



(Left)
Yosemite Toad
needs warm,
shallow water for
breeding.



(Right)
Mountain Yellow
Legged Frog
generally occurs
in cold water,
deep lakes

Amphibian Status and Trend Monitoring

The Yosemite toad and Mountain Yellow-legged frog Monitoring Program is designed to provide range-wide information about the Mountain Yellow-Legged frog (*Rana muscosa*) and the Yosemite toad (*Bufo canorus*).

The Yosemite toad is endemic to the Sierra Nevada and is found in high elevation aquatic systems from Alpine County south to Fresno County. The Yosemite toad has disappeared from more than half of the sites where it was known to occur historically, and formerly large populations have been reduced in numbers.

The mountain yellow-legged frog was once widespread and abundant in the high elevation aquatic ecosystems of the Sierra Nevada. It is considered highly aquatic and is found in a variety of aquatic habitats including high elevation lakes, ponds, tarns, wet meadows, and streams. However, recent assessments have found that the frog has disappeared from 70-90% of its historic range in the Sierra Nevada.

Accomplishments

In 2003, 598 lakes, ponds, meadows and streams were visited. Of these 423 contained or potentially contained suitable habitat for Yosemite toad.

In 2003, breeding was found in 15 of 20 basins where toads have been found since 1990 (called high probability

basins) and two of the four basins where toads were historically found (called medium probability basins). Adults were found in one additional high probability basin but there were no signs of breeding. No animals were found in the two low probability basins. Preliminary 2003 results support the view that Yosemite toads most commonly use meadow habitats but are also found in other aquatic habitats. In 2003, 62% of breeding sites were meadows but tadpoles were also found in lakes and streams.

In 2003, mountain-yellow-legged frogs were found in 44% of the 16 high probability basins and in none of the medium and low probability basins. Breeding was found in one quarter of the high probability basins and adults with no breeding were found in three (19%) of these basins. In 2003, 71% of breeding sites were lakes, 24% were meadows, and 6% were streams. Preliminary 2003 results generally support our current knowledge of mountain yellow-legged frog habitat.

Monitoring results will help determine whether Forest Service management practices are promoting desired conditions for these species' populations and habitat throughout their ranges in the Sierra Nevada, increase our knowledge of population dynamics and habitat requirements, and provide information for making more informed management decisions.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

For more information, please contact the
Sierra Nevada Forest Plan Implementation Team

Tom Efird, Implementation Team Leader:
707-562-8976

Sue Wheatley, Publication Editor:
707-562-8764

See also: <http://www.fs.fed.us/r5/snfpa/implementation/>



United States
Department of
Agriculture

Forest Service

Pacific Southwest
Region

R5-MR-015

July 2004



Monitoring:

Fire Severity

Fisher and Marten

Meadow Status
and Trend

Old Forest and
Understory
Vegetation

Lake and Air
Quality

Amphibian Status
and Trend

Monitoring Accomplishment Report 2003

Sierra Nevada Forest Plan Implementation

In 2003 the Forest Service in California spent over two million dollars monitoring ecosystems, and the viability of wildlife species in the Sierra Nevada. This fulfills our pledge to monitor in the 2001 Record of Decision for the Sierra Nevada Forest Plan Amendment. (SNFPA). The monitoring that took place last year includes several long term studies that will help guide management by Forest Service as trends develop.

Fire Severity Monitoring

Large fires during the last several decades have intuitively seemed to have become larger and more severe. Fuels loads are believed to have become greater in the Sierra Nevada vegetation types because the accumulation of plant material, including trees, shrubs, and grasses, has exceeded vegetation and dead fuel removal through wildfire, prescribed fire, natural decomposition, consumption or utilization.

This study is designed to quantitatively assess current fire regimes using existing data and fire severity mapping. Satellite imagery is used to create fire severity maps by quantifying fire severity attributes such as frequency and spatial complexity. These maps will show the size and severity levels inside fire boundaries since 1984, and for a ten year period into the future starting in 2002. These maps will help evaluate the supposition that fires are getting larger and

more severe. In addition the fire severity maps can be used to measure the effectiveness of fuel treatments at a landscape scale through correlations of fire severity and fuels treatments. They

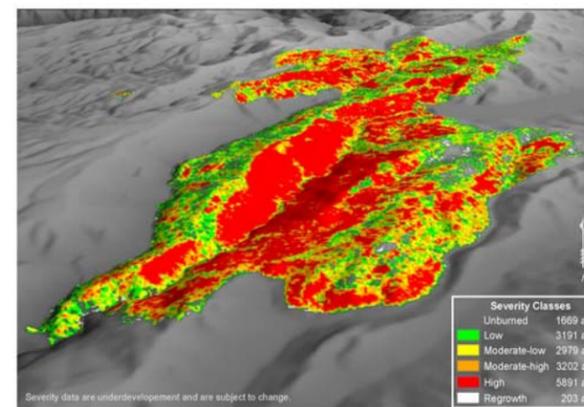
will help answer the question of what is happening in the Sierra Nevada region and guide choices for managing fire effects on the landscape.

Accomplishments

By the end of 2003 the fire severity and fuel monitoring program had collected data on a total of 929 field plots -- 786 plots on National Forest lands and 143 plots on National Park lands through collaboration on data collection with the National Park Service and United States Geological Service Burn Severity Mapping Project. Field data collection and data entry is done by collecting data electronically in the field.

Preliminary maps of fire severity have been created for fires greater than 1,000 acres in the Sierra Nevada for 2001 and 2002. Twelve to fifteen years of satellite imagery for areas in Yosemite National Park and around Lake Tahoe are also being analyzed. This will help classify the current fire regimes for at least four vegetation types by the end of Fiscal Year 2004.

Forest Inventory and Analysis (FIA) protocols for re-measurement of FIA plots one year following a fire were developed in conjunction with the FIA program. These protocols were used this last summer to re-measure the 31 FIA plots that burned in the McNally Fire on Sequoia National Forest.



Star Fire Severity Classification



Caught on a monitoring camera in the southern Sierra Nevada, Pacific fishers take the bait.

In addition to fisher and marten, surveys collect extensive information about the occurrence of several other potentially competitive carnivores in the region including: ringtail (*Bassariscus astutus*), gray fox (*Urocyon cinereoargenteus*), spotted skunk (*Spilogale gracilis*), striped skunk (*Mephitis mephitis*), weasels (*Mustela* spp.), and black bears (*Ursus americana*).

Fisher and Marten Population Status and Trend Monitoring

In 2001 in the Record of Decision, the Regional Forester set a goal that Pacific fisher (*Martes pennanti*) population and habitat in the Sierra Nevada would expand to re-establish connection with the fisher population in northwestern California. A first step towards that goal was to establish a study monitoring the southern Sierra Nevada fisher population by conducting annual surveys to estimate the fisher population and distribution. The field season of 2003 was the second year of field sampling. As a related species found throughout the Sierra Nevada, American marten (*M. americana*) is being monitored as part of the same study though monitoring strategies for each species differ slightly due differences in current the distribution of each species.

Accomplishments

During the past two field seasons, 349 primary sample units were completed which equates to more 20,000

survey nights at over 2,000 survey stations. Each primary sample unit, which includes six track plate stations and one remote camera station, is surveyed for ten consecutive days. Tracks and photographs of 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.

To meet the objectives of the fisher population monitoring program, sampling efforts have been greater in Sequoia and Sierra National Forests (225 sample units) than in the central and northern Sierra Nevada (124 sample units). In the southern Sierra Nevada, fishers were detected at 60 sample units. Marten were detected at 48 sites throughout the region, 18 of which occurred in designated wilderness.

Both species were detected in numerous habitat types, though the majority of detections for each species occurred in forested habitats. Fisher were generally observed at lower elevations than marten, but elevation ranges of the two species overlapped somewhat.

Preliminary results indicate that fisher are well-distributed in portions of the Sequoia and Sierra National Forests, and comparisons to survey data from the 1990's suggest that their populations may have expanded during the past 10 years.

Monitoring is designed to reveal possible expansion of the fisher population into the central and northern Sierra Nevada during the study period. Efforts are underway to collaborate with the National Park Service and extend monitoring surveys into Yosemite and Sequoia Kings-Canyon National Parks during the 2004 field season. Habitat monitoring procedures are being developed to track changes in habitat quality using a combination of remotely-sensed vegetation data and plot data collected in conjunction with the ongoing FIA program.

Old Forest Study and Understory Vegetation Status and Trend Monitoring

A goal of the Sierra Nevada Forest Plan Amendment is to increase old growth characteristics in area, distribution and continuity across national forest landscapes. This can best be monitored by measuring the change in density of large trees and in the structural diversity of vegetation.

Accomplishments

There are 1,917 FIA Phase 2 plots distributed evenly over the SNFPA area. To date, 757 plots have been measured using a specially modified data collection

process called the "big tree add-on". This modification of FIA data collection was added to yield better estimates for trees larger than 32 inches in diameter because it takes into consideration their relatively low density. The initial measurements have been completed on seven of the eleven National Forests in the SNFPA area.

Data for all three field seasons is in the process of being quality checked and loaded into the Forest Service corporate database. Analysis of the data should begin soon.

(Continued on page 3)

In addition to the national system of FIA plots, the Forest Service Remote Sensing Lab has initiated a series of "intensification plots". These plots are designed to sample in rare, unique, or sensitive vegetation types that the national sample design misses or under represents due to the nature of the national sample design. Examination of plot locations on vegetation maps of the SNFPA area show that only 53% of the vegetation types identified are represented by the FIA plots.

Of the 1917 Phase 2 plots in the Sierra Nevada, 134 are assigned additional vegetation sampling measurements. Initial measurement of plots with vegetation protocols was begun in the 2003 field season. Nineteen were measured by a PNW-FIA field team using vegetation protocols.

Meadow Status and Trend Monitoring

According to the Sierra Nevada Ecosystem Project Final Report, the aquatic, riparian and meadow ecosystems are the most degraded of all habitats in the Sierra Nevada. The goal of the meadow study is to determine the status and trend of ecological conditions of montane meadows. The study collects data from a random selection of herbaceous meadows, analyzes it, and documents whether meadow conditions improve over the ten year life of the study.

Data include plant species composition, nested rooted frequency, ground cover, and soil hydrologic characteristics. The information is collected in two five-year monitoring cycles.

Accomplishments

In 2003 meadows were sampled on ten national forests ranging from the Modoc at the north end of the Sierra Nevada to the Sequoia at the south end. Streamlined sampling, fine-tuned protocols, and experience improved efficiency during the second field season. Ninety-one sites were visited. Seventy-three of those sites met the meadow criteria and were sampled. Disturbance was rated as light to none in 60% of the meadows. Moderate and heavy disturbances were noted in 26% and 14% of meadows, respectively. Livestock



grazing was the most frequently noted source of disturbance, with recreational use the second most common source.



Lake and Air Quality Monitoring

The Sierra Nevada is characterized by over 3,400 lakes with a surface area of over one acre or larger with numerous resource values including habitat, water quality and recreation. These lakes are unique in being the most chemically dilute (i.e. lowest capability of neutralizing acidic inputs) group of lakes sampled in US Environmental Protection Agency's 1985 nationwide lakes survey. The California Air Resources Board also identifies high-elevation lakes as sensitive ecosystems.

The sensitivity of Sierran lakes combined with projected population increases, electricity demands, and new information suggesting a strong Asian influence on sulfate deposition along the west coast warrants an effort that provides an early alert to change.

Accomplishments

The Sierra Nevada Framework Study Plan for lake monitoring follows collection and lab protocols consistent with similar work in the Rocky Mountains and Pacific Northwest. An initial one time survey was done in seven of the ten Class 1 Wildernesses to select lakes with low acid neutralizing capacity for long term monitoring. Since then two years of long term lake sampling has been completed by National Forest staff.

The Smoke Monitoring Plan has provided a strategic approach to monitoring smoke in collaboration with air regulatory agencies. Fire Management is supporting a pilot implementation of the plan on the Sequoia National Forest. A contract has been awarded to provide instrumentation and service near sensitive communities. This includes near real-time satellite data delivered to a web site. The data will help managers make smoke management decisions.