occurred during three time periods from 1988-1991, 1998-2001, and 2004-2005. The lowest run size numbers were recorded in 2005. Upward trends in run size numbers occurred in four time periods from 1984-1986, 1992-1997, 2002-2003, and 2006-2007. Run size has fluctuated as much as four-fold from year to year. These numbers do not indicate a steady trend in any direction.

2. Surveys counted 150 adult summer steelhead trout and 203 half-pounder steelhead trout. Data indicate that fish numbers increased (over previous years) in about half the years, and decreased during the other half. Fish numbers fluctuated widely, and do not indicate a steady trend in any direction.
3. Surveys counted 314 redds in Salmon River, 582 redds in Scott River, and 670 redds in the mid-Klamath tributaries.

Data analysis conducted in 2007 estimates that fall Chinook escapement numbers for 2006 were highly variable across the basin. Based on redd surveys, approximately 1,432 fish returned to the Salmon River, 1,731 fish returned to the Scott River, and 2,121 fish returned to various mid-Klamath River tributaries. These numbers were the 6<sup>th</sup> lowest return of wild Chinook since the surveys were initiated in 1978, and follow two record-setting low escapement years for both the Salmon and Scott Rivers in fall 2004 and fall 2005.

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<sup>1</sup> Quinones, Rebecca. A summary of the status of six anadromous species in the Klamath River basin, California. In draft.

**Further Action Required:** None

**Monitoring Objective (Management Indicator Species):** Determine population trends and relationship to habitat changes for steelhead trout and rainbow trout.

**Monitoring:** Monitoring for steelhead trout is covered above. No monitoring of rainbow trout was conducted.

**Results:** N/A

**Further Action Required:** None.

**Monitoring Objective:** Determine effectiveness of watershed restoration projects at achieving Aquatic Conservation Strategy objectives.

**Monitoring:** A variety of restoration projects were evaluated through the BMP Effectiveness Program:

- 2 roads decommissioned in 2000
- 2 roads decommissioned in 2002
- 1 road with 3 Emergency Relief for Federally Owned Roads (ERFO) sites
- 1 crossing replacement
- 1 borrow pit that was restored in 2006

**Results:** These projects reduced erosion and sedimentation, restored channel alignments, encouraged revegetation of disturbed sites, and facilitated passage of fish through the system. They contributed to achievement of several Aquatic Conservation Strategy objectives, including:

- Maintain and restore spatial connectivity within watersheds (#2)
- Maintain and restore physical integrity of the aquatic system (#3)
- Maintain the water quality necessary to support healthy riparian and aquatic ecosystems (#4)
- Maintain and restore the sediment regime under which aquatic ecosystems evolved (#5)

Results are included on pages 8-10 of the 2007 BMP Monitoring Report located on the web at <http://www.fs.fed.us/r5/klamath/projects/forestmanagement/forestplan/reports/resourceplanreports>.

**Further Action Required:** None.

**Monitoring Objective:** Determine effectiveness of Standards and Guidelines in meeting objectives. Determine applicability to Klamath Mountain Province.

**Monitoring:** Watershed conditions are monitored through the Aquatic and Riparian Effectiveness Monitoring Plan (AREMP), which is part of the Northwest Forest Plan monitoring program carried out over 3 states. AREMP is designed to provide information at the regional and species-range scales. It is intended to characterize the ecological condition of watersheds and aquatic ecosystems, determine present watershed condition, track trends in watershed condition over time, and determine the effectiveness of the Northwest Forest Plan in improving watershed conditions across the region (Reeves and others 2004). AREMP resulted in a report called "Preliminary Assessment of the Condition of Watersheds", which assessed the change in selected watersheds over the last 10 years of implementing the Northwest Forest Plan.

AREMP monitoring was conducted in 2007 on Upper Elk Creek, Bear Creek and Big French Creek on the Klamath National Forest. Elk Creek was also monitored for the presence of aquatic invasive species.

**Results:** The "Preliminary Assessment of the Condition of Watersheds" report states that 57% of the monitored watersheds had higher condition scores (were in improved condition) than at the beginning of the 10-year period, 3% of the watersheds had lower condition scores, and the scores for the remaining watersheds did not change. The watersheds with lower condition scores had been affected by wildfire. In all cases, fire effects outweighed effects from management

activities. The report also noted that the growth rate of trees exceeded harvest rates, and more roads were decommissioned than constructed. The full report can be found at <http://www.reo.gov/monitoring/reports/10yr-report/index.shtml>.

The 2007 AREMP monitoring report for Klamath National Forest watersheds is not yet available.

No aquatic invasive species were found. The report dealing with invasive species is located at [http://www.pnamp.org/web/workgroups/General/meetings/2008\\_0124/2007\\_InvasiveSpeciesAREMP.pdf](http://www.pnamp.org/web/workgroups/General/meetings/2008_0124/2007_InvasiveSpeciesAREMP.pdf)).

**Further Action Required:** None.

## Other Monitoring Efforts

**Wildfire effects monitoring:** The effects of the 2006 Rush and Titus Fires on pool quality were monitored by measuring the amount of fine sediment in pools before and after the first winter following the wildfire using V-Star methodology. Monitoring was conducted in Rush Creek, the South Fork Salmon River, and Independence Creek. The low V-star values at all monitoring sites indicate that a very small fraction of the volume of the residual pool depth in the monitoring pools is occupied by fine sediments. These values were validated by field observations. Sediment delivery in the first year following wildfire has not affected pool quality at these sites.

**Berkeley Study:** A study conducted by the University of California Berkeley looked at the link between cumulative watershed effects modeling and watershed conditions on the Klamath National Forest. The study utilized two models: (1) a fine sediment model based on a locally-calibrated version of the universal soil loss equation, and (2) an empirical mass-wasting-based landslide model. Results from the study were published in **Technical Report on Quantitative Linkages Between Sediment Supply, Streambed Fine Sediment, and Benthic Macroinvertebrates in Streams of the Klamath National Forest**. The report indicates that there are significant, measurable differences in streambed fine sediment levels between basins in the Klamath National Forest with high and low sediment supply. Increased sediment supply was directly correlated with fine sediment stored in pools and riffles, and with an overall fining of the median grain size. Model estimates of sediment supply were inversely correlated with subsurface flow rates, which have been directly correlated with salmonid egg survival in laboratory studies. There was no correlation between fine sediment and common biological metrics used to describe the benthic invertebrate assemblage such as taxon richness and total abundance. There were, however, detectable changes in the abundance of several taxa (e.g. Chironominae, Oligochaeta, *Attenella delantala*), and an overall reduction in presumed prey availability for salmonid fishes. The full report is located on the web at <http://csmres.jmu.edu/geollab/may/web/Research/Christine%20May%20Home%20Page.htm>

## Visual Resource Management

**Monitoring Objective:** Determine Forest-wide visual condition and scenic character trends (every 10 years).

**Monitoring:** No formal forest scale monitoring was performed in 2007. This monitoring is required only once per decade. In 2007, informal observation of visual condition and scenic character was performed by KNF landscape architects while in the Forest working on other projects. This observation included occasional field photography of those trends.

**Results:** Informal observations confirmed two long term, forest-wide scenery trends: an improving visual condition, and declining scenic character.

Visual condition has been steadily improving with the reduction in large clearcut disturbances typical of the 1980s and 1990s, and the natural revegetation and restoration of these same scenery disturbances.

Scenic character has steadily declined for several decades as forest canopies have become increasingly dense due to fire suppression. This has reduced scenic variety both within forest canopies, and as they are viewed throughout the forest. It has also increased the likelihood of excessively large vegetation disturbances due to wildfires and insect and disease events, which can adversely affect scenic character.

**Further Action Required:** Forest visual conditions can be improved through forest health projects that increase the attractiveness and ecological resilience of forest vegetation. Forest projects will continue to be designed to address these opportunities.

**Monitoring Objective:** Determine compliance with Forest Plan Visual Quality Objectives (VQOs).

**Monitoring:** None conducted. This monitoring is required once every 3 to 5 years, and should take place in 2010.

Forest landscape architects typically perform informal monitoring of compliance with VQOs during project analysis. This observation usually includes some field photography.

**Results:** The frequency of project compliance of Forest Plan VQOs appears to be very high, approximately 95%.

**Further Action Required:** None.

## Wilderness

**Monitoring Objective:** Use Limits of Acceptable Change (LAC) concept to refine future wilderness management direction.

**Monitoring:** None conducted.

Informal observation of compliance with Forest Plan standards and guidelines for Limits of Acceptable Change was performed by District Recreation Officers and Wilderness Rangers.

**Results:** Informal observations have enabled Forest Wilderness managers to identify needs and develop strategies for Wilderness improvements.

**Further Action Required:** LAC monitoring will be initiated on Klamath National Forest wilderness areas in 2009 as part of the Forest Service Ten Year Wilderness Challenge program.

## Lands Program Management

**Monitoring Objective:** Determine if land adjustments have increased administrative efficiency, and whether Forest outputs are adversely affected.

**Monitoring:** Since 2002 the Forest has acquired 840 acres in 5 parcels.

**Results:** Approximately 4-½ miles of Forest boundary has been eliminated, reducing the total miles of landline that requiring location and posting.

**Further Action Required:** None.

## Timber Management

**Monitoring Objective:** Determine if growth and yield projections for silvicultural prescriptions are occurring as projected.

**Monitoring:** The Region 5 Remote Sensing Laboratory maps and monitors vegetation throughout the Region. Lab personnel use baseline inventory maps in conjunction with inventory plots to assess the vegetation resources and associated uses such as forest health, timber volume and growth, wildlife habitats, old growth forests, watershed conditions, and surface fuel mapping. The Klamath National Forest was inventoried in 2004 and updates were done in 2007 using Landsat photos and validated by the Province Ecologist.

**Results:** Growth projections are in line with Forest Plan expectations.

**Further Action Required:** None

**Monitoring Objective:** Determine average rate of loss of plantations to wildland fire.

**Monitoring:** Locations of plantations were overlaid with fire boundaries for the China Back and Elk Complex wildfires that burned in 2007, and field inspections were conducted to determine plantation survival.

**Results:** Approximately 3,000 acres of plantations burned in the two wildfires.

**Further Action Required:** None.

**Monitoring Objective:** Ensure that spacing of harvest openings conforms to Regional policy and Forest Plan direction.

**Monitoring:** None conducted. The Forest Plan modeled Green Tree Retention (GTR) harvest as the primary silvicultural system to be implemented on the Klamath National Forest. This prescription has been used only sparingly on the forest since the adoption of the Plan. Understory thinning, the primary prescription for timber harvest, does not create openings in the forest canopy. Large openings due to timber harvest are rare and spacing is not an issue.

**Results:** N/A

**Further Action Required:** None.

**Monitoring Objective:** Determine success of release and stand improvement practices to meet desired future condition.

**Monitoring:** The Klamath NF precommercially thinned 3,306 acres and released 1,532 acres of plantations in 2007. These stands were inspected to validate that the prescriptions were appropriately applied. Monitoring consisted of placing plots in many of the stands and recording spacing of the trees and the amount of competing vegetation removed. Other stands were inspected by a visual walk-through method to determine if treatments met standards. The stands take a number of years to respond to the treatments after being suppressed for a period of time, so immediate measurement of the plantations would not yield an increase in growth.

**Results:** 100% of stands met the required standards.

**Further Action Required:** None.

## Other Monitoring Efforts – Timber Management

### Timber Marking

Marking for the Goosenest LSR Heli Timber Sale was reviewed on the ground to determine whether silvicultural prescriptions had been appropriately applied. Reforestation success was monitored through survival surveys and certification of planted stands. Post-sale treatments required under contract were monitored by sale administration personnel. Silvicultural prescriptions in the sale generally accurately reflected the silvicultural prescriptions in some of the areas; however, marking in part of the sale was light and that area will need further treatment to meet the goals identified in the NEPA document. Those treatments have been scheduled to occur in 2009.

### Port-Orford Cedar

An infestation of Port-Orford cedar root rot (*Phytophthora lateralis*) in the Siskiyou Wilderness on the Happy Camp Ranger District was treated and preventative maintenance was performed. Monitoring supported that *P. lateralis* was associated with the Clear Creek trail. The infestation was treated and the trail was relocated to avoid further spread of the disease.

### Timber Targets

Allowable Sale Quantity (ASQ), reforestation, and timber stand improvement activity accomplishments are derived from data in the Planned Timber Sale Accomplishment Report, the Forest Service Activity Tracking System, and the yearly Plantation Survival Report. The Forest offered approximately 69,630 hundred cubic feet of timber in FY 2007. This exceeded the assigned target of 57,460 hundred cubic feet by 21%. This volume included 62,550 cubic feet of green material and 7,080 cubic feet of salvage material produced through a combination of commercial thinning, sanitation, biomass harvest, and salvage. The reforestation program remains at a low level, due mostly to the lack of regeneration harvesting. The Elk and China Back fires have created a need for site preparation and reforestation; those activities will be implemented over the next few years.

**Loss of trees to wildfire:** Region 5 annually tracks the acreage where trees have been lost to wildfires, concentrating on fires that burn more than 1,000 acres of National Forest forestland. There were two fires on the Klamath NF assessed by this process in 2007. A summary of the monitoring is located on the web at <http://www.fs.fed.us/r5/rsl/projects/postfirecondition/>.

## Fire Management

**Monitoring Objective:** Assure compliance with initial attack's 90<sup>th</sup> percentile objective.

**Monitoring:** Number of fire starts and escapes were analyzed.

**Results:** There were 99 fire starts on the Forest. All but 8 were contained during initial attack. Of those 8 large fires, 7 started under 90<sup>th</sup> percentile weather conditions.

**Further Action Required:** None.

### **Monitoring Objectives:**

1. Determine effectiveness of prescribed burn program in reducing wildfire effects.
2. Is prescribed fire being used more?

### **Monitoring:**

1. None conducted. In order to conduct effectiveness monitoring, wildfire must burn through sites that have received prescribed fire. This did not occur in 2007.
2. The actual number of acres burned was compared with the predicted value.

**Results:** The Forest Plan predicted that prescribed fire would be applied on 9,375 acres per year. Approximately 3,000 acres were burned under the prescribed fire program in 2007.

**Further Action Required:** None.

## **Other Monitoring Efforts - Fire**

### **Fire Ecology monitoring**

This effort was initiated on the Klamath National Forest in 2006, and continued in 2007. The study, which is being conducted in coordination with the Pacific Southwest Research Station, will field validate fire severity assessments from satellite imagery over a range of topography and vegetative types. Four wildfire areas in the Marble Mountain Wilderness were monitored in 2007 (Hancock, Rush, Titus and Uncles fires). Results will be presented in a series of peer-reviewed papers to be published in 2008 and 2009. Data from this work will also be applied to the Limits of Acceptable Change monitoring which will be initiated in 2009.

## **Range Management**

**Monitoring Objective:** Determine vegetative ecological condition and trend.

**Monitoring:** Range health and forage availability are monitored through a combination of methods that look at utilization, riparian condition, and vegetative trend. Monitoring methods include landscape analysis, ocular estimates, paired plots, photo points, and stubble height. All these methods were used to evaluate conditions on key areas (sites that represent allotment conditions, or are indicators of a specific habitat type, such as riparian reserves).

**Results:** Range health (ecological condition) on permitted allotments is generally good, with a stable or upward trend on most sites.

**Further Action Required:** None

**Monitoring Objective:** Compare permitted to Forest Plan projected Animal Unit Months (AUMs).

**Monitoring:** The Forest Plan projected that the Forest would support 34,000 AUMs. Actual use is tracked by billing documents and allotment inspections.

**Results:** Permitted use was 20,539 AUMs.

**Further Action Required:** None

**Monitoring Objective:** Determine number of wild horses and territory expansion.

**Monitoring:** None conducted. Population numbers are estimates based on observation, with adjustments made using knowledge of history of herd dynamics and removal efforts.

**Results:** Current estimates are 60 head for McGavin Peak (target of 0 animals) and 15 for Three Sisters (target of 20 animals). This year 17 horses were removed from McGavin Peak.

**Further Action Required:** Removal of horses to meet target populations is subject to availability of funding. Sixty horses are scheduled to be removed from McGavin Peak in 2009 and 2010.

**Monitoring Objective:** Assure that riparian objectives are in Annual Operating Instructions and that standards and guidelines are met.

**Monitoring:** Allotment Management Plans, Grazing Permits and Annual Operating Instructions were reviewed to determine whether Aquatic Conservation Strategy and Riparian Health objectives have been accommodated.

**Results:** All documents reviewed had satisfactorily incorporated guidelines to address Aquatic Conservation Strategy and riparian health objectives.

**Further Action Required:** None.

**Monitoring Objective:** Determine compliance with Forest Plan standards and guidelines for forage utilization.

**Monitoring:** 131 key areas and 3 non-key areas were monitored on 27 different allotments.

**Results:** 126 of 134 monitored areas met resource standards. Standards were not completely met on the Ball Mountain/Kucks, Bogus, Bray, Horsethief, Panther/Ball Mountain, and Red Rock allotments. In each case, a Forest Service range specialist met with the permittee to resolve the situation. Annual Operating Instructions were adjusted in 5 cases, and one fence was repaired.

**Further Action Required:** None.

**Monitoring Objective:** Determine if noxious weeds have increased to damaging levels.

**Monitoring:** Fourteen hundred (1,400) acres of weeds were treated and monitored. The Forest has developed an inventory and monitoring protocol that includes an estimate of effectiveness of the treatment method(s) employed at each weed site.

**Results:** Monitoring data indicate the following general trends:

A-rated knapweeds are on the decline as a result of aggressive inventory and treatment by volunteers on the Salmon River, California Conservation Corps crews in Scott Valley, Forest Service crews, and Siskiyou County Agriculture on private lands. Both the number of sites and the number of plants per site are declining.

Dyer's woad is on the increase in all areas where aggressive treatment is not being conducted. This species has the potential to infest areas at all elevations, under most conditions, except under dense shade. The areas where we are aggressively treating this species (Marble Mountain Wilderness in South Fork Kelsey and Bear Lake regions, and along Gunsight/Mahogany ridge) are showing declines over time with the hand digging methods that are being employed at these sites.

Star thistle continues to proliferate along roads and in disturbed sites on the National Forest. This species is highly opportunistic and has successfully invaded large areas throughout northern California. The County and Forest Service actively treat star thistle east of Interstate 5, and it is not seen at damaging levels on the Gooseneck Ranger District. Star thistle is at damaging levels in many areas on the west side of the Forest, primarily along roads and in disturbed sites. Star thistle is so common and widespread that the County and State no longer actively conduct control efforts along major vectors such as state and County highways. The Forest continues to treat high priority sites such as trailheads for all weeds; these areas currently do not contain damaging levels of weeds.

Monitoring indicates that some Forest Plan activities can aid in weed spread. Mastication, road maintenance, and prescribed fire projects all show increases in local weed populations if weed sources are nearby and prevention methods are not employed.

**Further Action Required:** Inventory efforts will continue. As new populations of weeds are located, they will be added to the corporate database which is scheduled to be updated in 2008. Efforts to treat and eradicate specified populations of weeds will continue in future years.

Resource protection measures designed to eliminate weed spread will continue to be incorporated into management projects.

**Monitoring Objective:** Ensure that Range Project Decisions include standards and guidelines and that the standards are implemented.

**Monitoring:** The Forest completed 2 range project decisions.

**Results:** Both decisions incorporated standards and guidelines from the Forest Plan. Standards were included in the Annual Operating Instructions.

**Further Action Required:** None.

## Cultural Resource Management

**Monitoring Objective:** Assure that Class I and II sites are not being adversely impacted.

**Monitoring:** Two National Register sites were monitored: a structure that is occupied under a special use permit, and an arrastra.

**Results:** The structure is being properly maintained per permit requirements. The arrastra sustained damage from a tree that was uprooted during a storm.

**Further Action Required:** The arrastra site will be assessed for repair and/or stabilization in 2008.

## Planning

**Monitoring Objective:** Validate assumptions used in the Forest Plan to predict impacts to resource programs including visual, wildlife and earth sciences.

**Monitoring:** None conducted.

The assumptions used in the Forest Plan to predict resource impacts are not accurate and cannot be tested. The level and type of management applied to the ground has deviated significantly from that assumed during Forest Plan development. Assumptions for the two vegetation management activities with the most potential impact are discussed below:

**Annual timber harvest of 51 million board feet, to be accomplished using primarily Green Tree Retention (GTR) prescriptions.** Since the plan was approved, the Klamath NF has achieved its annual timber target twice (1996 and 1997). GTR prescriptions have been used sparingly, if at all. Since 1998, timber harvest has been achieved primarily through thinnings, which means that a significantly higher number of acres have been impacted than was predicted in the Plan. The intensity of treatment has been reduced, and the effects have been diffused over a larger area.

**Fuels treatment on approximately 27,000 acres per year.** The Forest Plan assumed that 9,375 acres would be treated with prescribed fire, 3,183 acres would be timber-related treatments, and 14,550 acres would be other fuels treatments such as mastication. In 2007 the Forest treated a total of 9,350 acres, or 1/3 of the acres expected in the Forest Plan. Prescribed fire was applied on about 3,000 acres, mastication on about 1,700 acres, and about 4,700 acres received other types of fuels treatments.

**Results:** N/A

**Further Action Required:** Revise the Forest Plan using valid assumptions.

**Monitoring Objective:** Determine actual costs associated with implementing planned management prescriptions as compared with costs estimated in the Forest Plan.

**Monitoring:** None conducted.

The Forest Plan and Environmental Impact Statement did not provide costs by management prescription. The economic analysis focused on the impact of each alternative on the Present Net Value (the estimate of the market value of forest resources after all costs have been subtracted). While the Forest Service assumed that Congress would fund each Forest to fully implement its Forest Plan, this did not occur. Thus, program budgets have fluctuated according to a variety of Congressional laws and earmarks, and court requirements (Northwest Forest Plan, Herger-Feinstein Act, Lake Tahoe Deliverables, Southern California Forest Plan revisions, Northwest Forest Plan Settlement Agreement, Fire Transfer, etc.). A recap of the Forest budget indicates that, since 1995, most resource program budgets have been stable or declining, with timber management fluctuating between high and low points and fire and fuels steadily growing.

**Results:** N/A

**Further Action Required:** None.