



**Notes from the SNAMP Pacific Fisher Integration Team Meeting, July 15 2009
UC Center, Fresno Ca.**

In Attendance:

Mike Bacca – CAL Fire
Reg Barrett – UC Science Team
Matt Bissell – Yosemite Mountain Ranch
Sue Britting – Sierra Forest Legacy
John Buckley – CSERC
Mike Chapel – USFS Regional Office
Ed Cole – USFS Sierra National Forest
Kent Duysen – Sierra Forest Products
Tom Eliason – Sierra Club
Patrick Emmert - So. California Edison
Shasta Ferranto - UC Science Team
Patricia Flebbe – USFS Regional Office
Pamela Flick – Defenders of Wildlife
Rebecca Green – USFS - PSW
Lisa Gymer - Ca Dept of Fish and Game
Ann Huber – UC Science Team
Kim Ingram – UC Science Team
Sandra Jacks - Ca Dept of Fish and Game
Terry Johnson –USFS National Forest
Emilie Lang – USFS Sequoia NF
Anne Lombardo - UC Science Team
Theresa Lowe – USF Sierra National Forest
Dave Martin – USFS Sierra National Forest
Diane MacFarlane - USFS Regional Office
Lindsey Meyers - CSERC
Marc Meyer – USFS Sequoia NF
Darca Morgan - Sierra Forest Legacy
Kathryn Purcell - USFS PSW

Susan Roberts - Yosemite National Park
Duane Robinson - Indian Peak Ranch
Ana Otto- USFS Sierra National Forest
Kim Rodrigues - UC Science Team
Tom Sandelic – Cal Fire
Bill Sollinsky – Cal Fire
Mark Smith – Retired USFS Sierra NF
Kim Squires – US Fish and Wildlife Service
Rick Sweitzer - UC Science Team
Craig Thompson - USFS PSW
Steve Thompson - Yosemite National Park
Denise Tolmie – USFS Sierra NF
Rick Truex – USFS Sequoia National Forest
Harold Werner - Sequoia/Kings Canyon NP
Jeannette Warnerte – UC media contact
Deb Whitman - USFS Sierra NF

Web attendees: Dan Applebee, Justin Augustine, John Battles, Aaron Facka, Mark Grossi, Gordon Heebner, Richard Kangas, Gady Lasky, Roger Powell, Kevin Roberts, Arnold Roessler, Joe Sherlock, Adrianna Sulak, Robert Swiers, Craig Thomas, Don Yasuda, Scott Yeager, Wendy West

I. Welcome: Dr. Kim Rodrigues opened the meeting with an introduction of the UC fisher team and the public participation team. She reviewed the day's goals and the ground rules. She gave some background to SNAMP and reviewed the purpose of the integration team to share knowledge and promote mutual understanding. She reminded us of the importance of defining key terms we rely on, such as *adaptive management* and *indicators*.

Update on the Sugar Pine Project: The Draft Environmental Impact statement (DEIS) for the Sugar Pine Project has been released and the USFS is soliciting comments. Pacific fisher prefers areas with lots of biomass as habitat. The goal of the project is to manage for a more sustainable ecosystem over time, with less biomass that can tolerate fire. The main question to be addressed by the SNAMP study is: *What manner of fuel reduction is optimal to minimize the risk of catastrophic fire danger and still preserve the fisher?*

No treatments have yet been implemented in the Sugar Pine project. There is no goal to change treatments only to look at how they affect the fisher's movements. It was suggested that SNAMP address the findings of the Conservation Biology Institute and other studies on the risks associated where fuels treatments are done and fisher habitat is lost to wildfire. The fisher team is testing the fisher habitat model proposed by CBI.

II. Description of the SNAMP Fisher Study: Dr. Rick Sweitzer acknowledged his appreciation for the funding support received from the Forest Service for the SNAMP Fisher Team. They are studying a sub species of the Pacific Fisher that is genetically isolated, and found between 3000 and 7000 feet. Four key watersheds are defined within the study area proper. All Forest Service fuel treatment polygons from the larger surrounding area (Bass Lake Ranger District) that the fishers travel within are being studied.

The SNAMP fisher team has carried out camera-trap surveys of a 1km² grid annually. Cameras are run for 4 weeks in each grid cell. If there were no fisher in four checks within a month the camera was removed. These data have shown that the Conservation Biology Institutes' model predicting fisher occupancy in grids within the four key watersheds works fairly well. One individual animal known as M02 dispersed into Yosemite National Park, illustrating the potential for expansion of the fisher population.

The fisher team has captured 46 animals, 22 of which have died. Animals are outfitted with a radio collar and their locations are tracked daily by airplane. The team feels that they have learned a lot so far about the fisher's denning behavior and causes of mortality. Only one or two kits per female have been observed in the SNAMP and USFS Pacific Southwest Research Station studies. Rick showed three video clips of fisher kits that have been taken by the new SNAMP "kit cam".

The fisher team estimates that a 50% core use area for female fisher is about 600 acres. This includes natal and maternal denning trees. Data thus far supports the 650-800 acre buffers prescribed in the 2004 Sierra Nevada Forest Plan Amendment Record of Decision and the 2001 Framework.

Question: *Do you have a prey study? Is an occupancy study of prey needed?*

Answer: There is some limited prey base work going on in the study through detections by camera traps. Fishers have been noted to eat squirrels, spotted skunks, lizards, berries and fungus. Ground squirrels and lizards go underground in the winter, perhaps leaving grey and Douglas squirrels to

maintain the fisher. Fecal samples, when found, are analyzed at the Redwood Sciences Lab in Arcata. The team is not currently using scat dogs but is considering doing so.

Some fisher-prey interactions have been caught on cameras. A pine marten was caught in a trap and was actively hiding from a fisher. Fisher may limit marten territory to higher elevations. The team may be able to correlate squirrel presence with fisher presence.

Question: *Could the lack of porcupine as prey be an issue for the fisher?*

Answer: The fisher team has not seen a single porcupine even though they are at the right elevation to see them. Porcupines were actively killed in the past since they eat the cambium of young trees. They have a small reproductive output (only one young per year) so they do not rebound quickly.

Question: *How do the new GPS collars work?*

Answer: Using aerial radio telemetry with the current VHF collars, fisher locations can be pinpointed to a 300 by 300 yard (9 hectares) area. The current collars last about a year and a half. The iridescent band pattern on the collars is lasting better now. GPS collars do not have the ability to send a mortality signal yet and so don't help with mortality determination. They also sometimes cannot access the three needed satellites to identify a position, particularly in dense forest which would create a biased picture of habitat use. One suggestion made was to prioritize the use of GPS collars on animals in Sugar Pine at the time of treatments. This could provide more precise locations on the animals than once a day locations with the VHF collars.

III. Sources of Mortality: There are multiple causes of mortality including predation, road kill, and disease. Mortality statistics are being gathered from three studies: SNAMP, the Pacific Southwest Research station and the Hoopa study in northwestern California. Survival rate seems to decrease from Sequoia National Forest north. Although the team expected winter to have the highest mortality, they have found it to actually be highest in early spring. This may be because of the increased need for food for kits. There does not seem to be a difference in predation mortality by sex. So far, only males have been killed by disease. The one starvation death was a female that also had shotgun pellets in her tissue. The death may have been a result of lead poisoning; the team is awaiting further necropsy results.

Predation: The SNAMP team has found that predation occurred throughout the year with a pulse in winter and spring. Some of the necropsy work to identify the predator using genetic techniques is being done at UC Davis by the Wildlife Health Center. They are looking at predation resulting from competition for the same prey. This is an innovative part of the SNAMP study and very important for understanding this source of mortality. The fisher team is able to note the time and location of predator sightings using camera traps. This allows them to monitor time until predators are detected in the area again. The team wants to know how many predators are seen in a fisher' territory, how many and how long their visits are and what the level of risk to a fisher may be.

Roadkill: For fisher killed by vehicles, the statistics only show those animals actually found by researchers. Some may wander off and die elsewhere and if they are not collared they may never be found. In Yosemite National Park, three fisher and ten bears have been found dead from car strikes this year already.

Disease: Deaths from disease have been in the spring and early summer. A specific protocol has been developed to sample for disease. Complete blood work is done on all captured fisher. The following diseases have been found so far in the SNAMP study area: toxoplasmosis, canine parvovirus and canine distemper (also a virus). Early retrieval of the carcass is essential for disease detection. No serology for distemper has been found by SNAMP but yet we have confirmed deaths from it. It is very virulent, 0% prevalence as all have died. There was a sick fox nearby about 2 weeks prior to the deaths. Could there be any correlation? Canine distemper virus persists four to six hours in the environment, so epizootics can die out quickly. Toxoplasmosis is carried by felids (cat scratch disease) and they are often not killed by it, but many species of wildlife may carry it. These diseases may lead to mortality due to predation, accidents and starvation in addition to outright direct mortality from disease.

Question: *Could the bait sock be contributing to disease transmission?*

Answer: Yes, if it was chewed on by infected dogs (not vaccinated against canine distemper) and then the fisher soon after to transfer the saliva. However, no bait was out during this episode of infection as it was denning season and trapping had been suspended. The fisher team could freeze appropriate socks and send to the vet lab for analysis if needed.

Question: *If occupancy models are developed for predators using camera trap records, couldn't there be spatial autocorrelations?*

Answer: Yes, it is clear that a single predator may be "caught" on several different cameras and so could be counted more than once. Spatial autocorrelation can be dealt with statistically, but the team has not done this yet. There are no independent predator studies expected in this area.

Question: *Could disease be related to predation?*

Answer: Yes, this is a possibility. To better understand this, all fisher that have been killed by predation are tested for disease.

Question: *Since fisher can climb from tree to tree to avoid predators, might loss of canopy closure due to treatments affect their ability to escape predators?*

Answer: Yes, the SNAMP research teams are coordinating to help answer this question. The SNAMP forest team is measuring canopy cover in key watersheds. The project also has LIDAR images to document changes in canopy closure which can be used by the fisher team. There is also the possibility that by removing biomass and opening the canopy, treatments may preserve habitat from catastrophic wildfire over the long term and allow canopy closure to occur faster with fewer large trees versus many small trees. The time scale considered may affect the answer to the question of whether decreased canopy helps or harms the fisher.

Question: *Is there any evidence of fisher on fisher predation?*

Answer: There might be. The caching behavior of felids may have been seen in a fisher mortality that was found buried in the snow. However, the team saw fisher tracks and no bobcat tracks at the scene.

Question: *Are the Hoopa and Kings River studies able to find all their mortalities with their limited resources and lack of plane to identify the location of mortality signals?*

Answer: SNAMP researchers said that those studies are finding some but not all fisher mortalities because of the difficulty in tracking fishers by ground in rough terrain. The problem is to retrieve the carcass soon enough to carry out tests for diseases before tissues deteriorate or scavengers remove the carcass. To date, the causes of mortality have been fairly consistent across the three studies.

IV. Management Indicators: Dr. Reginald Barrett gave a power point presentation about possible management indicators for fisher and asked for feedback from those attending. The choice of indicators should probably be driven by the management objective for the area which is to maintain the fisher population while reducing the risks of catastrophic fires. Indicators chosen should be those most likely to be affected by SPLATS. Nevertheless, since the fisher population in the southern Sierra is currently being considered for listing by both the state and federal government, it would be useful to know if the population was increasing, stable or continuing to decrease for whatever reason in addition to the effects of SPLATs

The occupancy of the treated areas is a critical piece of information as is population size. Regional monitoring of fisher occupancy being done by Rick Truex for the USFS is essential. It is funded for this year, its 8th year and covers the entire extent of the southern Sierra fisher population from Kern County to Mariposa County. There is new software for occupancy modeling called "PRESENCE". The software can be used for all others animals detected by camera traps or track plates (e.g. mountain lions, coyote, fox, squirrels). There is a need for similar indicators at the watershed scale as well as the region wide scale.

Adult female survival: Dr. Barrett feels determining survival of adult females could be an important indicator, but monitoring it annually is a major challenge. The UC fisher team has expanded their study site beyond the key watershed area because determination of survival rates requires a large sample size. There are not enough fishers in just the treatment area to answer this question. Other potential indicators include: reproduction, juvenile mortality, and daily behaviors such as resting sites/patterns.

Adult population size in key watersheds: Assuming trapping and radio-tracking is done so intensively that one can assume all fisher with home ranges overlapping the key watersheds are detected and have their home ranges mapped, the fisher team can determine the total number of fisher home ranges involved. This procedure was illustrated for 2009. However, camera trapping documented at least one additional female fisher was present in the key watersheds but was not yet radio-collared.

Question: *Has the UC fisher team considered micro-chipping the kits?*

Answer: Capturing the kits in their dens is difficult to do. The Hoopa study has extracted some kits from dens and PSW has done two. Most dens are too deep to reach the kits. The team carries equipment to micro-chip kits just in case. There will be intensive trapping in the fall to collar kits and see how they survive the winter.

Question: *Is it hard to decide when you have done enough work to have confidence in it?*

Answer: Confidence intervals will be wide because the sample size is small, but there is not enough money to do more. The fisher team has considerable confidence it will be able to capture and radio-collar nearly all the fisher in the key watersheds.

Question: *What other lands besides the USFS's do fishers occupy? How do their land uses affect the fisher?*

Answer: A female fisher uses some 23 square kilometers for a home range. Most of the land is publicly owned administered by the USFS. A small amount is private land and some fisher home ranges extend into Yosemite National Park. Forest thinning and understory treatments are accomplished on some private and YNP lands as well as USFS lands. The fisher team is obtaining information on all such activities throughout the entire area.

Question: *Will you be developing a "trigger/threshold" level tied to an indicator?*

Answer: Thresholds linked to management decisions will have to be addressed by decision makers and the public. The SNAMP science team has decided not to propose thresholds at this time.

VI. Next Steps/Wrap up: Some of the attendees to the meeting would like a chance to ask further questions and help refine management indicators. This may require a focused fisher group to address these questions and bring back to the SNAMP Integration Team. Perhaps a conference call can be arranged as it was for the owl team in the past.

- Kim Rodrigues will take the lead in organizing follow up to this meeting.
- All Power Point presentations will be posted at <http://cnr.snamp.berkeley.edu>, under the fisher team and documents.
- The Draft Environmental Impact statement (DEIS) for the Sugar Pine Project is available on line at: <http://www.fs.fed.us/r5/sierra/projects/sugar-pine/index.shtml> The Forest Service will host two fieldtrips to review the project. These will be on Wednesday, August 5 and Saturday, August 8, 2009, 10:00 AM to 2:00 PM at the US Forest Service, Batterson Workstation, on Highway 41 (across from Sky Ranch Road). The USFS requests that participants make precise comments on the DEIS. The more specific the comments, the more helpful they are to them.