



**Spotted Owl Science Integration Team Meeting Notes  
August 5<sup>th</sup>, 2009 9 am - 3 pm**

***In Attendance:***

Nathan Amboy - USFS McClellan  
Mike Bacca - Cal Fire  
John Battles - UC Science Team  
Joe Battles  
Vince Berigan - UC Science Team  
Steve Brink - CA Forestry Assoc.  
Sue Britting - Sierra Forest Legacy  
Mike Chapel - USFS Region Five  
Kalie Crews - USFS Tahoe NF  
Kevin Dickinson - USFS El Dorado NF  
Chris Fischer - USFS Tahoe NF  
Claudia Funari - USFS El Dorado NF  
Rocky Gutiérrez - UC Science Team  
Lisa Gymer - Ca. Dept Fish & Game  
Tyler Harkness - Foresthill Fire Dept.  
Kim Ingram - UC Science Team  
Sandi Jacks - Ca. Dept Fish & Game

Susie Kocher - UC Science Team  
Patti Krueger - USFS Vallejo  
Dawn Lipton - USFS El Dorado NF  
Alex Lundquist - UC Berkeley  
Victor Lyon - USFS Lake Tahoe Basin MU  
Kelly Pavlica - USFS Tahoe NF  
Adam Rich - USFS Stanislaus NF  
Kevin Roberts - Sierra Pacific Industries  
Susan Roberts - US Geological Survey  
Kim Rodrigues - UC Science Team  
Gary Roller - UC Science Team  
Richard Rypinski  
John Sanders - UC Science Team  
Kim Squires - US Fish & Wildlife Service  
Doug Tempel - UC Science Team  
Pat Trimble - USFS El Dorado NF  
Sheila Whitmore - UC Science Team

**Action items:** Rocky and the owl team would be happy to receive any nominations for parameters to model from SNAMP stakeholders.

**Introduction:** Participants in the meeting introduced themselves and Kim Rodrigues gave an overview of the agenda and goals for the day. These were to understand the current spotted owl study and share results of the spotted owl telemetry study on the effects of canopy reduction on the owls, discuss the relevance of the telemetry study for SNAMP research, and review potential indicators for responses of owls to management.

Then, Chris Fischer, District Ranger on the American River Ranger District of the Tahoe National Forest, gave an update on the implementation of the Last Chance Project. The goals of the project are fuels reduction primarily with some emphasis on forest health. The project will treat 2383 acres with a mixture of different treatment types including tractor thinning on moderately sloping ground, cable thinning on ground with steeper slopes, and under burning. Retention of 50% of basal area is required in old forest emphasis areas.

There are no spotted owl protected activity centers (PACs) in the treatment although it does include a couple of home range core areas (HRCAs). PACs were designed to set aside 300 acres of owl nesting and roosting habitat surrounding historic owl territory centers. This size was suggested by the California Spotted Owl (CASPO) technical team in 1992. The CASPO team estimated that the area of contiguous nesting and roosting habitat around known owl nests was 288 acres. The 300 acres must be contiguous unless the nest is not on USFS land. The 1000 acre HRCAs are designated around the PAC areas and presumably contain the best habitat for foraging.

The Last Chance Project implementation date depends on whether the project receives bids, and whether there are appeals. There is also a pending lawsuit that challenges the 2004 Sierra Nevada Framework on which the project is based and the outcome of this lawsuit could affect implementation of the project. One difference between the Last Chance Project and the Sugar Pine Project in the southern site is that the southern project is a partial service contract with a greater emphasis on forest health. If the Last Chance Project gets no bids, it could be reoffered as a service contract.

***Canopy Reduction/ Telemetry study:*** Dr. Rocky Gutiérrez gave an overview of the recent University of Minnesota canopy reduction / telemetry study and its relevance to the SNAMP spotted owl study. Spotted owls require forest that structural characteristics that are typical of mature or old-growth forests, though not necessarily older-aged forests. They will use younger forests if they resemble older forest (i.e., contain large trees, uneven tree diameter distribution, high canopy cover, and coarse woody debris). There has been very little research on the effects of fire on spotted owls. One previous study (Bond et al. 2001) evaluated short-term effects of fire on owls and found no immediate effects of fire on adult survival or site fidelity. Long-term effects of fire on owls are unknown. Owls can adjust to some perturbations because they have evolved in fire-adapted ecosystems and can persist in forests that experienced some logging. But, no one knows the actual threshold of disturbance past which owls cannot survive or occupy a site.

Rocky and others involved in developing the California Spotted Owl Interim Guidelines (CASPO) in the 1990s suggested for many years that direct experimentation was needed to better understand how owls respond to forest management. The telemetry study was the first direct experiment to manipulate habitat and monitor owl responses. Experiments require a design structure that includes randomization, replication, and local control. Previous studies to examine owl home ranges and movements have used owls to monitor that were not randomly selected (i.e., easily accessible), which may create bias. His telemetry study used a random selection of owl pairs in the Central Sierra to allow inference to all Central Sierra birds. Birds were monitored at random times through all periods of the night. For replication, 24 birds were selected. Local control was implemented by removing territories from the sample that would lead to confounding effects (e.g., other treatments planned for the site) or were part of another study.

Several problems arose that probably affected the results of the experiment. Of the 24 birds randomly chosen and located in 2005, seven disappeared before attempted capture in 2006. In

addition, implementation of the fuels treatments did not occur on schedule. Owls were captured and banded in spring 2006 before fuels treatments took place. However, delays in applying resulted in no time left for post-treatment monitoring that same year. The design was changed to monitor the birds the next year instead. This change added an unknown confounding temporal effect.

Bayesian analysis, a probabilistic method, was used to allow better estimation of model parameters (i.e., predictor variables like the amount of area treated) for the small sample sizes. The results were equivocal. Findings included a home range size increase for both treatment (46 hectares) and control owls (77 hectares). Home ranges shifted, with treatment owls moving a bit farther (4143 meters) than control owls (3959 meters). Treatment owls moved further from treatments (3661 m) than control owls (3217 m). These home range shifts are larger than expected for owls occupying stable territories and the average distances moved were influenced by a few birds that moved very long distances between years (i.e., represented breeding dispersal events).

Since control birds had no specific area from which to measure distance moved relative to treatment (as treatment birds did), a random point near control owls was chosen and the shift in home range was measured relative to this random point. The difference in shift was 3.9 kilometers for control birds and 4.1 kilometers for treatment birds. Deviance information criteria were used to conclude that about 25% of the variation was explained.

Home range shifts by owls usually small. Scientists do know that spotted owls will disperse from their territories without treatments, sometimes because they deplete their prey base. It is true that the project does not have information on the prey available because this type of information is very expensive to collect. This is because prey occurs at low density and requires great effort to estimate their densities. Owls also forage in deep canyons that are very difficult to access, which requires additional effort to establish trapping grids.

Treatments were also not uniform. Confounding effects of the differences among treatments were accounted for by using the treatment area and changes in some vegetation characteristics as covariates. Pre- and post-vegetation measurements were taken to estimate these changes. The treatment guidelines were for retention of 40 - 50% of the canopy. However, most treatments had canopy reductions of approximately 10% so the canopy will recover fairly quickly (except for the understory removed).

Breeding had no effect on these results since it was a very unfavorable year and none of the pairs bred. The transmitters probably did not affect the breeding failure because owls on the Eldorado Study Area that had no transmitters also did not breed. A post-hoc analysis examining whether mate loss accounted for the territory shift was done, but that variable was not found to be explanatory. The team has gone back to see if areas that birds left are still empty and has found that most are still vacant.

Dr. Gutiérrez concluded based on this study that using radio telemetry to detect immediate effects of fuels treatment is not the ideal choice for spotted owl research because it would require annual change of transmitters, good monitoring locations, close access to birds and a much larger

sample size. These conditions do not exist on the most of the SNAMP and Eldorado owl study sites. Thus, the owl research being done for the SNAMP study designed using the knowledge gained by the telemetry study and will focus on long-term chronic effects estimated by survival and occupancy using banded birds and not radio telemetry. Good communication will also be critical to overcoming the barriers encountered in the canopy reduction study including treatment delays.

***Spotted Owl Parameters of Interest:*** After lunch, Rocky described the response variables being estimated in SNAMP and for each what they may indicate. These included owl survival, reproduction, and occupancy.

*Occupancy* is the presence or absence of owls at historic owl territories corrected for detectability. It is less expensive to monitor since it does not require knowledge of whether the bird occupying the territory over time is the same bird and, thus, doesn't require capture and banding. There is a lot of data on this over a long period of time for spotted owls. Occupancy is measured within a home range, not just based on a particular nest tree because birds will use different nest trees over time. Territories are defined for the SNAMP study as one half the nearest neighbor distance. SPLATs will occur in home range core areas (HRCAs), but not protected activity centers (PACs).

*Reproduction* is measured by the number of fledglings produced each year. It is not a very good response variable for fuels treatment because weather has a very strong affect on reproduction, which would confound efforts to evaluate treatment effects. Fuels treatments have a limited operating period, which means they must be postponed within a quarter mile of a PAC until after young birds fledge.

*Survival:* Currently, all areas on the SNAMP and Eldorado study areas are surveyed for owls multiple times each year. All known owls have been captured, banded, and uniquely color marked to facilitate identification without recapture. By resighting color marked birds each year, survival of birds can be estimated. Survival is a key parameter in estimating trends in owl populations and could be influenced by treatments so it will be estimated as a function of treatments.

*Habitat:* Habitat quality is a very difficult parameter to measure because scientists can only measure what they think is important, but could miss other important factors affecting habitat quality. Suitable habitat is considered to be stands with a dominant tree size  $\geq 24''$  diameter at breast height (dbh) or stands with a dominant tree size of 12-24'' dbh and  $\geq 70\%$  canopy cover. Habitat is being classified using the California Wildlife Habitat Relationship (CWHR) system. CWHR categories are delineated using aerial photos to make a large scale landscape habitat map, and then we sample areas intensively to estimate accuracy of the map. Although only CWHR category 6 is classified as a multi-structured stand, the owl team is also examining CWHR category 3 and 4 habitat as potential habitat because if there are residual trees and high canopy cover they may have the forest structure needed to support owls. Participants suggested that the owl team needs to be very clear about these definitions in the study and that it was desirable to use the CWHR categories because managers are familiar with these.

Variability in the treatments will be captured by measuring pre- and post-treatment tree diameters, canopy cover and understory. The wildlife team is collecting vegetation data within 25-meter radius plots. They will also compare this data with the data from the forest team in areas where both were sampled. The team feels that their sampling is sufficiently intensive to estimate the vegetation change resulting from treatments allowable under the 2004 Framework. One participant said that the Last Chance EA includes prescriptions that retain multi-story stands and that this was a direct result of SNAMP and the expanded public input process related to the project. Typical treatments on USFS lands may not retain multi-storied stands. Rocky noted that many treatments are being planned on the Eldorado study and these will capture the inherent variation in treatments so the restriction to retain multi-storied stand will only enhance the overall study design.

Characterizing forest structure is difficult. Rocky is very interested in finding a way to express structure in an integrated way. Using CWHR can be a problem because stands that are very different in structure can be placed into the same category. One suggestion from regulators present was to continue to use the CWHR system because so many are familiar with it, but to add other characteristics to the basic classifications. Rocky's hope is that the important variables will be correlated and so variables that are easier for a manager to understand and measure can be used.

A participant expressed concern at the number of canopy cover measurements being used by the team. The team currently takes 50 simple hit or miss data readings using a densitometer. A suggestion was made to add two more canopy cover transects to derive 100 readings. The team used a densitometer as well as a densitometer to measure canopy cover on the canopy reduction study, though a participant reported that some research has shown these two may instruments produce different estimates. Coarse woody debris on the ground is being counted. Understory cover is being measured using a cover pole in the center of the plot. Please refer to the owl team vegetation sampling protocol on the SNAMP public website for more detail.

LiDAR has also been flown on the Last Chance project although it is not available for the Eldorado Demography Study Area. LiDAR data will also be produced post-treatment, allowing for a very detailed analysis of the change in canopy cover in some areas. Landsat is another data source available Sierra-wide, but Rocky does not find it useful because it cannot detect forest structure at a fine scale.

There has been a paradigm shift from classic hypothesis testing to newer modeling approaches which compare individual models (using predictor variables [covariates]) to the data. In this way a set of plausible hypotheses (models) can be constructed and ranked by their fit to the existing data. This method requires the team to identify plausible hypotheses before analyzing the data, rather than "data dredging" afterwards to find relationships. Data dredging or post-hoc analysis may be acceptable, for example when little is known about the system, but this is not the case with spotted owl biology. Therefore, the team hopes to have a small but logical set of models nominated before the analysis begins. They would be happy to receive nominations from any SNAMP stakeholder for additional variables to model.

One hypothesis suggested by participants was that stands with larger ( $\geq 24''$  dbh) trees support increased survival and reproduction of owls. It was suggested that the team look at incremental changes in canopy reduction to see what the threshold may be for owl habitat.

*Next steps /Evaluation:* Rocky and the owl team would be happy to receive any nominations for parameters to model from SNAMP stakeholders. Participants in the meeting said highlights were the good meeting site and interaction between many agencies and stakeholders. The meeting could have been improved by making sure that participants had access to the reports and study plan ahead of the meeting.