



Sierra Nevada Adaptive Management Project Annual Meeting Notes
 650 Capitol Mall, Sacramento, CA, October 20th, 10:00 to 3:00 pm

In Attendance:

Roger Bales - UC Science Team
 John Battles - UC Science Team
 Vince Berigan - UC Science Team
 Barry Boulton - Ebbetts Pass Forest Watch
 Steve Brink - California Forestry Association
 Sue Britting - Sierra Forest Legacy
 Pete Cafferata - CalFire
 Mike Chapel - US Forest Service
 Brandon Collins - UC Science Team
 Martha Conklin - UC Science Team
 Thomas Contreras - US Forest Service
 Kalie Crews - US Forest Service
 Thomas Efird - USFS retired
 Ron Eng - CA Dept of Food and Ag
 Don Errington - US Forest Service
 Gary Estes - Protect American River Canyons
 Danny Fry - UC Science Team
 Shasta Ferranto - UC Science Team
 Todd Ferrara - CA Resources Agency
 Chris Fischer - US Forest Service
 Patricia Flebbe - US Forest Service
 Pamela Flick - Defenders of Wildlife
 Danny Fry - UC Science Team
 Julie Griffith-Flatter - Sierra Nevada
 Conservancy
 Cay Goude - US Fish and Wildlife Service
 Quinghua Guo UC Science Team
 Bernie Gyant - US Forest Service
 Russ Henley - Cal Fire
 Kim Ingram - UC Science Team
 Addie Jacobson - Ebbetts Pass Forest Watch
 Marek Jakubowski - UC Science Team
 Maggi Kelly - UC Science Team

Susie Kocher - UC Science Team
 Patti Krueger - US Forest Service
 Rhianna Lee - CA Dept of Fish and Game
 Mike Liquori - Sound Watershed Consulting
 John Litton - US Forest Service
 Anne Lombardo - UC Science Team
 Sarah Martin - UC Science Team
 Kelly Pavlica - US Forest Service
 Tony Rodarte - US Forest Service
 Kim Rodrigues - UC Science Team
 Stephen Roberts - CA Dept of Water Resources
 Gary Roller - UC Science Team
 Phil Saksa - UC Science Team
 Greg Schwab - Georgetown Fire
 Sean Sou - CA Dept of Water Resources
 Kim Squires - US Fish and Wildlife Service
 Scott Stephens - UC Science Team
 Peter Stine - USFS PSW Research
 Ricka Stoelting - Cal Academy of Sciences
 Adriana Sulak - UC Science Team
 Rick Sweitzer - UC Science Team
 Dana Walsh - US Forest Service
 Sheila Whitmore - UC Science Team
 David Wright - US Forest Service

On the Web:

John Buckley - Central Sierra Environ. Res. Cen.
 John Mathias
 Marc Meyer - USFS PSW Research
 Darca Morgan - Sierra Forest Legacy
 Sarah Pittiglio - California Energy Commission
 Christina Prestella - Sierra Business Council
 Frank Stewart - Quincy Library Group
 Doug Tempel - UC Science Team

I. INTRODUCTION: Kim Rodrigues welcomed everyone to the meeting. The desired outcome of the morning session was to present an overview of the research conducted so far by the University of California Science Team in the past year. The goal for the afternoon was to allow for public interaction and involvement with the project.

John Battles introduced the purpose of SNAMP, the general study design, the project timeline, and where the project is currently in the adaptive management process. John emphasized that SNAMP has many individual science teams but that the research will come together to deliver an integrated assessment of fuel reduction treatments on a management relevant scale.

II. IMPLEMENTATION UPDATE

Last Chance Project - Chris Fischer, District Ranger of the American River Ranger District, gave an update on the status of the NEPA process for the Last Chance Integrated Vegetation Management Project. The Draft Environmental Assessment (EA) has received an appeal by the John Muir Project (Chad Hansen). American River Ranger District withdrew the draft and has set a target date of December 14th to repost the new version of the Draft EA. Chris anticipates that it will be signed in March 2010. Once it is signed it will be advertised for contracts. They are still on track for treatments to begin in the 2010 field season. (Additional information about the appeal is available on the SNAMP website <http://snamp.cnr.berkeley.edu/>.)

Sugar Pine Project - Dave Martin, District Ranger of the Bass Lake Ranger District, was not available to give an update on the Sugar Pine Project NEPA process. The draft Environmental Impact Statement (EIS) has been published and has received comments.

Both districts have agreed to delay any treatments in the Water Team treatment catchments (Big Sandy and Bear Trap) for one year, to begin in 2011. (The Science Team had previously requested a one year delay in order to give the Water Team two years of pre-treatment data collection, due to delays in funding and equipment purchasing for the Water Team.).

III. OVERVIEW OF RESEARCH: Each science team gave a PowerPoint presentation with an overview of their research in the past year (these are posted at <http://snamp.cnr.berkeley.edu/> along with the annual report).

Project Integration Team - Dr. David Saah, of UC San Francisco, gave an overview of the results from the meta-analysis work comparing four sites in the Sierra to assess the modeled results of planned or already conducted distributed landscape fuel reduction treatments. The sites were chosen because they had field data available and had been through a USFS planning process.

***Question:** Has the team conducted a sensitivity analysis to determine if any particular treatment factors make a drastic change in the outcome?*

No, but this would be a good idea to consider for future analysis.

***Question:** Was there one key input that most affected the output of the fire modeling?*

This is an important question. Tree thinning diameter differences of 12", 20" and 30" showed little difference. Surface and ladder fuels seem to stand out as having the most effect at this point.

Question: *Will the team re-run the meta-analysis with actual post treatment data once the treatments are applied?*

So far only the Meadow Valley site has had treatments applied and this data was used. The team would like to be able to do post treatment analysis in the other locations as well that were included in this study.

Fire and Forest Ecosystem Health Team - Dr. Scott Stephens of UC Berkeley gave an overview of the fire modeling and forest health research and findings. This team has completed pre-treatment modeling of the Last Chance Project and found that the planned treatments were effective in reducing conditional burn probabilities in the area. They ran the models with different tree diameter removals and found that increasing the maximum diameter limit for removal did not result in much of a change in the conditional burn probability for surface fires. Scott believes that most of the fire risk lies in the ladder and surface fuels.

The forest health approach they are using quantifies tree health using tree ring growth. This approach is being used because it is quantifiable and testable. John Battles prepared a forest health primer that explains the SNAMP approach and other ways that forest health can be assessed (<http://snamp.cnr.berkeley.edu/documents/285/>). They are working on a more inclusive measure of forest health for SNAMP, by integrating other SNAMP team research into the forest health assessment.

Question: *Do the fire modeling results presented show that by the year 2037 the risk of fire would be the same with or without treatment now?*

Yes, the model shows that treatments are effective at reducing the risk of fire for 20-25 years.

Question: *Do the models used include information on climate change?*

No, but the team is considering including it for the southern site (Sugar Pine fire modeling).

Question: *Does the model take into account tree growth overtime?*

Yes.

Water Quality and Quantity Team - Dr. Roger Bales of UC Merced gave an overview of the Water Team research, its status, and preliminary findings. The Water Team research design has - modified its sediment sampling method. They have decided not to install sediment basins because of recent findings that the basins in the Kings River Experimental Watershed did not capture as much of the sediment as expected. They will be using in stream scour pans instead. They also have decided that they need to install stilling wells and weirs instead of relying entirely on pressure transducers to capture all of the high and low flow on the streams. They will use modeling results to try to establish thresholds for changes in water quality and quantity based on kind and area of treatment.

Question: *Please explain more about how you are dealing with the problem of measuring flow when streams dry up in the summer.*

The team is dealing with this by digging down to bedrock when building the weir. This brings the water to the surface and allows them to accurately measure the flow during low flow periods. They are also measuring soil moisture and adding more pressure transducers to try to capture all of the water being transported by the streams during the entire year.

Public Participation Team - Dr. Maggi Kelly gave an overview of the Public Participation Team's work, including the public outreach activities, the website, and the public participation research.

***Question:** Do you have a feel for the demographics of participants, and how demographics might affect public participation?*

PPT has been collecting some information, including website records data on where people are located that use the website. Demographic information about participation has also been collected but not yet analyzed, though team members agreed this was a good idea.

Spatial Team - Dr. Maggi Kelly presented the work of the Spatial Team, and gave an overview of parameters have been assessed using the LiDAR data and those in progress. The team is looking for additional funding sources to acquire LiDAR data for the larger SNAMP wildlife study areas, since the vegetation structure data that LiDAR can provide is very valuable to wildlife studies.

***Question:** What is the cost was per unit acre for the LiDAR flights?*

This is a difficult number to calculate since there is a significant upfront cost for the flight from Florida, and the significant data processing and analysis costs. The team spent about \$70,000 to acquire the images on one of the sites, which was a heavily negotiated price. This does not include analysis costs which are substantial. The larger the area, the less it costs per unit area because of the fixed rate to get the airplane to the study site.

***Question:** Is field data always necessary to ground truth LiDAR data?*

Generally, yes. The amount of field data necessary depends on the complexity of the vegetation in the area. The only exception to the field data requirement is in the development of DEMs from LiDAR data. There may also be a need to rethink how we collect the field data in the future to tailor it to LiDAR data needs.

***Question:** How well does LiDAR data measure vegetation structure if there are only four points returned per pulse?*

Four-pulse return LiDAR actually returns many more than four points per tree. The laser sends out around 100,000 pulses per second so actually hits each tree many times, with each pulse giving four returns on each line. This gives a very detailed picture of each tree.

Pacific Fisher Team - Dr. Rick Sweitzer gave an overview of the questions of the fisher study and its current findings.

***Question:** Have you separated out the adult survival from that of juveniles?*

Not yet, we need additional years of data on more juveniles before we will have a large enough sample to examine potential age differences in survival.

Question: *Has the Fisher Team coordinated with CalTrans about the road kill mortalities they have found along Highway 41?*

They have not talked to CalTrans, but the section of the road where the road kills have occurred has a 35 mph speed limit that people do not obey. The road kills are mostly happening at night, when it is difficult to see the animals on winding roads. They are hoping that the population can overcome the road kill mortalities.

Question: *Are the dogs in the fisher area pets, and is there evidence of dogs killing fishers?*

From the photos captured by the cameras, the dogs in the area appear to be pets and not feral. There has been no evidence so far of dogs killing fishers, just transmittance of the canine distemper disease. Outcomes of two necropsies of killed fisher that will be used to identify the predators involved are pending.

Spotted Owl Team - Dr. Rocky Gutierrez gave an overview of the Owl Team research; explained why the Owl Team study area includes sections of the Eldorado National Forest; and gave an overview of the findings from the Canopy Reduction Study in the Eldorado National Forest.

Question: *What matrix of vegetation types are required by owl?*

The owl team has a paper coming out on that soon.

Question: *What size of older trees or characteristics of older trees are important to spotted owls and can LiDAR be used to help us understand this?*

The Spatial Team is working on that question but the spatial data will probably not be able to get to everything. Rocky explained that they think big trees are important to owls at least in part because owls have a narrow thermal regulatory zone and that the trees help reduce temperatures in forest stands.

III. BREAK OUT SESSIONS: Each science team hosted a tabling session for all those in attendance who wanted to ask questions or give suggestions about SNAMP research. Notes of each session are listed below.

Public Participation Team session: *UCST - Maggi Kelley, Shasta Ferranto*
Facilitator - Adriana Sulak

Members of the Public Participation Team asked those at the table about the usefulness of the SNAMP website. They held a discussion around these questions:

- 1) Does the web play a critical role in adaptive management or is it redundant with public meetings?
- 2) What components of SNAMP can be used elsewhere? What is not needed?

1) Does the web play a critical role in adaptive management? The discussions concluded that the website is not redundant. The website allows for additional benefits that other forms of in person outreach do not. This includes archiving of SNAMP documents, advertising of upcoming events, information tracking, and transparency. SNAMP can post some items that the USFS can not on their site. It also allows users to see what others are thinking. The posted SNAMP glossary is useful. The

website should become more valuable in the future as more -people become tech savvy. Ways to increase use of the website would be to stop sending attachments so users have to retrieve documents from the website.

Question: *What are the demographic characteristics of participants reached by the web and other methods? It's important to track this to see who is missing and how to reach them.*

Currently, demographic information is not collected about SNAMP site users. This would have to be volunteered by users. This type of information is easier to collect at meetings or in-person events. Information about the location of users is collected.

Question: *Are other social media tools being used by SNAMP to reach a diverse audience?*

Current methods of involvement include webcasting meetings, providing a variety of locations for meetings, and having a Facebook page. The Facebook page has not been that active for SNAMP.

Suggestions on how to increase participation in SNAMP:

- Post videos on You Tube, especially about topics like the Pacific Fisher, Spotted Owl, activities with youth, or treatments when they occur. Coordinate this with the USFS.
- Continue to post maps and graphs. Add more detail on the work of different teams.
- Watch which subjects are viewed most on the web and track web interest by subject over time.
- To increase diverse participation, attend local meetings with local groups to talk about SNAMP (this is already done) and work with teachers to reach diverse students.

Suggestions on how best to share SNAMP research:

- Provide different formats for different audiences.
- Post summaries of journal articles and focus areas.
- Consider doing evaluations of written SNAMP products, like the newsletters to see if the science is understandable.
- Get back feedback on the SNAMP evaluation table.
- Do more to communicate the SNAMP process, and how - research data informs the management process.

2) What components of SNAMP can be used elsewhere? What is not needed? Much of what SNAMP does with its website may not be applicable to the US Forest Service since they have stricter rules about what can be posted.

Water Team Session UCST - Roger Bales, Martha Conklin, Sarah Martin, Phil Saska

Facilitator - Ann Huber

(Non-UCST participants to this session were not recorded.)

All of the SNAMP Water Team's meteorological station data is available online at CDEC (California Data Exchange Center).

Question: *Have you considered using piezometers for measuring subsurface water levels?*

No, as piezometers would not directly measure the total amount of water in the channel.

Question: *Has the Distributed Hydrology Soil Vegetation Model (DHSVM) code improved since it was first developed 10 years ago?*

DHSVM has evolved considerably over the years since it was first developed. The team did not know specifically of problems with earlier versions that may have been improved.

Question: *How are you measuring soil moisture?*

With instruments placed at two depths to cover the tree root zone, on both hill slopes of the streams, and under tree species that represent the vegetation in the area.

Question: *Are the methods you are using standard approaches to measuring water quality and quantity?*

They are standard methods, except the distributive measurements of soil moisture and snow pingers are innovative aspects of the study.

Question: *Will you be testing riparian manipulations?*

No, we are only measuring what is in the USFS fuel reduction plans. The USFS is conducting the treatments. There are restrictions on how close to the stream they can treat. However, Carolyn Huntsaker's research in the Kings River Experimental Watershed may be looking at riparian manipulations and effects on streams.

Question: *Are you aware of the research on forest thinning in other areas, like Blodgett Experimental Forest?*

Yes, Scott Stephens and John Battles are heavily involved in the research at Blodgett. All researchers on the SNAMP study incorporate existing knowledge to their research, and it their academic duty to stay abreast of other research that is related to their field of study.

Question: *Are you looking at climate change?*

No, climate change is not part of the SNAMP study design. However, the study sites were specifically chosen at the snow melt border to capture changes in peak snow melt timing and amount. Roger and Martha are interested in the question of climate change, and are working on expanding their monitoring sites to test this question for another project working with the California Department of Water Resources.

Question: *Can you expand on hypotheses you have about climate change?*

Depending on the treatment strategy, treatments might lead to higher base flow, which could possibly compensate for a climate-induced reduction in base flow because of earlier snow melt.

Question: *How will you integrate your work with the forest health team?*

Soil moisture is tied to tree health so this work will be integrated as the project evolves.

Ideas for public outreach with the Water Team

- Extend the knowledge from this study to private landowners by collaborating with the local Resource Conservation Districts (RCDs).

- Contact California or Sierra Nevada-wide conservation organizations to include SNAMP water research in a symposium where research and practitioners can collaborate on water research questions using east west transects.
- Consider this topic for a future Sierra Nevada Conservancy conference. Other organizations suggested were Sierra Nevada Alliance, the Central Sierra Environmental Resource Center.

Other Next Steps Identified:

- Ann Huber (UCST) will send Tony Rodarte (USFS Last Chance Project) the shapefile of Bear Trap catchment. Tony had requested this so he was clear on which area is the Water Team treatment catchment in the Last Chance Project.
- Phil Saksa (UCST) will contact Tony Rodarte to coordinate with him on Tony's offer to fell hazard trees around meteorological stations.

Owl Team Session: *UCST - Rocky Gutierrez*
Facilitator - Kim Ingram

Question: *How is the owl team accounting for the owls on the Eldorado study site?*

The Eldorado study area consists of two components: a density study area and a regional study area. The density study area incorporates a blanket survey of all owls within the study area. The regional study area, which includes a much broader area, only allows for surveys of owls detected on individual territories.

Question: *Implementation of fuels treatments is expected to occur in the Eldorado/Georgetown district in 2011. How is the owl team preparing for this?*

The owl team is keeping track of all sales within the study area on both public and private lands, and shape files of treatment areas have been shared. Accounting for the results of differing treatments is handled through modeling of the treatment as a covariate.

Question: *Are SPLATs uniform in treatment results?*

SPLAT's do not have to be uniform in treatment. However, as you increase the number of types of treatments (logging vs. mastication vs. a combination thereof) you add confounding treatment effects which makes it harder to sort out responses.

Question: *LiDAR will be used to map the overall structure of the forest, but are there any other methods that can/will be used?*

LiDAR produces the best results in showing the overall structure of the forest. Field sampling of vegetation is one method to monitor changes in forest structures as a result of SPLAT's, which is being done.

- *There is recognition that there must be better communication between SNAMP and the USFS in regard to plot center markings as well as consistency of method.*

Question: *Because of canopy and small sample size concerns, can SNAMP come up with good results?*

We are confident in our estimates of survival and occupancy because of small, confidence limits. However, with respect to reproduction, we know that there are some factors such as weather and

prey that are correlated with reproduction and may operate independently of changes in habitat. We knew small sample size would be a problem on the SNAMP study area because of the results of the telemetry study, which is the reason we expanded the SNAMP study area to include the Eldorado area study birds in the experimental design. Including the Eldorado birds increases the sample size greatly and likely should reveal an effect of SPLATs if one exists.

Question: *Regarding the odd/even (or high/low) years of owl reproduction, is this an effect of prey availability and is there any way to predict a high or low year?*

There are many factors that can contribute to owl reproduction, prey being just one factor. There is no prey estimate study occurring at this time (it is very expensive). However, models do show these odd/even patterns in some populations over the course of many years. We do not know why these patterns occur, but it could be related to prey dynamics (and presumably the prey's use of a resource such as acorns) or it could be an effect of cost of reproduction (birds reproducing in one year are less likely to nest in the next year), but the answer to the question is unknown at this time.

Question: *Looking at oaks in relationship to owls...are results site-specific or regional i.e. Lassen vs. Last Chance vs. Kings River?*

It is possibly site-specific. One would have to know how the oak stands were identified in the past (what is their map base), what types of oaks there are, what size are the stands, etc. One surprise finding is that the area of oak forest in a territory is correlated with lower owl occupancy and survival. But we are not sure if this result is an artifact of the issues identified above or a real effect of oaks. This finding was contrary to a priori prediction. There are also differing opinions across the Sierra Nevada regarding the relative importance of oaks to owls.

Question: *Does the viability of the spotted owl really depend on one pair?*

The dynamics of a population really does not depend on one pair. However, as the total number of pairs decline, each pair becomes incrementally more important. This is why one has to evaluate cumulative effects (or the cumulative loss of owls) over the total range.

Question: *What is the ideal population size and what is needed to delist a species?*

We cannot say what an 'ideal' population size is. To delist a species, the criteria for listing must be re-evaluated to assess whether the original threats have been removed or have abated and the population has stabilized or is increasing.

Question: *Is the current approach to Protected Activity Areas (PACs) good?*

Yes. PACs are based on protecting the habitat surrounding nest sites. PACs were a construct of the California Spotted Owl Technical Assessment Team (CASPO) effort in the early 1990s where the scientists decided that a 'large preserve' conservation strategy, like that for the northern spotted owl, was not necessary because there were no obvious gaps in population densities or distribution as there was in the range for the northern spotted owl. Still, the premise for PACs remains valid, which is that we are still uncertain about the effects of logging on owls and PACs provide a degree of habitat protection in the face of this uncertainty.

Question: *Regarding canopy closure guidelines...what is the importance of the understory?*

The owl team is measuring the understory structure and how owls respond to the differences in fuels treatments. According to the telemetry study, canopy did not change that much, but the

understory did change dramatically. Still, we don't yet know the actual effect from understory changes.

Question: *Are there any studies on the return of owls to burned areas?*

There are a few studies of owls following non-catastrophic fires. However, in a recent telemetry study of owl use of areas experiencing wildfire it was shown that owls use areas affected by fire. However, it was not known if the owls that were radio marked in this study were the same owls using these sites before the fire or if they were new owls that colonized the site after the fire. Another study showed that, in the short term, survival rates of owls that experienced low to moderate severity fires in their territories were similar to owls not experiencing fires, but we are unaware of any published studies about the long-term effects of fire on owls.

- *There was a suggestion to look at the Moonlight Fire, as there may be some pre-fire data available.*

Question: *Are owls back on logged areas in the Eldorado?*

The general survey of the density study area has detected some owls still within territories that have experienced logging but there is no upcoming study proposed to explicitly examine whether owls use previously logged sites on the Eldorado (other than for nesting and roosting) because it would require radio telemetry to determine the use of logged areas by owls. Such a study would also have a serious design flaw because there would be no 'pre-treatment' data on owl habitat use before logging.

Fisher Team Session: *UCST - Rick Sweitzer*

Facilitator - Ann Lombardo

Attending: Sue Britting (Sierra Forest Legacy), Ron Eng (CDFA), Pat Flebbe (USFS), Pam Flick (Defenders of Wildlife), Cay Goode (USFWS), Patti Krueger (USFS), Kim Squires (USFWS), Peter Stine (USFS), Mike Chapel (USFS)

Question: *How are the new GPS collars working?*

The team currently has three Telemetry Solutions mini-GPS collars deployed in the fisher study area encompassing the Sugar Pine treatments. The Kings River crew is also testing the same type of GPS radio-collar. Locations data stored in memory on the GPS collars can be downloaded by plane when above the location of the collared fisher. The GPS collars have three antennas: a VHF (very high frequency), a UHF (ultra high frequency) and a GPS. The UCST fisher team has experienced some trouble with the mini-GPS collars including complete failure at acquiring/ recording GPS locations. We are working with the manufacturer to improve the devices so they are more reliable.

In general, the GPS radio-collars introduce some logistical constraints when they are deployed. The two batteries in the GPS collars weigh more than the single battery in a standard VHF radio-collar. The units cost more (\$2700/unit compared to \$310/unit). And the battery life is much shorter (3-6 months compared to 18-24 months), which means these collars must be recovered from the animals, new batteries put in, and the collars redeployed much more often. Also, the GPS antenna must link to a minimum of three satellites to calculate and record a position, which is a problem when the animals are in areas with high canopy closure, in deep canyons, or in resting/ den cavities in trees. The ultimate result is that the rate at which the collars record locations is low and likely biased to when the animals are in relatively open areas.

Question: *What do we know at this point about limiting factors for fisher? What are human causes for mortality versus naturally occurring causes?*

The three most common causes of mortality for fishers in our study area have been predation, road kills and disease (in that order). Predation should be considered a natural cause of mortality, whereas road kills and disease are associated with humans/human activities. All of the road kills we are aware of have occurred along Hwy 41, including 2 adult males, 2 adult females (lactating at the time of death), and one juvenile male. The nursing females may have been out foraging more often than normal because of the increased nutritional demands of lactation, placing them at somewhat higher risk. Vehicle traffic along Hwy 41 is heavy and, because of their dark coloration, fishers are very difficult to see and avoid, especially at night when they are most active. With only 5 known road kill events to date, there is no readily discernible pattern in the areas where fishers are dying on roads that might allow a tunnel/underpass to be built.

Other issues related to road kill events that we may be able to evaluate in the future are whether there are long stretches of road where car speeds increase, and whether areas where roads bisect good quality fisher habitat are problem areas. These factors might identify high priority areas for signage. It is not clear how much road kill information is provided to Yosemite National Park visitors or how much signs about the issue have been posted. Steve Thompson (Yosemite National Park wildlife biologist) might be able to help with these questions.

Question: *How is the team interpreting the distemper death?*

There have been three fisher deaths linked to canine distemper: the two distemper deaths that occurred during spring 2009 were likely associated with a localized disease epizootic (a gray fox also died from distemper close to where the two fishers died). There may be a vaccine that could be given to fisher in the future. Certainly the public could be better informed about the issue.

Question: *Is there a vaccine for toxoplasmosis?*

There is no vaccine for this protozoan parasite (*Toxoplasma gondii*). The organism is relatively more common among felids (cats) than other carnivores, and can be transmitted to rodents/squirrels (fisher prey) when they sniff or come into contact with urine/feces from felids.

Question: *Do we know the chemical persistence of the rodenticide that killed the fisher? This might help understand the time and distance issues related to its use.*

Laboratory tests confirmed that the rodenticide that one male fisher was exposed to and died from was a long-acting anticoagulant-type rodenticide. The fisher was secondarily exposed to the rodenticide, meaning it consumed a squirrel or other rodent that had consumed the rodenticide. Given the large area over which male fishers move, it would be very difficult to determine which block of private land or private residence in the forest vicinity was using rodenticides to control rodents.

Question: *Is the mountain lion protected??*

Mountain lions in California are a specially protected species by voter mandate. There is no hunting season for mountain lions in California. Nevertheless, mountain lions that kill livestock or threaten human safety can be legally removed/killed by depredation permit

Question: *Do we see any pattern to the predation events i.e. habitat similarities? Will the openness of the terrain under treatments serve to expose the fisher more to predation?*

No pattern has been detected yet, but the habitat question will be monitored after the treatment.

Question: *Are you making an effort to coordinate and standardize your protocols with the other groups doing fisher research so that we can get better meta-analysis results in the end?*

Yes, the SNAMP Fisher Team is in regular communication with the Kings River Fisher Study and Rick Truex's USFS track plate research. The density of fishers in the SNAMP study area is about half the density of fishers in the Kings River/Dinkey Creek area, which means that SNAMP has to cover a larger area to monitor the same number of collared fisher. Also, the Sugar Pine area only supports 3 or 4 fisher and would be too small of an area for a viable study.

Question: *Are you doing any genetic studies?*

Yes, we are using DNA analyses to confirm maternity for juvenile fishers in the study area. Beginning this year, we will also be using hair snares to learn more about the overall genetics of fishers residing in the study area.

Question: *Is there any age or sex difference in mortalities?*

The most surprising result on mortality has been that most of the deaths are occurring during the spring period (March to May), and not during winter (as expected). Juvenile survival is lower than adult survival (this is not at all surprising), but there is no discernible pattern for either sex being more at risk to mortality than the other. Additional details on age- and sex-specific patterns in mortality will become available as the research continues.

Question: *Do you need more LiDAR for the fisher study?*

Yes, definitely. The current LiDAR coverage includes only about 10-15% of the SNAMP Fisher Study area. Peter Stine (Research Program Manager, USFS Pacific Southwest Research Station) indicated that he would like to obtain LiDAR coverage for the Kings River Fisher Study Area as well. The one meter resolution data that SNAMP has collected is at a much higher resolution than that required by the fisher team. A coarser resolution would cost less and costs could be spread around to others like the Bureau of Land Management, tribes, private land owners, etc. Forest carbon monitoring efforts might support LiDAR acquisition along with some of the money going towards climate change issues. SNAMP and the Kings River crew should consider writing a proposal for LiDAR needs.

Question: *How does the CBI model distinguish habitat quality?*

SNAMP has found that the CBI model is fairly accurate but it is largely a biomass map. Hopefully LiDAR will help in further defining habitat quality.

Question: *Is there a sex preference for lower quality habitat? Perhaps males use it more than females who prefer the high quality areas?*

Our preliminary data analyses have not examined this question. Males do have much larger home ranges than females, but this is more related to differences in reproductive strategies and behavior between males and females than habitat issues. One participant suggested that it is important to note that there is a difference between acute and long term conclusions: immediately after the treatments versus 2, 3, and 4 years after the treatments.

Fire and Forest Health Session UCST - John Battles, Scott Stephens, Gary Roller, Dave Saah, Danny Fry

Facilitator - Susie Kocher

In attendance: Sue Britting (SFL), Kallie Crews (USFS), Don Erringto (USFS), Chris Fischer (USFS), Julie Griffith-Flatter (SNC), Addie Jacobsen (Ebbett's Pass Forest Watch), Kelly Pavlick (USFS), Greg Schwab (Georgetown Fire), Kara Scott (USFS), Dana Walsh (USFS)

Question: Can you explain more about Brandon Collins' (member of SNAMP UC Science Team and Ecologist at USFS Pacific Southwest Research Station) finding that a diameter limit on trees does not change the effectiveness of conditional burn probability?

The canopy changes made for the modeling were made on a sliding scale, with more trees removed when canopy reduction was larger. The modeling, which was very careful and detailed, found there was no difference in effectiveness in treatments where the largest trees removed were 12, 16 or 20 inches. Also, activity fuels remained constant in the different scenarios, even though some treatment options, such as tractor piling and burning may not be physically feasible if only trees up to 12 inches in diameter are removed. The characterization of post-treatment conditions is an interpretation by the researchers of the project prescriptions. It might be instructive to go back after the actual treatments and see how close their interpretation was.

In addition, the finding applies to surface fire only. There was some concern expressed that this finding of no difference in diameter limits for surface fires was being applied to EAs and EISs for all types of fires. To understand the effect on crown fire, a probabilistic model needs to be developed. This is technically very challenging, but Brandon is working on this. One place that has been suggested for testing this new model was the Cone Fire at Blacks Mountain Experimental Forest. This site had experienced a treatment of 10,000 acres. SNAMP researchers have recently been talking to researchers at Blacks about this. However, they need to make sure the new method they are coming up with works before trying it out in many locations.

Question: Will you be assessing conditional burn probability outside the treatment area?

Yes, the graphic shown includes results for outside the treatment area. Areas within 500 meters of a treatment showed a reduction in burn probability because of the shadow effect from the treatments.

Question: Do you know why some treatments, like Last Chance, were more effective than others? Was it a result of different planning processes for each project? How did each USFS district decide where to treat?

Researchers have not yet connected with project planning staff but were interested in how different projects were planned. One determining factor to success is fire weather patterns. Researchers put together a lot of weather information for modeling, but do not know whether the USFS districts did a similar exercise. One useful product of the research effort could be identifying which particular planning process led to the best outcome. This could be done through some kind of decision tree.

Question: What kind of activity fuels treatment is being proposed? Is it the same for all projects?

A range of activity fuels treatments are proposed for each, including tractor piling and burning, mastication, and burning only, depending on site conditions. Some material currently coming off the Tahoe National Forest is being sold as biomass, especially in areas closest to Interstate 80.

Question: *For your forest health research, will you be able to interpret results to the correct scale? Or is there a possibility that the mortality effects you find will be overwhelmed by the patterns in the larger area (as water findings have scale effects according to the size of the watershed?)*

Researchers are confident they will be able to make inferences at the appropriate scale. One way they are doing this is by choosing very specific size classes of trees to core so they can scale up and down accurately. The results will be interpretable at the stand scale so that comparisons of the mortality predictions based on Stand Density Index (used by the USFS in management) can be made.

Question: *How were your control areas chosen? If they had little management in the past, aren't they more likely to be steep slopes or different forest types?*

Yes, the control areas are less managed and have more old growth than the treatment areas. However, they are all mixed conifers and researchers feel confident they will be able to compare them.

Question: *For the forest health work, are you trying to look at the effects of insects and disease? Are you trying to quantify these impacts?*

Not directly. The team will be looking at health overall as indicated by tree ring growth and size over time. Field crews did note evidence of insects or other damage in the 200 plots measured, but it can be very difficult to identify exactly what killed a tree.

Question: *How do you work with state and local government to disseminate the information? Results could help the Board of Forestry as they develop the modified Timber Harvest Plan for fuel reduction, and local groups like RCDs and Fire Safe Councils so that science in place as a foundation and local discussions are not so polarized.*

SNAMP has been hosting outreach events and produces newsletters about the teams. Each team has also had field trips or workshops with many locals attending. Overall, how to get out fire science information is a problem that the researchers are thinking about. One suggestion made was to think about producing two page briefs like those disseminated by the USGS's Western Ecological Research Center.

Spatial Team Session: *UCST - Qinghua Guo, Marek Jakubowski*

Facilitator - Kim Rodrigues

In attendance: Peter Stine (USFS PSW), Rhianna Lee, Ron Eng, Barry Boulton

- 1) Vegetation detection
- 2) How to define different types of wildlife habitats. Which scales matter: individual tree vs. landscape
- 3) LiDAR detects edges of different land cover types. Ecotone: corridor. Forest health
- 4) Data are available: snamp.ucmerced.edu

Additional:

- 1) LiDAR acquisition together with CZO LiDAR acquisitions.
- 2) LAI (Leaf Area Index)– tree species
- 3) Multiaged Stocking Assessment Model (MASAM) mixed conifer

IV. SESSION SYNTHESIS AND EVALUATION: After the breakout session, facilitators for each group reported the main discussion themes to the whole group. The issues that were discussed will be used by the UC Science Team to guide further public involvement opportunities in the next year.

Tom Contreras, the acting Deputy Regional Forester filling in for Beth Pendleton said he was very impressed by the mutual learning occurring at the meeting and the atmosphere of respect between scientists and managers in evidence. He challenged participants to be ambassadors for natural resources to members of the general public who are not involved in these issues.

Next steps:

- LiDAR acquisition
- Forest Integration Team meeting
- Modeling workshop that emphasizes how models are used to guide management
- Chris Fischer the USFS District Ranger on the Last Chance Project said he would be happy to work with SNAMP to arrange field trips during project implementation