UC Science Team updates for SNAMP 2013 Fourth Quarter (Q4)
Main project findings and work accomplished since annual report on October 17, 2013
~January 23, 2014~

Project Integration and Management (PIM) Team

Quarterly financial update

Based on projections for the final quarter, the UC Science Team was on budget for Year 7, 2013. Full budget information for 2013 will be provided in the 2014 Q1 update in April.

Integration

In addition to the financial, administrative, and logistical support that PIM provides to the UCST, we also are responsible for developing and implementing the integration framework that the UCST will use to produce the final integrated assessment in 2014. During the 4th quarter of 2013, we finalized the integration framework and the 2014 integration timeline.

In addition, we developed a proposal for an oral session on adaptive management at the Ecological Society of America (ESA) annual meeting in Sacramento in August 2014. The session has been selected by the ESA and will include speakers from the UCST, the MOUP, and stakeholder groups.

UCST Coordination

PIM continues to plan and budget for successful project completion in 2014.

- Administration: assisting teams with planning and budget reporting; maintaining SNAMP publications list; maintaining bSpace archive and secondary UCST archive
- Logistics: coordinating monthly UCST conference calls and other interteam communication/meetings; producing notes for monthly UCST conference calls
- Keeping track of adherence to SNAMP and science team agreements (e.g., neutrality, data-sharing agreements)
- Helped organize SNAMP Annual meeting in October
- Participated in fisher team webinar in October
- Keeping track of UCST adherence to integration timeline

- Submitted proposal to ESA for oral session on adaptive management
- Coordinated UCST response to request for university publication article on SNAMP

Communication with MOU Partners (MOUP) and stakeholders

- Coordinated UCST production of 2013 SNAMP Annual report
- Coordinated with MOUP on SNAMP Annual meeting planning during federal government shut down
- Gave presentation on SNAMP integration process at Annual meeting
- Helped PPT produce notes for Annual meeting
- Helping organize January MOUP 2013 Q4 conference call
- Coordinating UCST team updates and agenda development for MOUP 2013 Q4 call
- Helped coordinate potential FFEH team interview regarding SNAMP and Last Chance site by Sacramento television station
- With PPT, wrote Integration newsletter that will be available in early 2014
- Communicated with MOUP regarding Owl team contractual report to California Department of Fish and Wildlife
- Communicated with MOUP regarding recently published UCST scientific publications
- Communicated with MOUP and stakeholders regarding participation in ESA oral session on adaptive management
- Coordinated UCST response to stakeholder request for information

California Spotted Owl Team

Worked on during October-December, 2013:

- Owl surveys: Completed data entry and validation from 2013 field season, shared owl survey data on the SNAMP web server (https://snamp.ucmerced.edu/), and submitted required reports with USFS and California Department of Fish and Wildlife.

- Retrospective analysis: Completed analysis for effects of habitat change, timber harvest, and wildfire on owl demographic rates (reproduction, survival and occupancy). Manuscript is in review at *Ecological Applications*.

- A draft report of the retrospective analysis was submitted to California Department of Fish and Wildlife as a requirement to a grant we received from them.

- Ricka Stoelting's (one of Zach Peery's PhD students) manuscript on spotted owl reproduction cycle and the cost of reproduction is in review at *Evolutionary Ecology*.

Current and future work:

- Retrospective analysis: Interpret results from analysis and finish write-up for final report.

- Fire risk collaboration with FFEH: Doug Tempel and Matt Reetz are currently doing preliminary work using fire modeling output from the Collins et al. (2011) *Forest Science* paper. A conference call between the FFEH Team and the Owl Team is being scheduled to discuss our next steps.

- We are currently hiring for the 2014 field season for the Eldorado demography project.

Fire and Forest Ecosystem Health (FFEH) Team

4Q 2013 Activities:

- The FFEH team is manipulating and error-checking the entire set of post-treatment forest inventory plots from both sites. This is in preparation for using the plot data to develop forest structure maps for landscape-level fire behavior simulations, and to inform the development of vegetation maps that will be used to project forest change for 30 years.

- We continue to work with the Spatial Team to develop the landscape vegetation maps for both sites. These maps are important for assigning multiple forest structure variables (canopy cover, tree density, fuel models, etc.) to stand polygons. Developing maps for pre- and post-treatment conditions has been challenging. While the vegetation groups developed through our analyses have identified forest types with distinct differences, many factors including complications with different conditions associated with imagery and lidar acquisition, and the ability to identify forest changes due to growth vs. treatments inhibit the development of comparable maps.

- We are preparing a manuscript with the Spatial Team examining the effects of measurement error associated with lidar-derived forest structure maps on simulated fire behavior. Over 800 hours of fire behavior simulations were performed with the 101 versions (best-fit map with measurement error randomly assigned to each raster pixel) of both canopy height and canopy base height maps. We hope to submit the manuscript to a journal within the next month or so.

Spatial Team

Update

Lidar data have been flown for the southern site and re-flown for the part of the northern site; the new lidar data are discrete return, waveform and hyperspectral imagery for the northern site. We have received the discrete and waveform lidar for both sites (total: about 2T byte space).

Analysis:

The UC Berkeley Spatial team is focusing on an uncertainty analysis of lidar data used for forest modeling (FARSITE). This is in collaboration with the FFEH team.

The UC Merced Spatial team has been actively working on the following:

1. With FFEH, classifying the vegetation classes for both sites at the plot level based on both the lidar and high resolution aerial images.

2. With the fisher team, modeling fisher habitat using environmental niche models.

3. Communicating actively with NCALM re: reflying the northern site.

4. Extracting vegetation parameters from the discrete and waveform lidar data for both sites.

5. UCM Spatial is actively working on modifying the SNAMP data server to meet data sharing needs.

Presentations/Workshops:

Guo, Q. Simulating forest landscape: a lidar approach. 13th International Conference on LiDAR Applications for Assessing Forest Ecosystems, Beijing. October 9-11, 2013.

Publications:

Published:
Jakubowski, MK, L Wenkai, Q Guo, and M Kelly. 2013. Delineating individual trees from lidar data: a comparison of vector- and raster-based segmentation approaches. *Remote Sensing* 5, 4163-4186; doi:10.3390/rs5094163.

Jakubowski, M. K., Q. Guo, B. Collins, S. Stephens, and M. Kelly. 2013. Predicting surface fuel models and fuel metrics using lidar and CIR imagery in a dense, mountainous forest. *Photogrammetric Engineering and Remote Sensing* 79(1):37-49.

New or In Process:
Tao et al. Using volume metrics calculated from airborne Lidar for aboveground biomass estimation: a comparative assessment. In review: *Agriculture and Forest Management*.

Di Tommasso et al. Uncertainty analysis of Simulated Fire Behavior in a Sierran Mixed Conifer Forest. To be submitted to *Forest Ecology and Management*.

Li et al. Evaluation of satellite derived metrics for forest aboveground biomass estimation with airborne Lidar. To be submitted to *Forest Ecology and Management*.

Public Participation Team (PPT)

Website

- Maintained SNAMP website.
- Web updates sent out to SNAMP membership.
- Continued work on three manuscripts related to the use of the web for public participation, based on SNAMP website.

Assessment

- Archiving SNAMP materials – on-going.
- Analysis of online survey, interview, and observational data – on-going.
- Program evaluation matrix refinement – on-going.
- One paper in progress studying the effect of social network on participation and information flow in adaptive management using social network analysis and content analysis methods.
- SNAMP review article accepted for peer review in *California Agriculture*, January-March 2015 edition, celebrating its centennial.
- 22 final interviews completed, interviewing to be continued through the winter.

Outreach

Both sites:
- Refined the training modules developed to train managers and stakeholders in Collaborative Adaptive Management (CAM) and facilitation based on outcomes of the workshops and assembled in a draft workbook/pdf.
- Assisted in the preparation and coordination of the SNAMP Annual meeting, October 29, 2013
- Presented public participation schedule for last year of SNAMP to stakeholders at the October Annual meeting.
Described SNAMP outreach and facilitation to the new University of California President and her Presidential Advisory Committee, November 19, 2013.
- Held a CAM/facilitation workshop at UC Berkeley for graduate students, December 2, 2013
- Scheduling Integration Team meetings with other teams for spring and summer 2014.

Northern site:
- Published a UC Green blog entitled "Energy from forest products", November 2013.
- Maintained the UC Collaborative Tools site for CAM trainings – on-going.
- Facilitated a session at the Sierra Cascade Dialog meeting on December 12, 2013.
- Holding ongoing discussions with potential participants and preparing for CAM facilitation workshops in Eldorado/Amador/Calaveras/Tuolumne counties to take place in 2014.
- Attended the Southern Sierra Fisher Conservation Strategy public meeting, December 3, 2013.
- Assisted in the write up of a SNAMP science brief for the SNAMP Owl team, December 2013.

Southern site:
- Put on a Collaborative Adaptive Management workshop, October 17, 2013, in Oakhurst, CA.

- Assisted with an article in the Agriculture and Nature Resource Extension Professional's Fall newsletter "UC Cooperative Extension Helps Facilitate Collaboration in Public Forest Management", October 28, 2013.
-Assisted the Yosemite/Sequoia Resource Conservation District in acquiring a $25,000 grant from the Chukchansi tribe for rodenticide clean-up of local illegal marijuana grow sites in the Sierra Nevada National Forest, November 2013.
-Wrote an article for the Yosemite Gateway Partners newsletter - "Chukchansi Tribe Support" about the grant award from the Chukchansi, December 2013.
-Continued outreach to local residents who report fisher sightings.
-Developed three science briefs for recently published SNAMP papers regarding the fisher.

Fisher Team

During the fourth quarter, the SNAMP fisher team completed the conversion to the USFS Pacific Southwest Research Station-led Sugar Pine research project. Additional staff were hired, bringing the field crew to five. A replacement pilot was also hired, providing additional stability in the research effort. While the SNAMP field effort winds down, the Sugar Pine effort will continue for an additional 3 years to provide post-treatment monitoring.

Year 8 camera surveys were initiated, following the protocol developed during the SNAMP effort. Trapping efforts were also initiated, though the unusually warm and dry weather meant that bears remained active (wreaking havoc with baited traps), and fishers appeared hesitant to enter traps. However, toward the end of December trapping success increased, and a total of seven animals, 4 males and 3 females, have been captured and collared to date.

During the final quarter of 2013, necropsies were completed on 14 mortalities collected during 2013. Eleven females and 3 males were necropsied, resulting in 5 documented bobcat predation events, 2 documented mountain lion predation events, and 4 unknown predation events. One female died of infected wounds, while for another male, M41, the cause of death could not be determined. Five of the carcasses had sufficient tissue remaining to test for rodenticide exposure; 4 showed exposure to between 1 and 3 rodenticides. Notably, M41, for whom a cause of death could not be determined, showed the highest exposure rate to the rodenticides brodifacoum and bromadiolone.

Publications released in 2013 utilizing the SNAMP fisher data include:

Thompson, C., R. Sweitzer, M. Gabriel, R. Barrett, and R. Poppenga. 2103. Impacts of rodenticide and insecticide toxicants from marijuana cultivations sites on fisher survival rates in the Sierra National Forest. *Conservation Letters*.

Matthews, S.M., J.M. Higley, J.T. Finn, K.M. Rennie, C.M. Thompson, K.L. Purcell, R.A. Sweitzer, S.L. Haire, P.R. Sievert, and T.K. Fuller. 2013. An evaluation of a weaning index for wild fishers (*Pekania* [*Martes*] *pennanti*) in California. *Journal of Mammalogy* 94:1161-1168.

Manuscripts submitted for publication and currently under review include:

Wengert, G., M. Gabriel, S. Matthews, M. Higley, R. Sweitzer, C. Thompson, K. Purcell, R. Barrett, L. Woods, R. Green, S. Keller, P. Gaffney, M. Jones, and B. Sacks. Intraguild predation on fishers in California: patterns of predation by three larger carnivores. In review at *Journal of Wildlife Management.*

Sweitzer, R.A., C.M. Thompson, K.L. Purcell, R.E. Green, G.M. Wengert, M.W. Gabriel, L.W. Woods, and R.H. Barrett. Survival and causes of mortality for fishers in the Sierra Nevada Forest, California. Submitted. *Journal of Wildlife Management*.

Wengert, G., M. Gabriel, S. Matthews, J.M. Higley, R.A. Sweitzer, C.M. Thompson, K.L. Purcell, R. Barrett, L. Woods, R.E. Green, S. Keller, P. Gaffney, M. Jones, and B. Sacks. Using DNA to Describe and Quantify Interspecific Killing of Fishers in California. Submitted. *Journal of Wildlife Management*.

Water Team

Fourth quarter updates (2013)

Data Analysis
- Collection of water quality and water quantity field data is complete. We are finalizing the QA/QC of the WY 2013 field data, and as data are completed, they will be made available on the SNAMP data sharing website (https://snamp.ucmerced.edu/).

Water Quality Analysis
- A manuscript on stream turbidity showing localized sources of sediment dominate sediment production and that seasonal and event-scale accumulation and depletion cycles govern sediment transport has been submitted for publication.
- Preliminary analysis results on scour pan measured bedload movement as well as work on the watershed scale modeling were presented at the American Geophysical Union Fall Meeting.

Hydrologic Modeling

At the watershed scale, we are working towards the final calibrations for the RHESSys model. Two model developments are needed to complete these calibrations. Currently, we are working to improve the model energy balance to achieve a better representation of snowpack processes with changing vegetation cover and density. We will then input the vegetation map derived from lidar measurements and forest team ground plots to the model, which will complete the pre-treatment model setup.

For the fireshed scale modeling, we have determined a methodology to calibrate models for the ungauged fireshed-scale basins. This method uses models for gauged headwater catchments and larger basins, which include the firesheds, to create the calibration metrics needed for the

firesheds. These larger scale models are The North Fork of the Middle Fork of the American River for the Last Chance sites and the Lewis Fork of the Fresno River for the Sugar Pine sites. Since much of these basins fall outside of the SNAMP study areas, data have been collected and formatted for RHESSys. Currently, we are running these larger basin models to determine the necessary calibration parameters for the fireshed scale models. As with the headwater models, once we have access to vegetation maps for the firesheds, we will then complete the pre-treatment models.