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Sierra Nevada Forest Plan Accomplishment Monitoring Report for 2005

Sierra Nevada Forest Plan Implementation

In 2005 the Forest Service, Region 5 which includes California, Hawaii, Guam and the Trust Territories of the Pacific Islands continued several long term monitoring studies of significant wildlife species in the Sierra Nevada mountain range and initiated several new studies. The studies focus on developing scientifically valid assessments of the status of several species, and increasing understanding of how forest and rangeland management may affect specific species, ecosystems and processes over time under the management direction in the Sierra Nevada Forest Plan Amendment Record of Decision 2004 (SNFPA ROD).

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Identification of Fisher from Hair Samples

The current fisher population monitoring program in the Sierra Nevada is based on the assumption that the proportion of track plate sample units with fisher detections is an index of population size. This assumption is difficult to validate. An alternative method to estimate the size of the southern Sierra fisher population directly is by using noninvasive genetic sampling. This requires being able to recognize specific genetic markers from fisher hair samples. The goal of this study is to identify a larger number of genetic markers for the population of fishers that occur in the southern Sierra Nevada. At the beginning of this study, the number of recognized markers was too few to reliably identify individual animals. During 2005, a collaborative effort was initiated to explore genetic monitoring opportunities. Two groups were funded for this work by the Forest Service, Region 5 in 2005, the Conservation Genetics Laboratory of the Rocky Mountain Research Station Forest Sciences Laboratory at the University of Montana under Dr. Michael Schwartz and work conducted by Mr. Mark Jordan, a Ph.D. student at the University of California's Department of Environmental Science, Policy and Management.

The barbed wire across the entrance of the track plate station catches hair from fishers going in to eat the piece of chicken beyond the track plate

Track plate stations which were part of the Carnivore Status and Trend study (see next segment) were modified to include hair snaring devices similar to those developed by the Pacific Southwest Research Station (PSW). Two modifications of the existing barbed-wire snaring method were field tested. These field tests were designed to test the fisher willingness to enter the track plate box when barbed-wire was strategically placed across the entrance to the track plate box and to collect hair samples from which genetic material could be extracted.

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Accomplishments

Field tests were successful: the presence of barbed wire did not deter fishers from entering the track plate boxes, and quality DNA was extracted from approximately 90% of the samples submitted for analysis.

Eleven genetic markers were identified for application in determining individual fisher identity by the Rocky Mountain Research Station Forest Sciences Laboratory. In addition, Mr. Jordan's work resulted in five additional markers, out of 47 markers checked. The relatively small number of markers providing identification information among the large number of markers tested provides additional evidence that genetic diversity in the southern Sierra Nevada fisher population is very low.

Based on these results and the growing promise of genetic methods to identify individual fishers from hair samples, hair snares will be broadly incorporated into the fisher status and trend monitoring. This should ultimately provide the opportunity to estimate actual population size annually, rather than the index of abundance currently being monitored.

Fisher and Marten Status and Trend Monitoring

Status and trend monitoring for fisher (*Martes pennanti)* and American marten *(M. americana)* began in 2002. The basic monitoring objective for each species is the same: to detect 20% declines in population abundance and habitat across the Sierra Nevada. Monitoring strategies for each species differ slightly due differences in current distribution of each species. Fishers are limited in distribution to the southern portion of the Sierra Nevada mountain range. Monitoring involves two components: intensive sampling on Sierra and Sequoia National Forests (NFs) designed to monitor population trend and less intensive sampling at sites in the central and northern Sierra (the area assumed to be unoccupied by fisher) focused on documenting population expansion.

Martens seem to be distributed throughout their historic range in the Sierra Nevada, and monitoring occurs on all forests throughout the Sierra Nevada though at slightly higher elevations than for fisher. For both species, population monitoring involves conducting presence/absence surveys throughout the region to estimate the proportion of sites (primary sample units) annually occupied by fisher and marten, and detect declines over the proposed ten year monitoring period. Each primary sample unit includes an array of six detection devices (track plates and cameras) off-set from Forest Inventory and Analysis plots. Sample units are surveyed for ten consecutive days. Tracks and photographs of wildlife species visiting each sample unit are collected every two days. Each species is considered present at the primary sample unit if it is detected at one or more stations during the ten day survey. Habitat monitoring relies on tracking changes in habitat quality using a combination of remotely-sensed vegetation data and plot data collected in conjunction with the on-going Forest Inventory and Analysis program.

Accomplishments

During the past four field seasons, 708 primary sample units have been completed (with more than 4,500 individual survey stations and over 45,000 survey nights). Sampling effort for both species has been greater on the Sequoia and Sierra NFs (510 sample units) than in the central and northern Sierra Nevada (198 sample units). In the southern Sierra Nevada, fishers were detected at 128 sample units.

Marten were detected at 84 sites throughout the region, 28 of which occurred in wilderness areas. The proportion of sample units with detections for fisher, marten and select associated carnivores during the first four years of the monitoring program is described in the table on page 3.

These preliminary proportions are estimated as number of sites with detections divided by the number of sites surveyed. In the future they will be adjusted based on species' detectability, possibly resulting in annual estimates being higher than estimates reported here. Annual estimates ultimately will be used to monitor trend.

Fishers were consistently detected at lower elevations than martens. Fishers were detected as low as 3,110 feet and as high as 9,000 feet; martens detections ranged from 4,400 feet to 9,793 feet. Preliminary results indicate that fishers are well-distributed in portions of

	Proportion of Primary Sample Units Detecting:				
Year	Fisher	Marten	Gray Fox	Ringtail	Spotted Skunk
2002	0.268	0.176	0.205	0.087	0.199
2003	0.234	0.167	0.162	0.084	0.126
2004	0.238	0.144	0.139	0.089	0.178
2005	0.248	0.084	0.175	0.143	0.162

Sequoia and Sierra NFs, though annual occupancy rates are consistently higher on Sequoia NF (33.3% to 41.1% annual occupancy) than Sierra NF (14.5% to 22.7% annual occupancy). The spatial pattern of detections also appears to be more consistent from year to year on Sequoia NF than on Sierra NF. Fishers were not detected in the central and northern Sierra Nevada where more than 120 sites at historic fisher elevations were sampled. Martens were detected sporadically throughout the central and southern Sierra Nevada, including on the Inyo NF in the Mammoth Lakes area, though relatively few detections were recorded in the northern Sierra Nevada. The proportion of sites detecting martens during 2005 was lower than previous years. This probably reflects sampling emphasis rather than a population decline: during 2005 more sites were sampled in low and mid elevation habitats outside the typical marten range than previous years.

Continued monitoring will be critical not only to understand trends in the southern Sierra fisher population, but also to document fisher population expansion into the central and northern Sierra Nevada. Contingent on funding and meeting objectives of the fisher population monitoring program, sampling will continue in the central and northern Sierra Nevada to better understand regional variation in marten distribution. Program objectives for 2006 include: (**1**) continued intensive sampling of the fisher population in the southern Sierra Nevada, (**2**) sampling for fisher in the central and northern Sierra Nevada with emphasis on Stanislaus NF and Lassen NF, (**3**) continued marten monitoring, and (**4**) completing data migration to the Forest Service corporate databases, (**5**) expansion of fisher monitoring onto National Park Service lands in the southern Sierra Nevada, and (**6**) integration of hair snaring devices for genetic identification of individual fisher at all survey locations in the southern Sierra Nevada.

A fisher inspects the area before it enters the tunnel style track plate station.

Forest Monitoring Summary for October 1, 2004 to September 30, 2005 (FY 2005)

Treatment in fisher den site buffers occurred on 37 acres on the Sequoia NF. Treatment within fisher den site buffers may occur if necessary to achieve fuel objectives in Wildland Urban Interface (WUI) zone (ROD page 61).

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The ROD requires evaluation of CSO (California spotted owl) PACs after potentially stand replacing fires in order to replace PACs or PAC acres which may have become unsuitable (page 37). Three CSO PACs were affected by wildfire in FY 2004 and 4.5 acres became unsuitable as a result of the fire but suitable replacement acres were found. The fires occurred on the Sierra and Stanislaus NFs.

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None of the Sierra Nevada NFs identified any vegetation management treatments in Great Grey Owl PACs, or marten den site buffers though the ROD allows some vegetation treatments (pages 61-62).

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Pilot Study to Assess Fisher Response to Fuel Treatments

Reducing risk of catastrophic wildfire through managing forest fuels is a priority for the Forest Service, not only to protect human communities within the forest and reduce the risk of catastrophic fire, but also to reintroduce fire to the Sierra Nevada mountain range as an ecological process.

Fishers are known to use habitat that is primarily dense forests with high canopy cover, multiple layers, and large trees, snags, and downed logs. Some of these habitat elements are also those associated with high fire hazard that can easily escalate to crown fires during fire season. Some of these forest characteristics would be altered to some extent by forest management activities designed to reduce the high risk of severe fire in forests where fire has been suppressed for decades.

Catastrophic fire following decades of fire suppression is clearly detrimental to fisher habitat, but treatments to reduce the risk of high intensity wildfire may have negative short-term effects on fishers and their habitat. Although fishers are expected to ultimately benefit from the reintroduction of fire, the short-term risks associated with fuel management treatments are poorly understood. As long as the effects of fuel reduction activities remain unknown, there is a potential conflict between the need to reduce fuels and the short-term habitat needs of fishers.

Because fishers are secretive animals who live as isolated individuals, except for mothers raising young, with home ranges that are several thousand acres in size, traditional experimental designs are difficult to implement and developing a scientifically credible study that is not cost-prohibitive poses a challenge. In 2005, funded by the Forest Service Region 5, scientists from PSW and Region 5 developed and tested a study using baited track plates to examine whether there would be differences in habitat use in areas treated to reduce hazardous fuels compared with fisher use in similar untreated areas on the Sierra and Sequoia NFs.

Accomplishments

Working with local forest staff, three pairs of treatment and control areas were selected within the range of fishers in the southern Sierra Nevada. Treatments were selected from planned projects that each forest considered high priority and thus likely to be implemented during the next five years. The control units were selected to match their paired treatment units as closely as possible for the following: overall size (approximately 1,000 to 1,300 acres), the percent of suitable fisher habitat within them, elevation, and the presence of fishers based on previous studies in these areas. Fifty sooted track plate stations, baited with a piece of chicken were placed at sites 200 or more meters apart within each treatment and control unit. Track plate stations were monitored for ten days, and checked every two days, in both late spring and fall. No commercial lure (a skunk-smelling concoction attractive to fishers) was used to avoid drawing fishers in from outside the site.

In addition to sampling for fisher presence at 300 track plate stations, habitat characteristics were measured. Measurements included shrub and tree cover, the number and size class of trees by species, and measures of the amount and type of dead, downed, woody material surrounding each track plate station. These measurements will be used to assess what effects the fuel treatments had on forest structure after they are treated. Even at this early stage, the data is valuable to

Preliminary results for the pilot study assessing the effects of fuel treatments on fishers in the southern Sierra Nevada. The number and proportion, in parentheses, of stations with fisher detections for treatment and control sites sampled in late spring of 2005 and fall of 2006.

	Proposed Treatment Areas		Control	
Site	**Spring**	**Fall**	**Spring**	**Fall**
Kings River 1	**2 (0.04)**	**5 (0.10)**	**9 (0.18)**	**10 (0.20)**
Kings River 2	**0 (0.00)**	**1 (0.02)**	**27 (0.54)**	**20 (0.40)**
Sequoia NF	**0 (0.00)**	**10 (0.20)**	**19 (0.38)**	**32 (0.64)**

further refine knowledge of habitat used for foraging by fishers as it probably differs from the better understood habitat selected by fishers for resting or denning.

As the table displays, there was large variability among detection rates on the paired sites, even though they were matched as closely as possible. There were no detections at two of the sites proposed for treatment during the spring of 2005 at all and detections tended to be lower for spring samples compared to fall samples. These results suggest that either an increase in the number of pre-treatment samples or the number of track plates per site is needed to increase the probability of detection.

During 2006 the data will be evaluate to refine the number of sites needed to answer questions about how fuel treatments effect fisher habitat use and estimate the investment necessary to get answers about measurable effects with a stated statistical confidence. For example, how many sites it will it take to detect a 50% decline following treatment with 90% confidence, so that a true difference is correctly detected? If conclusions from the above analyses suggest that the study is feasible and should go forward, it will provide information needed by land managers on how to manage for fuels while retaining, conserving, and restoring fishers and their habitat.

Willow Flycatcher Distribution and Demographic Study

Once common through out the western United States, the willow flycatcher (*Empidonax traillii*) has been eliminated from much of its historical range. The willow flycatcher is a Neotropical migratory bird which breeds in North America and migrates outside the continental United States during the non-breeding, winter season. In Central California the willow flycatcher raises its young in montane meadows. All three subspecies of willow flycatcher occurring in California were listed as state endangered birds by the California Department of Fish and Game in 1990. The southwestern willow flycatcher (*Empidonax traillii extimus*), found in the southwestern United States including the Kern and Owens River regions of southern California, was listed as federally endangered by United States Fish and Wildlife Service (USFWS) in 1995. Both *Empidonax traillii brewsteri* and *Empidonax traillii adastus* are currently designated sensitive species by Forest Service, Region 5, and are listed as species of concern by USFWS. Activity related standards and guidelines for conserving willow flycatchers were developed and included in both the 2001 and the 2004 SNFPA ROD.

Photo by: Ivan Samuels

Surveys indicating a declining population trend led to the initiation of a distribution and demographic study in the central and northern Sierra Nevada. The project is funded by the Forest Service Region 5, and is directed by Dr. Michael L. Morrison of Texas A&M University and Heather Mathewson of the University of Nevada, Reno.

The primary objectives of the willow flycatcher study are to (1) determine the distribution of breeding willow flycatchers; (2) quantify reproductive success, recruitment, dispersal and survival of

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Treatments in Northern Goshawk Protected Activity Centers (PACs) since 2004 occurred on the following NFS: 24 acres on the Eldorado, 200 acres on the Humboldt-Toiyabe, 79 acres on Lake Tahoe Basin Management Unit (LTBMU), 400 acres on the Modoc, 116 acres on the Plumas, 43 acres on the Sequoia, 67 acres on the Stanislaus and 194 acres on the Tahoe National Forests (NFs). The ROD for SNFPA limits vegetation treatments to no more than 5% of the acres in Northern Goshawk PACs per year (page 61). Northern Goshawk PACs in the Sierra Nevada NFs cover approximately 264,200 acres

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Almost all Sierra Nevada NFs in California have completed FACTS (Forest Activity Tracking System) data base entry for FY 2005 projects. The ROD requires each forest to begin using FACTS in 2004 (page 12).

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willow flycatchers in selected meadows; and (3) examine factors influencing demographic patterns through associated graduate research projects in order to provide information needed by land managers to make management and restoration decisions.

Good nesting habitat for willow flycatchers

Accomplishments

During the 2005, 74 sites were visited to survey for and/or monitor territories of willow flycatchers. Forty-eight sites were surveyed for occupation and to note resightings of birds that had been leg banded in the past. In the southern Sierra Nevada, no flycatchers were detected at 14 sites. In the central Sierra Nevada, 26 sites were surveyed and willow flycatchers were detected at four sites. In the north, eight sites were surveyed: flycatchers were detected at all sites resulting in approximately 45 willow flycatcher territories. Combined, these visits resulted in the detection of 80 individual flycatchers in 54 territories.

In addition to the sites surveyed, 26 meadows or sites in the southern, central, and northern Sierra Nevada were monitored for nesting willow flycatchers.

In the southern and central Sierra Nevada, a total of 22 meadows were monitored of which 15 meadows have records of flycatcher occupation within the last eight years. Records of occupation in the remaining sites are unknown. These sites include meadows south of Lake Tahoe, on the west side of the Lake Tahoe basin, and in the central Sierra Nevada north of Lake Tahoe. Flycatchers were detected breeding in 15 of these 22 meadows. Fifty-seven total territories were detected which is slightly greater than the 50 detected territories in 2004. In total, 26 (46%) territories in the southern and central Sierra Nevada produced one or more young. Overall nesting success was 47%, which was up substantially from the 37% observed in 2004. Forty-two females produced 67 fledglings based on the maximum estimate of the number of fledglings so that fecundity (number of young/female) is 1.59 (0.795 female young/female assuming a 50:50 sex ratio). Only three nests were parasitized by cowbirds. The cowbird can parasitize willow flycatchers by laying their eggs in willow flycatcher nests which adult willow flycatchers will then raise to the detriment or even death of the willow flycatcher young.

At four sites in Warner Valley in the northern Sierra Nevada, 33 breeding territories were monitored, 23 (70%) of which were successful. Overall 63 total nests were located, whereas only 49 nests were found in 2004 and 41 in 2003; 26 of these nests were successful (41% nest success), which was much lower than the 63% success in 2003 and 51% in 2004. As a result of increased funding, more meadows and sites were visited to search for willow flycatchers and the

A Study of Effects of Canopy Cover Reduction on California Spotted Owls

The SNFPA ROD sets forth a strategy for vegetation management to reduce the risk of wildfire to communities and change wildfire behavior on the landscape. Management prescriptions include thinning forests near communities and strategically placing fuel treatments throughout the landscape. The SNFPA ROD allows some modifications to habitat within and around spotted owl sites. Because there is a risk to California spotted owls (CSO) associated with the proposed strategies, a study monitoring the effects of canopy reduction on owls in strategically placed land allocation treatments (SPLATS) within owl Home Range Core areas (HRCAs) under carefully designed and controlled conditions provides the best approach to understanding risks. This study will also be an opportunity to develop the potential of the adaptive management approach described in the SNFPA for developing new knowledge.

Spotted owls can respond to canopy reduction treatments in an acute, immediate manner by moving away from the treatments, changing the size and shape of their home range, abandoning their territory, and/or discontinuing use of the treatment area. They can also respond in a chronic manner by having lower survival or reproduction rates than they had before the treatment, relative to other owls. Owl behavior is the key indicator of treatment effects.

A study was begun in 2005 on the Eldorado and Tahoe NFs within the long-term spotted owl monitoring study area of effects of canopy reduction likely to occur during fuel treatments. The study is funded by the Forest Service, Region 5 and is conducted under the direction of Dr. R. Gutierrez of the University of Minnesota.

Accomplishments

In 2005, twelve owl pairs and their HRCAs were selected from among the 45 owl territories within the Eldorado/Tahoe NFs Demography study area to be part of the canopy reduction study. There are six treatment areas in HRCAs (but outside PACs) and six untreated control HRCAs. Radio telemetry will be used in 2006 to monitor the twelve owl pairs' responses to treatments. Radio telemetry provides the most reliable mechanism to assess acute responses of owls to canopy reduction. The owls will be monitored on a randomly selected schedule during the three hours after sunset and before sunrise, which are the most active foraging times for spotted owls. Night vision goggles will be used to observe owl behavior during harvest activities. Fecal samples will be collected before, during, and after harvest to assess any stress response to a major disturbance stimulus in their territories.

In 2005 each treatment area was sampled for structural features known to be important to CSOs including percentage of canopy closure, shrub cover, coarse woody debris, tree density and sizes, and diameter distribution before treatment in order to evaluate the degree to which the habitat will be modified after treatment. Sampling followed standard protocols for owls except that canopy closure was sampled in several different ways (spherical densiometer, densitometer, moose horn, aerial photography, and digital photographs) since this is the central theme of the treatment.

This project should provide information necessary to assess treatment effects on owls at the landscape-scale across the study area and suggest how treatments or SPLAT layout might be modified to benefit owls elsewhere in the Sierra Nevada in an adaptive management context.

Management and Wildfire within California Spotted Owl SNFPA Land Allocations

The 2004 SNFPA ROD established two land allocations related to the CSO PACs and HRCAs. Uncertainty about the effects of management activities and wildfire on owl habitat within these allocations was a significant concern which influenced the owl conservation strategy. The SNFPA effects analysis modeled these land allocation acres that could be altered by planned vegetation treatments and randomly modified by wildfire. A system of activity tracking was identified as a fundamental part of the bioregional adaptive management and monitoring strategy

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Implementation of landscape level fuel plans for fiscal year (FY) 2005 fuel projects varies. All fuels treatments on the Eldorado and Humboldt-Toyiabe NFs in 2005 had landscape level assessments completed. All large and DFPZ projects on the Lassen and Plumas NFs had landscape assessments completed. Inyo NF has a fireshed analysis and assessment workshop scheduled in 2006 to support future fuels planning. The Sequoia and Tahoe NFs have completed landscape level fuel treatment planning for approximately 85-90% of the 2005 projects. 40% of the fuel treatment projects on the Stanislaus NF were supported by landscape level assessments. The Sierra NF has conducted landscape level assessments for fuel treatment planning though the 2005 projects were developed prior to the assessments. Several forests indicated that a number of small fuel treatment projects such as some Resource Advisory Committee fuel projects, some small sales, and volunteer work are occurring outside the landscape level fuel plans.

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67,014 acres on Sierra Nevada NFs received fuel treatments in 2005. 48% of those acres were located in WUI areas. The Regional goal is to have 50% of all fuel treatments in the WUI (SNFPA ROD page 5). In addition 58% of the acres treated for fuels were treated through mechanical means, 41% of the acres were treated through prescribed burning and less than l% of the acres were through other treatments.

to compare the modeled acres with actual treatments and fire events subsequent to the SNFPA ROD.

Forest Service corporate database, FACTS with geospatial references is envisioned to be the platform where this information is recorded and tracked. Due to delays in the complete roll out of FACTS, Sierra Nevada forests were queried for annual accomplishment by fiscal year of initial mechanical (thinning or mastication) treatment acres, prescribed fire treatment acres and wildfire acres burned within owl PACs and HRCAs. Initial treatments only were reported to eliminate double counting of follow-up activities that were a planned part of the sequence of treatments that might occur on the same acre. Preliminary results for PACs are shown in the table below for the ten Sierra Nevada NFs in California. Validation and analysis of the data is ongoing and will be reported in the future.

	PAC / Vegetation Treatment Intersections			PAC / Wildfire Intersections		
Year	Mech. Acres	Prescribed Fire Acres	Total Acres	Acres Burned	Burned Acres Unsuitable	Acres Remapped
2001	1157	596	1753	2513	2058	1509
2002	1143	955	2098	5875	2924	3136
2003	765	1346	2111	105	51	51
2004	489	224	713	3602	1575	2100
2005	696	468	1164	*	*	*
Totals	4250	3589	7839	12095	6608	6796
Total Bioregional CASPO PAC Acres as of 2004 SNFPA = 421,780						
* Wildfire acres are surveyed and reported one year following burn.						

2004 SNFPA ROD Standard and Guideline Number 80 (FSEIS page 146) established a threshold of no more than 5% (21,089 acres) of PAC acres treated per year and 10% (42,178 acres) of PAC acres treated per decade.

Forest Monitoring Highlights

The SNFPA requires various kinds of monitoring. (pages 4 and 70). Some highlights include:

- LTBMU has a comprehensive adaptive management program which evaluates a number of parameters related to their watershed restoration program, fuel reduction program and road and trail upgrade, conversion and decommissioning program based on BMP monitoring. The results of their monitoring program are summarized in the 2004/2005 annual report at http://www.fs.fed.us/r5/ltbmu/publications/ . That website also shows the 2005 BMP Evaluation Program Report and Forest Road Upgrade BMP Monitoring Report.
- Of the 112 Implementation Monitoring questions in Appendix E of the SNFPA FEIS (SNFPA ROD, 2004, page 70), the Tahoe NF routinely monitors 90 percent of all projects for those questions that pertain to designated land allocations (PACs, Home Range Core areas, Riparian Conservation areas), applying appropriate standards and guidelines, following appropriate process requirements (Riparian Conservation objectives analysis, weed risk assessments), and designing projects to meet SNFPA goals and objectives. In addition, the Forest conducted BMP implementation monitoring on 100% of projects. The Sierraville RD conducted implementation monitoring on 90 % of its HFQLG Projects in FY2004 and FY2005.
- On the Lassen NF specific monitoring is required by HFQLG monitoring plan. 100% of the Botany/Noxious Weeds monitoring for FY 2005 Projects was completed. 10% of the projects were monitored for BMP compliance. Compliance monitoring of contract specifications for timber projects and prescribed burn plans was done on all projects of those types.
- The Humboldt-Toiyabe, Modoc, Plumas and Sequoia NFs completed monitoring on 75 to 100% FY 2004 Projects. The same forests completed monitoring on 75 to 100% of FY 2005 projects. The Stanislaus NF completed monitoring on 25% of the FY 2004 Projects and 10% of the FY 2005 Projects.

Forest-Community Collaborations

All forests worked at increasing the level of community collaboration following direction in the ROD (page 25). Highlights from across the Sierra Nevada range include:

- The Stanislaus NF increased community based collaboration this year through the Stewardship and Fireshed Assessment process involving over fifteen organizations and agencies to develop a five-year vegetation management plan.
- The Tahoe NF working with PSW brought about the establishment the Sagehen Experimental Forest, the eleventh experimental forest designated in California and the first since 1962. The experimental forest will be managed for research focused on adaptive management by collaboration between Forest Service management, PSW, and various research institutions, including University of California at Berkeley (UCB), University of California at Davis (UCDavis), California Natural Reserve System, University of Nevada at Reno, and the Desert Research Institute.
- The Humbodt-Toiyabe NF collaborated with Washoe County on the development of the Martis landscape analysis and with Carson City and Douglas County in the development of the Clear Creek/Kings Canyon landscape analysis. The landscape assessment and strategy for the Martis/Interstate 80 corridor area on the Carson RD was completed in January 2005. The strategy includes recommendations for improving and managing wildlife habitat, roads, trails, access, water quality, and other resources. Using those recommendations, the Forest Service is now developing a proposed action. The 2004 Clear Creek/Kings Canyon Landscape Strategy, prepared by the Carson RD in cooperation with Carson City and Douglas County, resulted in an Environmental Assessment and Decision Notice being issued in 2005. The Strategy covers 17,000 acres, of which 10,000 acres are national forest lands located west of U.S. Highway 395 near Carson City, Nevada.
- The Bureau of Land Management, Kern County and Tulare County Fire agencies and Kern River RD are developing plans and prioritizing the fuels projects to treat the urban-wildland interface areas in the Kern River Valley and Kennedy Meadows areas. The group is currently working on the Kennedy Meadows Community Fire Protection Plan that will be completed in 2006.
- The Inyo NF has established a collaborative group to help develop thinning and fuel reduction needs for the next five to ten years.
- Fireshed assessment meetings with the public took place on the Placerville, Amador and Pacific RDs of the Eldorado NF. The fuel treatment planning had great public participation.
- The Plumas NF with Butte and Yuba County Fire Safe Councils jointly hosted a well-attended meeting and field trip in Forbestown for the Slapjack project.

Working with Tribal Governments and American Indians

The commitment in the SNFPA 2004 ROD (page 25) to meet trust responsibilities and encourage the participation of American Indians in national forest management was a continuation of the commitment in the 2001 ROD. Consequently it is not surprising that many of the activities forests carried out were projects, agreements and protocols begun in past years and planning and activities that will continue into the future. There are numerous highlights including:

- Consultation with local Tribes is ongoing for Native American Graves Protection and Repatriation Act (NAGPRA) requirements on the Stanislaus NF. Both the Brunskill and Little Sweden NAGPRA cases were completed in 2005. Work on the Indian Burying Gulch and Pinnacle Point Cave cases will be completed in 2006.
- In FY2004, the American River RD on the Tahoe NF worked with local basket weavers to prescribe burn a stand of beargrass to enhance its utility for basket weaving. With the initial objectives met, in FY2005, the stand was monitored to determine the need for re-burning to maintain desired conditions.
- The LTBMU issued the *Cave Rock Closure Forest Order* in February 2005. The order maintains appropriate access to a sacred and ceremonial site of the Washoe tribe and a National Register of Historic Places eligible site.
- The Plumas NF and Mt Hough RD meet frequently with the Maidu Cultural and Development Group to advance their ecosystem stewardship project. For more information on the latest project see http://www.redlodgeclearinghouse.org/stories/maidustewardship.html
- Laurence Crabtree, Doublehead District Ranger on the Modoc NF approved the special use permit for the Medicine Lake Traditional Spiritual Gathering of the Pit River Tribe. Forest employees assisted with public education for the event. Ranger Crabtree came to the gathering and met with the Native Americans and the public to accommodate access to ceremonial sites.
- The Amador RD assisted the Ione Band of the Miwok Tribe in procuring cedar poles to construct a traditional ceremonial dance house in Amador County.
- The Forest Lands Staff Specialist of the Sequoia NF has been working with the Tule River Indian Tribe to determine tribal access needs for an MOU.
- LTBMU has had a government to government protocol with the Washoe Tribe of Nevada and California since 1997. During 2005, the Forest Supervisor met with the tribal chairman to work on resolution of a technical amendment to the Washoe Land conveyance Bill.
- The Lassen NF formalized Memorandums of Understandings on protocols with two tribes, the Greenville Rancheria and Susanville Indian Rancheria.

Amphibian Status and Trend Monitoring

All the range of the Yosemite toad and the most of the range of the mountain yellow-legged frog's range fall within the Sierra Nevada. Populations of both species are believed to have declined throughout the area. Recent assessments have found that the Yosemite toad has disappeared from more than half the sites where it was known to occur historically. Mountain yellow-legged frog populations have disappeared from 50%-80% of the sites where it was known to occur historically. Both species are USFWS candidate species for federal listing as threatened or endangered species, California state species of special concern, and Forest Service sensitive species. Both species are found in high elevation aquatic systems. The Yosemite toad is most commonly found in shallow, warm water areas including wet meadows, small ponds, and shallow grassy areas adjacent to lakes. Because of its multi-year tadpole life stage, the mountain yellow-legged frog is most commonly found in larger, deeper lakes that do not freeze during the winter.

The Amphibian Monitoring Program under the direction of Cathy Brown, Stanislaus National Forest, evaluates whether the Forest Service, Region 5 is achieving its management goals for the Yosemite toad *(Bufo canorus)* and mountain yellow-legged frog *(Rana muscosa)*. These goals are to protect and restore aquatic, riparian, and meadow ecosystems, and provide for the viability of these species.

Accomplishments

902 lakes, ponds, meadows and streams were surveyed in 46 sample basins in the Sierra Nevada in 2005. Of these sites, 694 had available aquatic habitat. Twenty-seven of these basins were surveyed for the Yosemite toad, and all were surveyed for the mountain yellow-legged frog. To date, a total of 94 basins have been surveyed over the past four years that include 1,239 sites with available aquatic habitat. Twenty-six of these basins have been re-surveyed in at least two of the four years of survey. To date, preliminary habitat analysis from survey data collected by this study supports current knowledge of habitat associations for both species.

In three of the past four years, 75%-85% of high probability basins (where toads have been found since 1990) were occupied by the Yosemite toad (2004 occupancy was lower at 50%). In 2005, 17 of 20 (85%) high probability basins had evidence of Yosemite toad breeding. There were not any basins that contained only adults or subadults without signs of breeding.

As was the case in the previous years, occupancy for the mountain yellow-legged frog was considerably lower than for the Yosemite toad. In 2005, occupancy rates were similar to the past two years with evidence of breeding in 27% of high probability basins (seven of 26 basins) and adults or subadults in an additional 12% (three of 26 basins).

The goal of monitoring is to detect changes over time. For Yosemite toads, of the 16 high probability basins that have been surveyed for at least two years, ten basins had evidence of breeding in all years surveyed, four had breeding in some of the years, and two basins had no animals.

Seventeen high probability basins were surveyed for at least two years for mountain yellow-legged frogs. Four basins had breeding occupancy in all years surveyed, four had breeding in some of the years, and nine had no signs of breeding.

In 2005, work began on the intensive component of the monitoring program for the Yosemite toad. The intensive component is designed to provide more detailed information on demography and habitat conditions in selected study basins. Two intensive basins, one on the Stanislaus NF and one on the Sierra NF were selected for sampling. In these basins, methods were tested for estimating population of tadpoles and metamorphs, and for collecting microhabitat data for both life stages. During this process, each basin was visited several times during the summer, noting habitat and population changes as well as other aspects of the ecology of Yosemite toad tadpoles and metamorphs. These observations provided insights about how to approach intensive monitoring, and will lead to final protocols for the field season of 2006. Once summarized, this data will enable us to compare sampling methods, estimate sample sizes, and refine the protocol.

The Amphibian Monitoring program will increase knowledge about population dynamics and habitat requirements for both species, and provide information for making management decisions.

Determining the Effects of Livestock Grazing on Yosemite Toads and their Habitat: An Adaptive Management Study

This study is a collaborative effort between the USDA Forest Service, Region 5, PSW, Sierra Nevada Research Center (SNRC) led by Dr. Amy Lind, and UCB and UC Davis led by Dr. Barbara Allen-Diaz under a Cooperative Ecosystem Studies Agreement. There are two "teams" that function independently and periodically meet together; a research team (UCB and UCDavis and SNRC) and a steering team (Region 5 and national forest staff). The research team is charged with designing and implementing the study and the steering team provides technical support and oversight.

The primary goal of the study is to better understand the relationships between cattle grazing and Yosemite toad populations and habitats. The Yosemite toad is native to the Sierra Nevada mountain range and is typically associated with wet high mountain meadows and shallow lake shores. Yosemite toads are believed to have declined or disappeared from at least 50% of known localities during the latter part of the 20th century and are a Species of Special Concern in California, a Forest Service, Region 5 sensitive species, and a candidate for federal listing under the Endangered Species Act.

Because of their association with shallow water areas in montane meadows, suspected factors in the decline of Yosemite toads include: livestock grazing, airborne chemical toxins, disease, and climatic shifts and variability (especially temperature and precipitation). Preliminary evidence suggests that livestock use of wet meadow habitats may affect Yosemite toads through: (1) changes to meadow stream hydrology and bank stability (increased down-cutting and head-cutting), (2) changes to water quality, and (3) changes in micro-topography of egg deposition and larval rearing areas. The extent of these potential effects and their relationship to toad population survival and persistence has not been quantified. The results of this study will provide guidance to land managers who are faced with decisions regarding human and livestock use of montane meadows and increase understanding of the role that livestock grazing may be playing in the decline of the Yosemite toad.

The specific objectives for the study are to gather data to answer the following two questions: (1) does livestock grazing under Forest and SNFPA Riparian Standards and Guidelines have a measurable effect on Yosemite toad populations; and (2) what are the effects of livestock grazing intensity on the key habitat components that affect survival and recruitment of Yosemite toad populations?

The study is proceeding in two phases. Phase I addresses these questions by relating existing data on toad presence/absence to a variety of factors, including livestock grazing history, vegetation associations, and the climatic history of meadows. This analysis will rely heavily on GIS tools and is planned to cover the historic geographic range of the Yosemite toad and include at least 50 meadows.

Phase II is an experimental study in which four livestock grazing treatments are implemented on groups of study meadows on the Stanislaus and Sierra NFs. The treatments were derived from SNFPA ROD standards and guidelines with some modifications based on discussion with Regional and Forest staff, and the research team:. The four treatments are (1) grazing in accordance with current utilization and stream bank disturbance standards across the entire meadow, (2) exclusion of livestock from toad breeding areas within the meadow, (3) no grazing within the entire meadow, and (4) ungrazed reference meadows (where grazing has not occurred within recent history). Twenty meadows are included in this part of the study (five meadows for each of the four treatments).

Accomplishments

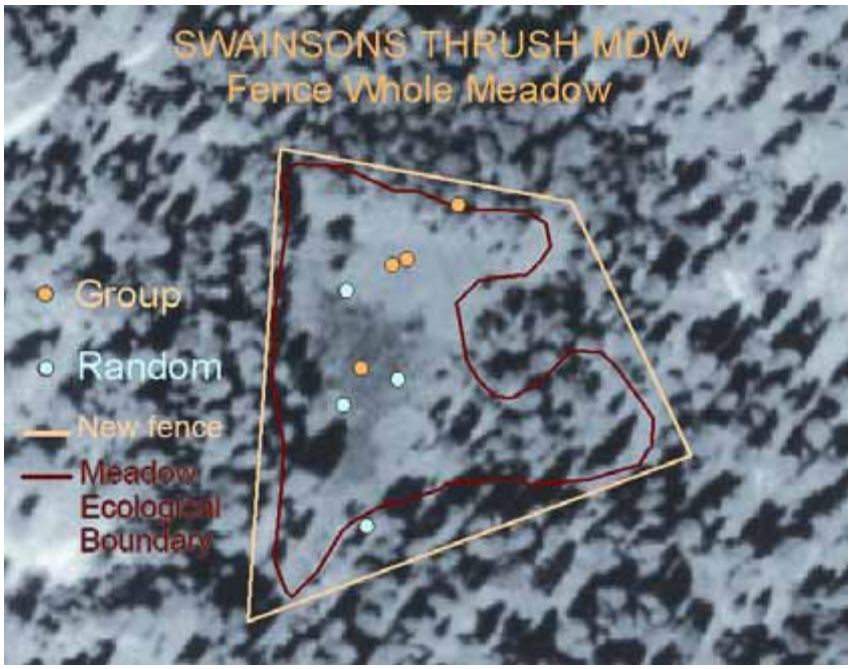
Over the past year, design of the study and baseline data collection were accomplished.

Development of study objectives and a preliminary study plan was done during the autumn of 2004 and winter of 2005. The study plan was circulated for both scientific peer and stakeholder review in April 2005. The research team is currently revising the study plan based input from those sources.

For both Phase I and II, the research team has acquired spatial data on Yosemite toad occurrence along with other geographic data (such as hydrology and vegetation) from National Forests and other sources. Because meadows are the sampling unit for this study and not all Yosemite toad occurrences are associated with a

meadow, occurrences were matched with a meadows layer in a GIS environment.

Phase II of the study employs a randomized block design, with blocks representing grazing allotments. Each block contains four meadows; one of each treatment type. The primary purpose for blocking was to simplify formidable data collection logistics so meadows within each block are in reasonably close proximity to each other. A secondary benefit is that all meadows within the block should have similar environmental conditions, such as temperature and precipitation, and similar grazing management styles. For this phase, only meadows with an elevation between 6,000 and 10,000 feet on the Stanislaus and Sierra NFs were considered. Blocks were selected using a random process and three allotments (blocks) on the Sierra NF and two allotments on the Stanislaus NF were selected. The research team collected data on the 15 meadows to receive treatments (nine on the Sierra NF and six on the Stanislaus NF) as well as visiting ten other meadows as potential ungrazed reference sites and compiling information. The research team is currently evaluating the potential set of ungrazed meadows.



Field data collection is focused on quantifying toad populations and microhabitat associations, meadow scale vegetation, hydrology, and grazing activity. In 2005, instrumentation was installed and baseline data collected for toads, vegetation, and hydrology at all 15 treatment meadows. Two toad surveys were done at each of the 15 selected meadows and one was done at each of potential ungrazed meadows.

Instrumentation included installation of piezometers for measuring water table level, permanent plant transects across meadows and through toad breeding areas, and paired vegetation cages within broad-scale plant community types. Water temperature loggers and time-release digital cameras to document livestock activity were pilot tested at several meadows. Meadow scale data collection included plant identification and cover along line transects, water table depth, and soil and water sample collection for future analyses. Toad population and microhabitat data collection included numbers of toads in various life stages, marking of metamorphs and older toads to derive population estimates, and quantification of vegetation and aquatic characteristics at individual toad or breeding area scale. In addition, counting and marking methods were tested at non-study meadows and on captive toads. In 2006, the research team will complete installation of all equipment and collect the full set of data at all study meadows with grazing occurring.

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www.fs.fed.us/r5/snfpa

Other websites that may be of interest

www.fs.fed.us/psw