UC Science Team 2010 Annual Report
For MOU Partners

October 19, 2010
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Purpose and Scope of Report

The purpose of this report is to summarize the past year’s work accomplished, findings, and challenges. Updates are also given to the MOU Partners during quarterly conference calls throughout the year, and posted to the SNAMP website for public viewing, at http://snamp.cnr.berkeley.edu/. Research summaries are main highlights only. Each science team also communicates their work at Integration Team meetings, SNAMP field trips and workshops, presentations at scientific conferences, and publications in scientific journals.

Project Integration and Management (John Battles)

1) Overall Goal

Our work is divided into three themes: fostering science integration; managing the SNAMP budget; and serving as a communication hub within the Science Team (UCST) and to the MOUP. Our overarching goal is to ensure that at the end of this project, UCST will deliver SNAMP’s intended result: a multi-resource assessment of US Forest Service land management practices on Water, Wildlife, Fire, Forest Health, and Public Participation on a fireshed scale using an adaptive management framework, innovative research, and stakeholder participation. The work of the Spatial Team is fundamental to fulfilling the science integration and innovative research goals. The Project Integration and Management team works to keep the SNAMP Science Team functional as an integrated whole, building science integration and ensuring that teams will be able to report their findings on a common scale – the fireshed.

2) What Has Been Done – and Learned – in 2010

Nuts and bolts project management

- SNAMP budget, contracts and grants administration
  - The University of California finalized an umbrella contract agreement with the Department of Water Resources that will greatly reduce the administrative burden of issuing contracts.
  - Given the demonstrated public benefit of UC’s role in the SNAMP, the University of California has waived indirect costs for SNAMP grants and contracts. However, UC continues to evaluate each waiver request on a case by case basis.
  - We successfully completed a new cooperative agreement with the USFS that provides Year 5 (2011) funding for SNAMP.
  - We report on team budgets and project their expenses on a quarterly basis and provide invoice details for every reimbursement request.
  - We provided the Sierra Nevada Conservancy the necessary information for their project audit.

- Communication with MOUP
  - Maintained regular communication with MOUP members
  - Reached agreement between UCST and USFS Districts to delay treatments in Water Team treatment catchments for both study sites until 2011.
Coordinated all reports to MOUP and conference calls.
Co-ordinated SNAMP 2010 Annual Meeting on October 21.
UCST reply to Bass Lake Ranger district regarding the request by the district to identify areas for treatment if a third year of treatments were needed.

- Internal UCST communication
  - Led and organized 2-day “All Scientists Meeting” for UCST on September 9-10.
  - Maintained frequent, open communication with all science teams.
  - Led and organized monthly UCST conference calls.
  - Distributed monthly team updates to all science teams (except during months with quarterly or annual reports).
  - Visited teams in the field, attended IT meetings and workshops.
  - Maintained collaborative internal UCST website (bSpace).
  - Check for consistency in funding acknowledgements and SNAMP publication number in SNAMP submitted manuscripts.
  - Served as point of contact to investigate and respond to questions from public stakeholders regarding potential conflicts with the Statement of Neutrality.
  - Maintained up to date USFS treatment unit shapefiles on SNAMP data server for Last Chance and Sugar Pine.

- Overall SNAMP work
  - Summary of SNAMP Key Agreements – Created a chronology of all agreements and shared understandings since the beginning of the project. The main agreements and guiding principles will be posted to the SNAMP website before the end of 2010.
  - Held introductory meeting with the newly formed SNAMP Oversight Committee.
  - Updated the UCST’s Statement of Neutrality description of the SNAMP scope of research to include expanded Owl and Fisher study areas. Coordinated update of study map and associated shapefiles.
  - Data and Information Sharing Discussion – meeting with USFS and UCST to develop an agreed upon policy about SNAMP data, research findings, and management guidelines.
  - Facilitated discussions with UCST and MOUP to add two new PIs to the UCST (Rick Sweitzer on the Fisher Team and Zach Peery on the Owl Team).

Science Integration
We held the second annual “All UCST Scientists” meeting on September 9th and 10th. The overall purpose of the meeting was to bring together the science team members to discuss and build understanding of the science of SNAMP. This year, the theme was a review of the SNAMP research design in light of 3+ years of on-the-ground experience. We began discussion of a revised and detailed research design to reflect our improved understanding of the science. Equally important were the two other goals of the meeting: achieve a working understanding of all SNAMP research to date, and build science integration between teams by identifying specific areas for collaborative research.
The SNAMP Workplan includes the task of conducting meta-replication studies during the project. The concept of meta-replication in SNAMP is to compare results from the SNAMP study sites with other studies in the Sierra that investigate related topics of research. From the outset of SNAMP, the meta-replication work has been a joint effort between the USFS PSW office and the UCST. In 2008 and 2009, Dave Saah led a meta-replication study that compared four sites in the Sierra with different approaches to fire reduction. He reported on those results in the 2009 Annual Report, at the 2009 Annual Meeting, and at an Integration Team meeting in 2010.

This year, we investigated the potential for another meta-replication study to investigate the use of occupancy analysis as an indicator of the rate of change for wildlife populations. We have invited Dr. Perry de Valpine (UCB) to take the lead to compare approaches by SNAMP wildlife teams and other non-SNAMP wildlife studies in the Sierra. This work is currently on hold but we plan to pursue this idea in 2011.

3) Plans for the Rest of 2010 and 2011
We will continue to work towards the goals stated previously (item no.1). In the next year, we will focus on a team-wide evaluation of the overall SNAMP design. We began the discussion on a revised and detailed research design at the All Scientist Meeting in September. Our goal over the next year is to lead a small and committed workgroup of SNAMP scientists to develop an analytical framework for analysis and integration, explain the design and integration plan to SNAMP stakeholders, and draft a manuscript for a peer-reviewed journal.

We will hold another UC Science Team meeting in 2011. We are will pursue the occupancy analysis topic for the next meta-replication study. We will coordinate science integration workshops between teams as needed, and continue to look for ways to standardize common metrics between teams, so they are able to be combined for analysis at a common scale.

4) Integration Efforts in 2010 – Please refer to item no.2.

5) Research Products
Briefing, Executive Associate Dean, Bob Buchanan, College of Natural Resources, January 2010
Briefing, Vice-chancellor for Research Graham Fleming, UC Berkeley, February 2010
Briefing, Resources Secretary Lester Snow, July 14, 2010
Presentation, “Forestry for Lawyers” course, August 23, 2010
Presentation, California Biodiversity Council, October 14, 2010.

6) Current and Near-term Challenges
Intellectually, the current challenge is to make concrete the innovations in research design and integration envisioned in the 2007 research proposal. With 3+ years of data and experience, we can now begin to develop and evaluate the best approaches to meet the goal of “exceptional science relevant to management.”
Programmatically, a challenge is to maintain the partnerships among the agencies, UC science team, and the public as the inevitable changes in leadership occur. SNAMP is built on personal relationships and these relationships need to be rebuilt if the goals of SNAMP are to be achieved.

Financially, funding SNAMP continues to be a challenge. We have been coping with delays and shortfalls but they do constrain our progress. For example, because of past funding delays for the Water Team, the Water Team is behind the other research teams for some of their critical parameters. However, they were able to collect data on their full set of parameters during the last water year, so they now have one year of pre-treatment data. The UCST has requested a one year delay in treatments for the Water Team catchments, so treatments in Water Team study catchments will not begin until 2011. Thus, they are on track to have at least two years of pre-treatment data, as with the other teams.

Please see next pages for SNAMP budget summary tables.
Table 1. Summary of expenditures of the Sierra Nevada Adaptive Management Project for Year 4 from 1/1/10 - 8/31/10. Received amounts reflect actual transfers of funds to the contracting institutions. Balance reflects account balance as of 8/31/10. Encumbered amounts reflect funds already committed to pay salaries (as specified in hiring agreements) and ordered supplies/services. Projected balances are the difference between available funds and encumbered funds. All amounts in USD($).

<table>
<thead>
<tr>
<th>Research Theme</th>
<th>Contracting Institution</th>
<th>Received&lt;sup&gt;1&lt;/sup&gt; 1/1/10&lt;sup&gt;USFS&lt;/sup&gt;</th>
<th>Balance 8/31/10</th>
<th>Encumbered thru 12/31/10</th>
<th>Projected Balance 8/31/10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1/1/10&lt;sup&gt;7/1/10&lt;sup&gt;DWR&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spatial&lt;sup&gt;2&lt;/sup&gt;</td>
<td>UC Berkeley</td>
<td>100,357&lt;sup&gt;3&lt;/sup&gt;</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>UC Merced</td>
<td>92,946</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Fire and Forest</td>
<td>UC Berkeley</td>
<td>159,216</td>
<td>46,273</td>
<td>40,173</td>
<td>6,100</td>
</tr>
<tr>
<td>Health</td>
<td>UC Berkeley</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>UC Merced</td>
<td>271,281</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Wildlife</td>
<td>UC Berkeley (fisher)</td>
<td>490,679</td>
<td>233,217</td>
<td>151,186</td>
<td>82,031</td>
</tr>
<tr>
<td></td>
<td>U Minnesota (owl)&lt;sup&gt;4&lt;/sup&gt;</td>
<td>144,415</td>
<td>?</td>
<td>144,415</td>
<td>0</td>
</tr>
<tr>
<td>Water&lt;sup&gt;2&lt;/sup&gt;</td>
<td>UC Merced</td>
<td>271,281</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Project integration</td>
<td>UC Berkeley</td>
<td>158,792</td>
<td>63,184</td>
<td>51,071</td>
<td>12,113</td>
</tr>
<tr>
<td>Public participation</td>
<td>UC Cooperative Ext&lt;sup&gt;1,5&lt;/sup&gt;</td>
<td>126,188</td>
<td>?</td>
<td>126,188</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>UC Berkeley</td>
<td>87,385</td>
<td>57,822</td>
<td>40,173</td>
<td>17,649</td>
</tr>
<tr>
<td>TOTAL</td>
<td>UC Science Team</td>
<td>1,204,000&lt;sup&gt;(USFS)&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>364,227&lt;sup&gt;(DWR)&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NOTES

1. Spatial and water components are funded by California Department of Water Resources (DWR). This funding arrived in 7/1/10. The US Forest Service (USFS) funding began on 1/1/10.

2. The funding from DWR arrived in 7/1/10 and has an end date of 6/30/11.

3. This allocation does not include the $37,250 provided as bridge funding by the USFS while DWR processed the spatial contracts.

4. We cannot track subaward finances (UC Cooperative Extension and University of Minnesota) as closely as the awards held at UC Berkeley. Invoicing lags by approximately a fiscal quarter.

5. The public participation subcontract with UC Cooperative Extension was from 1 May 09 to 30 April 2010. Thus it is the only USFS award that extends past the calendar year for Year 3. Year 4 started on 1 May 1, 2010 and continues to 30 April 2011.
Table 2. Total year-to-date support of the Sierra Nevada Adaptive Management Project by research theme. Reporting period is from May 2007 through December 2010. USFS = United States Forest Service; DWR = California Department of Water Resources; DFG = California Department of Fish and Game; SWG = State Wildlife Grant from the US Department of Interior Fish and Wildlife Service; SNC = Sierra Nevada Conservancy.

<table>
<thead>
<tr>
<th>Research Theme</th>
<th>Contracting Institution</th>
<th>YTD Funding (Direct)</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial</td>
<td>UC Berkeley</td>
<td>215,893</td>
<td>DWR</td>
</tr>
<tr>
<td></td>
<td>UC Merced</td>
<td>345,814</td>
<td>DWR</td>
</tr>
<tr>
<td>Fire and Forest Health</td>
<td>UC Berkeley</td>
<td>762,942</td>
<td>USFS</td>
</tr>
<tr>
<td>Wildlife</td>
<td>UC Berkeley (fisher)</td>
<td>1,965,021</td>
<td>USFS</td>
</tr>
<tr>
<td></td>
<td>U Minnesota (owl)</td>
<td>538,776</td>
<td>USFS DFG (via SWG)</td>
</tr>
<tr>
<td>Water</td>
<td>UC Merced</td>
<td>709,072</td>
<td>DWR</td>
</tr>
<tr>
<td>Project integration</td>
<td>UC Berkeley</td>
<td>706,106</td>
<td>USFS, SNC</td>
</tr>
<tr>
<td>Public participation</td>
<td>UC Cooperative Ext</td>
<td>490,203</td>
<td>USFS, SNC</td>
</tr>
<tr>
<td></td>
<td>UC Berkeley</td>
<td>347,323</td>
<td>USFS, SNC</td>
</tr>
</tbody>
</table>
Table 3. Details of financial support (direct and indirect) for SNAMP through Year 4 (2010).

<table>
<thead>
<tr>
<th>Direct</th>
<th>Institution</th>
<th>Year-to-date (USD $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Forest Service</td>
<td></td>
<td>4,533,666</td>
</tr>
<tr>
<td>California Dept. of Water Resources</td>
<td></td>
<td>1,233,483</td>
</tr>
<tr>
<td>California Dept. of Fish and Game (via State Wildlife Grant from the USDI Fish and Wildlife Service)</td>
<td></td>
<td>191,000</td>
</tr>
<tr>
<td>Sierra Nevada Conservancy</td>
<td></td>
<td>123,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indirect</th>
<th>Institution</th>
<th>Support</th>
<th>Value (estimate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USFS</td>
<td>Airplane support for fisher research</td>
<td>$1,120,000 (based on 3.5 years of support at $320K/yr)</td>
<td></td>
</tr>
<tr>
<td>University support</td>
<td>Waiver of indirect costs on all SNAMP grants</td>
<td>Indirect rate for field projects = 26% of direct costs; indirect rate for state grants = 25% of direct costs</td>
<td></td>
</tr>
<tr>
<td>Resources Legacy Fund Foundation</td>
<td>Allied grant: “Applied science for Sierra Nevada Forests Adaptive Management.”</td>
<td>$100K to explore implications of climate change on fire, forest structure, and wildlife habitat in the southern Sierra Nevada</td>
<td></td>
</tr>
</tbody>
</table>
1) Overall Goal
One of the central questions of the SNAMP and thus the priority for FFEH is:

**How well do strategically placed area fuel treatments (SPLATs) reduce the fire risk and fire hazard across the entire fireshed?**

In terms of forest health, we have built on the idea that tree survivorship is an essential component of forest health. It is also a parameter that we think we can quantify the impact of landscape treatments at a relevant management scale (i.e., the fireshed). We acknowledge that canopy tree survivorship does not encompass the totality of the forest ecosystem. But at the same time, it is hard to envision classifying any forest as “healthy” with an abundance of dead and dying trees. In short, we are arguing that tree survivorship is a necessary but not sufficient condition of forest health. Determining a sustainable level of tree mortality is an important question but given our BACI design, we have narrowed our question to:

**Does forest management in the treated firesheds significantly shift the tree vulnerability profiles relative to the changes observed in the reference firesheds?**

2) What has been done - and learned – in 2010

Field and laboratory work
The field work necessary to characterize the composition and structure of the forests and develop the necessary information for the fire models was completed in 2008.

Also in 2008, we completed the field collection of pairs of tree cores. We used a case control sampling approach where the “case” is a recently dead tree (rare, hard to find) and then matched it with a “control” (a nearby tree of the same species and size). From both sites we collected 1,553 pairs from six conifer species. During the last year, we have been analyzing these cores on a species by site basis. To date, we have complete, ring width chronologies for 93% of these cores (Table 1). In 2009, we completed the field collection of tree cores from live trees for both sites (pre-treatment sample, Table 1).

Table 1. Update on tree ring collection and analysis. Field work was completed in August 2009. Laboratory work is ongoing.

<table>
<thead>
<tr>
<th>Tree status</th>
<th>Collected (field)</th>
<th>Prepared (mounted/sanded)</th>
<th>Analyzed (rings read)</th>
<th>QAQC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model pairs</td>
<td>Live 1553</td>
<td>1553</td>
<td>1473</td>
<td>740</td>
</tr>
<tr>
<td></td>
<td>Dead 1553</td>
<td>1349</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-treatment samples</td>
<td>Live only 1194 (includes subsamples with 2 cores per one tree)</td>
<td>Drying 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Results - Forest Health

An essential step in the development of vulnerability profiles from tree growth records is the building of master chronologies for each species at each site. Tree growth rings are sensitive to the internal dynamics of the tree (i.e., growth based on the size, age, health, and canopy position of the individual tree) and the regional climate signal. Patterns due to internal dynamics tend to change slowly and somewhat predictably over time. In statistical terms, internal dynamics create low frequency variation. In contrast, the response to annual fluctuations in the weather tends to bounce around from year-to-year with little predictability – a response that creates high frequency variation in the tree ring record. Given the difference in the signals, we can decompose a tree ring pattern and isolate the response to climate alone.

Growth records from all live trees are screened for compliance with the local response to climatic drivers. These trees are included in a “master chronology” that quantitatively describes the temporal pattern in growth due to weather. Not only is this climate response informative in itself, but also it provides the means to check the accuracy of all the tree ring records. This accuracy check is particularly relevant in our case. Dead trees (half our sample) are particularly likely to have missing rings (they are dying after all) and there is no way to detect this missing information without comparing their overall growth pattern to a master chronology.

To date, we have constructed master chronologies for four species by site combinations (out of nine total). For example, raw ring width patterns for the 52 ponderosa pine trees in the chronology for Sugar Pine show huge individual variation (Fig. 1). However, when the trends due to internal dynamics are removed, a very clear climate signal remains that tracks the annual changes in weather (Fig. 2). Not only do we pick-up the record-setting 1976-77 drought (Table 2) but also below average growth in the pine chronology (residual < 1) corresponds with other dry periods. The need to develop species and site specific chronologies is clear when we compare the responses of ponderosa time at Sugar Pine (Fig. 2) to the chronology for incense-cedar at Last Chance (Fig. 3). Incense-cedar is much less sensitive to the fluctuations however it does clearly respond to extremes (1976-77 drought).

Please see next pages for Figures 1-3 and Table 2.
Figure 1. Raw ring width patterns for ponderosa pine (Sugar Pine Project, Bass Lake Ranger District, Sierra NF).

Figure 2. Results from detrending (via ARSTAN) the ponderosa pine samples in Fig.1. Residuals = 1 (red line) represent the “average” growth response to the “average” climate.
Severity of Extreme Droughts in the Sacramento and San Joaquin Valleys

<table>
<thead>
<tr>
<th>Drought Period</th>
<th>Sacramento Valley Runoff (maf/yr)</th>
<th>(% Average 1901-96)</th>
<th>San Joaquin Valley Runoff (maf/yr)</th>
<th>(% Average 1906-96)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1929-34</td>
<td>9.8</td>
<td>55</td>
<td>3.3</td>
<td>57</td>
</tr>
<tr>
<td>1976-77</td>
<td>6.6</td>
<td>37</td>
<td>1.5</td>
<td>26</td>
</tr>
<tr>
<td>1987-92</td>
<td>10.0</td>
<td>56</td>
<td>2.8</td>
<td>47</td>
</tr>
</tbody>
</table>

Table 2. Summary of droughts in California from the Dept. of Water Resources

![Incense-cedar chronology -- Last Chance Project](image)

Figure 3. Results from detrending (via ARSTAN) the incense-cedar samples from the Last Chance Project (American River Ranger District, Tahoe, NF). Residuals = 1 (red line) represent the “average” growth response to the “average” climate.

**Public participation and education.** In February 2010, the FFEH team led a public meeting and discussion of the results from the Fire Integration Project, a joint effort among UC and PSW researchers to evaluate the impact of various coordinated forest management strategies on fire behavior. We also prepared a series of tree cores, mounted cores, and sanded cores for a K-12 education outreach effort by Ann Lombardo (Public Participation Outreach representative at the southern SNAMP study site).
3) Plans for the Rest of 2010 and 2011

Our immediate emphasis is to continue processing the tree core samples. As cores are completed for each species, we will continue the development of the master chronologies necessary to estimate the age of our dead trees. With a complete set of cores for live and dead trees, we will use growth rates and trends to build the most reliable predictors of tree survival following the approach described in Das et al. (2007). Our objectives are to have survival probability models for the major species finished by May 2011.

We have worked a great deal this year trying to integrate the remotely sensed data into our fire modeling work at the southern SNAMP site. Results to date have not been satisfactory in terms of being able to accurately describe forest structure and fuel conditions for our models.

We will shift our focus to working in the smaller watersheds where we have a higher density of field plots. A recent paper not connected to SNAMP was published that created information and techniques to spatially describe fuel and forest structure in Jeffrey pine-mixed conifer forests, it is Fry, D.L., and S.L. Stephens. 2010. Stand-level spatial dependence in an old-growth Jeffrey pine mixed conifer forest, Sierra San Pedro Martir, Mexico. Canadian Journal of Forest Research 40: 1803–1814.

Our plan is to use the high density field plots and remotely sensed data to build our Flammap landscape files in the relatively small watersheds and then use what we have learned in these areas to build the larger landscapes. Our past work has attempted to create the spatial data at the fireshed scale and this has not proven effective. Using what we have learned from the work in Jeffrey pine-mixed conifer forests should assist us with the current task to model planned treatment effectiveness at the southern SNAMP site.

4) Integration Efforts Initiated or Completed in 2010

All of the forest inventory data has been uploaded the UCST data server and has been made publically available to UCST colleagues, the MOUP, and the public. Our shared data on forest structure and composition is essential to ongoing research by the PSW testing the impact of landscape treatments on small mammal diversity (Sugar Pine site) and planned research by the California Energy Commission on sustainable biomass harvesting (Last Chance site). As noted above, we led an integration meeting to discuss results from a Sierra-wide analysis of the efficacy of coordinated landscape treatments on modifying fire behavior.

5) Research Products in 2010

One publication was accepted this year at Forest Science, it is Brandon Collins, Scott Stephens, Gary Roller, and John Battles

Simulating fire and forest dynamics for a coordinated landscape fuel treatment project in the Sierra Nevada.
Both the extent at which recent wildland fires are impacting forests and the increasing magnitude of fire-related effects necessitate landscape-scale mitigation efforts. We evaluate an actual coordinated landscape fuel treatment project that was designed by local U. S. Forest Service managers in the northern Sierra Nevada. We model the effectiveness of this project at reducing landscape-level fire behavior at multiple time steps, up to nearly 30 yr beyond treatment implementation. Additionally, we modeled treatments under multiple diameter-limited thinning scenarios to assess potential impacts on fuel treatment effectiveness. As designed, the coordinated fuel treatments reduced modeled burn probabilities and fire sizes substantially across the landscape. This reduction was evident approximately 20 yr following simulated treatment implementation. Although diameter-limited thinning scenarios resulted in different forest stand structures, we detected no real differences in modeled landscape-scale burn probabilities and fire sizes. The modeling adaptations we made with respect to fuel model selection and simulated regeneration/ingrowth over simulated time, as well incorporation of variable winds in fire simulations, collectively contribute to a robust analysis of the study area. (in review at Forest Science)

This manuscript had 2 very strong peer reviewers that pointed out some areas that could be improved during revision. The analysis of this work was revised and strengthened substantially during revision. It is now one of the most complete and novel research projects in the area of the effectiveness of landscape fuel treatments.

We have not received the proofs of this paper from Forest Science but should in November of 2010. Publication will occur in early 2011. This journal is not fast in its ability to get accepted papers into print but once out it will be seen by many forest and fire scientist nationally and internationally.

6) Current and Near-term Challenges for FFEH
We see no obstacles to meeting our goals for 2011. How eventual treatments get installed in terms of their timing will affect us but we can create a solid plan for re-measurement of our plots once treatments are installed.
Wildlife

A. PACIFIC FISHER (Reg Barrett and Rick Sweitzer)

1) Overall Goal

The SNAMP Fisher Project study area is at the northern end of the southern Sierra Nevada fisher population in California, encompassing the area bounded by the Merced River in the north and the San Joaquin River in the south. Our overall project goal is to assess life history responses of fishers to SPLATS that the Forest Service will implement, while also identifying and understanding how a range of population limiting factors contribute to the probability of persistence of Pacific fisher in the southern Sierra Nevada region and our study area. The specific research objectives for the study which will contribute to achieving this goal are listed below.

SNAMP Fisher Objectives:

- Estimate population parameters (age and sex-specific survival, fecundity, dispersal) and identify population limiting factors in the region encompassed by the study area.
- Evaluate effects of SPLATS on survival and fecundity.
- Characterize resource/habitat use by fishers, including how SPLATs influence resource/habitat use.

2) What has been accomplished - and learned – from October 2009 to October 2010

**Population Parameters and Limiting Factors**

- 71 total fishers have been captured and radiocollared (43 females: 28 males).
- 12 females and 10 males were captured in the study area during the period.
- We are currently monitoring 23 radiocollared fishers (13 females, 10 males).
- 88% of the known adult females reproduced this year, and fecundity was 1.7 kits/female.
- Dispersal events have now been documented for 3 males and 4 females; the overall mean dispersal distance for fishers in our study area has been around 14 km (± SD 7.8 km).
- A pattern is emerging where most dispersers are originating from a “source” area in the Sugar Pine/Nelder Grove, and Laurel Creek area.
- Adult female survival was estimated at 0.83, or 83% during 2009-10.
- Adult male survival was estimated at 0.80, or 80% during 2009-10.
- 15 additional mortalities were confirmed/recorded during the period; 13 radiocollared fishers and 2 noncollared fishers.
- Predation and vehicle strikes continue as the leading causes of mortality on the study.
**Effects of SPLATS on Fisher Biology and Behavior**

- Fuel reduction management has not yet been initiated in the Sugar Pine Treatment portion of the Fisher Study Area. Across the larger Fisher Study Area, however, we have been monitoring and acquiring data on commercial thinning and mastication activities in multiple other areas including those listed below:
  - Cedar Valley (commercial thinning and mastication)
  - Sonny Meadows North and South Units (commercial thinning and mastication)
  - Graham Mtn Units, Gertrude Units (predominantly commercial thinning)
  - Minarets Work Station area (predominantly mastication)
  - Grizzly Road (mastication)
  - Road Hazard tree removal along the Beasore Road (Forest Service Road 7), Minarets Road (Forest Service Road 81), and the Grizzly Road (Forest Service road 6501)

- The Bass Lake District Office has agreed to provide SNAMP Fisher with information on all mastication, commercial thinning, road hazard tree removals, hand thinning, and controlled burning within the Bass Lake Ranger District since summer 2008.

- We are collecting data on whether fishers may alter or fail to establish home ranges in areas treated for fuels: detailed home range analyses are underway for 55 individual fishers for which we have > 100 locations/individual.

- Preliminary analyses are revealing much larger home range sizes for fisher in the SNAMP Fisher Study Area than anywhere else in California. Our average adult female home range is ≈ 26-30 km², whereas the mean home range size for males is 55-70 km². We hypothesize that home range sizes for fishers in this study may be larger because we monitor all collared animals daily by airplane, and are therefore able to capture nearly all of their movement activity compared to ground-based telemetry.

- Higher resolution location records obtainable by GPS radiocollar technology may allow us to identify fine scale movements useful for understanding responses to fuel treatements. GPS radiocollars have been deployed 12 times on 10 different individual fisher. Information on GPS location clusters and movement paths from these deployments are now being examined.

**Resource and Habitat Use by Pacific Fishers**

- During Camera Survey Year 3 (Oct 07, 2009 to Oct 08, 2010) we completed surveys in 123 1 km² grids within the Key Watersheds portion of the study area; fishers were detected in 72 of those grids. Camera surveys were also completed for 223 additional grids across the larger overall fisher study area; fishers were detected in 120 of those additional grids.

- Preliminary analyses of data from 259 grids that had been surveyed for fisher presence during October 2008 to May 2009 suggested that the mean elevation of the grid and the CBI habitat value were important predictors of fisher
3) The Plan for the rest of 2010 to October 2011

- We will continue our program of daily monitoring of all radiocollared fisher by aerial radiotelemetry during October 2010 to October 2011.

- We recently initiated our 4th year of camera surveys. During fall and winter from mid October to mid January, camera surveys will be focused in the Key Watersheds area. Other high priority areas for repeat camera surveys include any national forest habitat within the Bass Lake Ranger District where fuel reduction treatments have occurred, or are projected to occur in the near future. We also plan to conduct camera surveys in a small number of high elevation (>7500 feet) grids where prior research suggests Pacific fisher and American marten may co-occur.

- Intensive trapping for any non-collared fishers detected by cameras, as well as juvenile-aged fishers will be completed during the period from mid October to early March. Our goals for trapping and collaring fishers are to (1) maintain a minimum of 20 collared fisher being monitored at all times, (2) estimate survival for all fishers residing in the Key Watersheds area and the large majority (>85%) of fishers occupying the overall study area, (3) capture most of the juvenile-aged animals in the population for assigning maternity and tracking eventual dispersal, and (4) monitor home range dynamics and habitat use by fishers in areas where fuel reduction activities have occurred, or will occur.

- Research during mid March 2011 to early June 2011 will focus almost entirely on estimating female reproduction and fecundity, which involves a combination of aerial and ground-based radiotelemetry for locating den trees, camera-based monitoring of den trees, and tree climbs.

  - During the summer period from June 2011 to September 2011, we will complete camera-based distribution surveys, while also measuring habitat characteristics around fisher natal and maternal den trees.
Data analysis is an ongoing research activity on the fisher study. We are currently working on data analysis for multiple different research articles, three of which are listed below:
- Evaluation of a landscape level habitat suitability model for Pacific fishers in the Southern Sierra Nevada, California.
- Seasonal patterns in diel activity of Pacific Fishers in the southern Sierra Nevada.
- Body size and determination of sex for Pacific fishers using infrared digital cameras.

4) Integration Efforts in 2010
- Fisher Integration Meeting, July 22, 2010. Here we provided a detailed status report on the SNAMP Fisher Project, as well as information on the diverse sources of fisher mortality identified during the research. We also presented an overview of the use of GPS radiocollar technology for understanding fisher movements and activity.
- Presentation to the Mariposa Airport Pilots Association (June 2010).
- Presentation given to Yosemite High School (May 2010).
- Developed and implemented a detailed protocol for measuring habitat characteristics around fisher den trees, based on the Forest Inventory plot protocol used by the SNAMP Fire and Forest Ecosystem Health (FFEH) Team.
- Developed a plan for using Spatial Team Lidar data and analyses to characterize habitat characteristics/features associated with denning structures and habitats used by female fisher during the denning season.

5) Research Products in 2010
- Three presentations at the Annual Meeting Western Section of the Wildlife Society, Visalia, CA, January 26-29, 2010
- Presentation to the Forest Carnivore Working Group, Visalia, CA, January 29, 2010.
- Co-authored book chapter completed and in review for the yet to be titled proceedings of the 5th International Martes Symposium:

6) Current and Near-Term Challenges
Our major challenge will be to continue the SNAMP Fisher Study at the same level of activity for the 2010-11 research year. We hope to be able to re-establish our “Volunteer Carnivore Research” program, which has been inactive since April 2010 because of administrative difficulties associated with payment of small stipends. Nineteen different volunteer researchers aided SNAMP Fisher in the past, which helped us to maintain our very active year round research program.
1) Overall Goal

We will assess the potential effects of SPLATs on spotted owl site occupancy, survival, and reproduction. We will continue to participate in Owl Integration Team (IT) meetings and other public outreach efforts involving all interested stakeholders.

2) What Has Been Done - and Learned - in 2010

2010 Field Surveys: On the Last Chance Owl Study Area, we resighted (or captured and banded) 10 females and 6 males and assessed reproduction at 9 territories. We identified 3 nests and we banded all 4 fledglings. We completed 4 rounds of night surveys in the Last Chance Owl Study Area and the Eldorado Density and Regional study areas. In the Eldorado study areas we resighted (or captured and banded) 72 birds and assessed reproductive status at 31 territories. We captured 16 out of 19 fledglings at the 12 nesting territories. We completed post-treatment vegetation surveys at the Hartless SPLAT site for the units that had been treated by August 2010.

We constructed occupancy and capture-recapture survey histories for the data collected thus far (2007-2010) and made comparisons between control and treatment sites (see figures below) to demonstrate their similarity prior to SPLAT treatments.

The figures below include data from both the Owl Last Chance Study Area and the Owl Eldorado Study Area, 2007-2010.

![Territory Occupancy Chart](image)

Figure 1: Comparison between treatments and controls for spotted owl site occupancy (% of sites occupied for sites that have been occupied at least once since 2007).
Figure 2: Comparison between treatments and controls for annual survival of individual owls (subadults and adults combined).

Figure 3: Comparison between treatments and controls for reproductive output (# fledglings per territorial owl pair for which reproduction was successfully assessed).
3) The Plan for Rest of 2010 and 2011

Rest of 2010: We will continue to update our vegetation classification map for the owl study areas using shapefiles of USFS harvests, data received from private timber companies, and 2009 NAIP imagery (color aerial photographs).

2011: From April to August, we will continue to survey the Last Chance Owl and Eldorado Study Areas. We will conduct post-treatment vegetation surveys at SPLAT sites that will be completed by the summer of 2011.

4) Integration Efforts Initiated or Completed in 2010

We led a field trip this past summer that was attended by members of the public and agency staff. We led a training field trip for the wildlife staff of USFS Georgetown Ranger District.

We shared owl detection data with the USFS and posted all owl data from the Last Chance Owl Study Area onto the SNAMP Science Team data server.

5) Research Products in 2010

Our collaborative manuscript with the Spatial Team on the use of lidar to characterize spotted owl nesting habitat is in revision after being submitted to *The Journal of Forestry*.

Our paper on the location of owl nests relative to habitat edge was accepted for publication the December 2010 issue of *The Journal of Raptor Research*. This paper was motivated by stakeholder comments at the November 2008 annual SNAMP meeting and has been designated SNAMP Publication Number 3.

6) Current and Near-term Challenges

We anticipated completing more post-treatment vegetation surveys at SPLAT sites. However, some treatments were delayed or had not started by the end of our field season. Nonetheless, we should be able to complete post-treatment vegetation surveys in future years.
1) Overall Goal

The goals of the Water Team are:
1. To better understand the timing and movement of water through the catchments (i.e. - how and when the water beginning as precipitation, moves through the system as soil moisture and eventually reaches the stream, exiting the system as discharge);  
2. To look at the effects forest treatments might have on the route and timing of the water; and  
3. To quantify any erosion caused by the water routing.

Our working hypothesis is that treatments will alter the timing of flows and increase water quantity and sediment movement in the streams. Any changes in water quality (such as turbidity) will be due to in-stream changes from the increased discharges.

2) What Has Been Done - and Learned - in 2010

We have our first full winter of soil moisture data (Fig 1) to combine with ongoing measurements of meteorology (3 yrs), snow depth (2 yrs), water quality (1.5 yrs), and streamflow (1.5 yrs) data. Stream water samples and flow measurements have been taken bi-weekly at each of the sites, and will continue until stage-discharge ratings are solidified and the automatic water samplers installed. Maintaining and repairing the field installations for continuous measurements remains a large portion of the fieldwork. Processing the extensive dataset for analysis and modeling has also taken several months. Currently, all of the inputs for the hydrologic model (RHESSys) are set up and ready to run, but a few remaining software and parameterization issues are being worked out with the software developers, and then it will be up and running shortly.

Figure 1. Soil moisture levels within the Last Chance study watersheds. Measured at 30- and 60-cm below the surface, the lighter bars represent the range of moisture recorded from all the distributed sensors. Volumetric Water Content is the fraction of the soil volume that contains water.
The initial set of stage-discharge rating curves (Fig 2) have been developed to calculate stream discharge from our water level measurements. Although these relationships are still being improved, they are giving us a good indication of the flows and will be used for initial model comparison and calibration. As more discharge measurements with increased accuracy are completed in this next year, these rating curves will improve, but will not change the overall trends of existing calculated discharges.

![Figure 2. Stage (top graph) and calculated discharge (bottom graph) determined with the rating curve (inset) at Speckerman Creek.](image)

3) **The Plan for Rest of 2010 and 2011**

This fall we are testing one of three planned culvert weirs at Speckerman Creek. We will observe if any changes or improvements need to be made to the weir design, so they can be successfully installed at all three stream culverts next summer. These weirs will only be in place through the low-flow summer and fall months. Sonic depth sensors, which are already used to measure snow depth, will be mounted to the top of the culverts to measure water level during the high-flow periods of winter and spring, and will be in place for this winter. The fourth weir at Big Sandy Creek, a permanent concrete structure, is also still in the works. Compounded delays due to prolonged snowpack (access to the site), completing the necessary permitting and agreements, and engaging a contractor through the procurement rules may delay this installation. We are working to finalize contractor agreements with as much speed as possible, but concrete for the weir plate will need to be poured by November 1 to complete installation this fall. In the event the weir is not completed this year, sonic depth sensors will be installed on the top of the Big Sandy Culvert, also to capture the high winter and spring flows. The additional accuracy from the installation of these weirs will be critical for fine-tuning the model parameters. This improvement in the precision of stream discharge measurements where we have data will be especially important when transferring model parameters to the larger firesheds, where observed flows are unavailable.
Automatic water samplers and scour pans were received earlier this summer and are being installed this fall. An expanded network of snow depth sensors at Duncan Peak will improve characterization of snow variability over the terrain. Ten new sensors transmitting wirelessly to the met station are currently being installed, and will be ready for activation when the production of the wireless system is completed later this year. Soil samples collected last summer are undergoing processing for texture analysis at the University of California Agricultural and Natural Resources Analytical Lab. These results will be combined with the same analysis completed for the Fire & Forest Health Team samples to provide a distributed characterization of physical soil properties throughout the firesheds. Fieldwork to maintain our instruments will continue throughout the year.

The Regional Hydro-Ecologic Simulation System (RHESSys) is expected to be running shortly. We are working closely with the RHESSys developers and SNAMP data to start producing hydrologic simulations of the SNAMP basins. The southern site study watersheds will be processed initially, as the lidar products were first completed for this site, followed by the northern study watersheds for which the lidar vegetation products have just recently become available.

4) Integration Efforts in 2010

Within the UCST, we use the products provided by the Spatial Team and the information gathered by the Fire & Forest Health field work to set up our modeling environment. We are also leading a field trip to Duncan Peak on November 18 of this year to show the newly installed wireless snow depth sensor array (weather permitting). The field trip is organized by the Public Participation Team.

Outside of the UCST, we continue to collaborate with multiple public agencies to collect and provide data. Additionally we are hosting technicians from the ARS Northwest Watershed Research Center both this year and next to install the three culvert weirs and stilling wells. As in the past, we continue to provide our meteorological station data publicly through the California Data Exchange Center (CDEC), hosted by the Department of Water Resources.

5) Research Products in 2010

In May 2010, we gave a presentation to state legislative members at the state capitol building in Sacramento for Graduate Research Day. We also presented a poster at this event. In December 2010, we will demonstrate the water team’s instrumentation and research design for SNAMP at the American Geophysical Union Annual Meeting in San Francisco. We have two manuscripts in progress. One paper describes the modeling of the four study watersheds with RHESSys and distributed lidar vegetation data. The other paper focuses on upscaling point measurements to the landscape using our distributed sensor network.

6) Current and Near-term Challenges

Ongoing funding issues, tied to the state budget situation and associated funds provided by the Department of Water Resources, continued to delay complete instrumentation of the research sites this year. Just recently receiving the balance of funding for year 2 and most of year 3, we are now able to replace the staff hydrologist that changed positions in January. This funding will help
complete the final instrument installations, cover needed repairs to existing infrastructure, and ensure faster progress on modeling results.

Improving the accuracy and precision of the stage-discharge rating curves continues to be a challenge, but this is being addressed with ongoing discharge measurements and installation of the stream weirs.
1) Overall Goal

The spatial team will acquire, maintain and distribute when possible lidar and other spatial data relevant to SNAMP goals; will integrate with other SNAMP teams through data provision and analysis; and conduct independent original research in processing and analysis of lidar and other spatial data.

2) What has been done - and learned – in 2010

Data analysis.

At the plot level, the following forest-related variables can be calculated at pixel size of 20m and larger:

- Canopy Bulk Density – mass of available canopy fuel per unit volume (e.g. kg/m3);
  - Completed for both sites
- Canopy Base Height – the lowest height above the ground at which there is sufficient available canopy fuel to propagate fire vertically through the canopy;
  - Completed for both sites
- Canopy Height – average height of the dominant and co-dominant trees;
  - Completed for both sites
- Canopy Cover - horizontal percentage of the ground surface that is covered by tree crowns (Can be calculated in bins (1: 1-20, 2: 21-50...)) or percent (0-100), and include all trees at some distance from the ground.)
  - Completed for both sites
- Leaf area index
  - In progress for both sites

The following ground-based variables can be calculated at pixel size of 1m and larger from the DEM

- Slope (%)
- Aspect (degrees)
- Elevation (m)

3) The plan for rest of 2010 and 2011

We are working on visualization of the lidar data at the Sugar Pine site.

At the individual tree level we are working on the following products:

- Location of individual trees
  - Planned for both sites
- Individual tree height, DBH, crown size
  - Planned for both sites
- Stem map of trees;
  - In progress for Sugar Pine, planned for Last Chance
- Location of individual residual trees (e.g. > 45m in height).
  - In progress for Sugar Pine, planned for Last Chance
4) Integration efforts in 2010

All completed products are available at the SNAMP data server at snamp.ucmerced.edu.

We continue with several intra-UCST integration efforts, including Spatial/wildlife integration, Spatial/Fire integration, and Spatial/Water integration.

5) Research Products 2010

Presentations:

- M. Kelly. USGS Western Region Colloquium: Modeling forest structure with lidar in the Sierra. June 7 2010. Menlo Park, CA
- M. Kelly. Our Public Forests: Who gets to make decisions about the public forest and how do those decisions get made? Guest Lecturer in UCBerkeley ESPM 11. February 16, 2010

Publications:


Research Briefs:


6) Current and Near-term Challenges

The spatial team is focused on the challenges associated with recapturing lidar for post-treatment in both sites; and extending coverage to assist with owl Eldorado area.
Public Participation Team (PPT)

The following summary includes updates for Strategic Facilitation (Kim Rodrigues), Program Analysis (Lynn Huntsinger), and Internet Discussion Board and WebGIS Internet Discussion Board (Maggi Kelly).

1) Overall Goal

Our goal is to contribute to increasing capacity for public forest management by developing and modeling best practices for public participation, and by researching the institutional arrangements and stakeholder perceptions that enhance or constrain the ability to manage Sierra forests and engage the public in that management.

2) What Has Been Done - and Learned - in 2010

The project has developed a multitude of field opportunities for public/stakeholder, and collaborating agency participation in scientific research on water, wildlife, and forest health issues. The SNAMP website has been updated and maintained and newsletters are constantly being developed and disseminated. A comprehensive stakeholder contact list has been continuously updated and used for communication with all interested parties, and as of October 11, 2010, our stakeholder distribution list has over 670 valid email addresses.

In the last year, 4,374 people visited the SNAMP website from 101 countries (52.9% from the US). The website received 7,060 total visits over the year, 40.8% of which were returning visitors. The map at right shows recent web visitors to the SNAMP website from within California. A visit to the website at: http://snamp.cnr.berkeley.edu is highly recommended. SNAMP outreach materials, meeting notes, and interactive discussions are available there, as well as numerous photos of SNAMP subjects and activities. Website hits come from all over the state as the map shows. Over the last year, we have added several new additions to the SNAMP website, including “Research Briefs” (summaries of SNAMP publications) and the capability to embed SNAMP outreach videos onto the website.

SNAMP held multiple public participation events in 2010, including field trips, integration team meetings, public meetings, and meetings with organizations and schools in communities near the field sites (Figures 1a and 1b). A summary of SNAMP events is detailed in the appendix. Over 1,000 contacts were made through PPT Outreach. An annual meeting with all teams was held in October 2009 and integration team meetings with the Fire & Forest Health and Fisher teams were held in February and July 2010 with a combined total of 188 participating (Table 1). Field trips and/or Science Team presentations coordinated and facilitated by PPT included outreach by the Water, Fisher and Owl teams reaching 109 people in spring 2010 (Table 2). Over 28 outreach presentations or events were made or hosted by UCCE staff in the past year to local and regional groups leading to a total of 769 contacts (Table 3). Tables 1-3 are appended to the end of the PPT report.
UC Cooperative Extension local representatives have begun to create videos for the SNAMP website that will describe certain focal areas of the project that they feel are relevant to making SNAMP more generally accessible. The first one was posted July 2010 and focuses on what public participation actually means to our participants (please see http://snamp.cnr.berkeley.edu/news/2010/jul/15/public-participation-video/).

Figure 1a. SNAMP public event participation

![SNAMP public event participation graph]

Figure 1b. SNAMP public events

![SNAMP public events graph]

A white paper created to look into decision-making with the Forest Service has evolved into an article to be submitted for publication in the fall of 2010. A second publication about stakeholder perceptions of forest health is almost ready for submission. The impacts of the SNAMP project, and perceptions of participants of adaptive management, forest management, UC research and
outreach, have been researched via in-depth interviews and an internet survey conducted in 2010. Results will be analyzed and integrated in the next phase of the SNAMP project. Some highlights of the internet survey are presented in this document and in the presentation (Figure 2). Interviews of stakeholders and public are completed.

Figure 2. Internet survey—where email participants live and their backgrounds.

![Participant Backgrounds, email survey](image)

![Participant residence, email survey](image)

Figure 2b. Internet survey – perceptions of SNAMP impacts.

3) The Plan for Rest of 2010 and 2011

PPT will continue outreach activities, adapting to what we learn. PPT will develop a series of science briefs on all academic papers published as part of SNAMP. This increases the access, readability and
relevance of SNAMP work to a broader audience. Historical interviews in the northern site will be completed. PPT will submit publications of which the PPT has three in draft form and five planned, and continue to develop the evaluation framework for the overall SNAMP program analysis. A survey research effort is being considered. The PPT will assist with the proposed SNAMP paper mentioned by John Battles at the UC Science Team Retreat in September 2009.

4) Integration Efforts in 2010

PPT is deeply involved in integration efforts through the Integration Team. PPT research is about the interaction of stakeholders, and the contextual institutional arrangements, that affect the work and the outcomes of all team efforts. PPT will be working with other science teams to host integration team meetings. We expect to host the following series:

- Public Participation Integration Team meeting – January 2011
- Water Integration Team meeting – early spring 2011
- Spatial Integration Team meeting – late spring 2011
- Fisher Integration Team meeting – summer 2011
- Owl Integration Team meeting – summer 2011
- Fire & Forest Health Integration Team meeting – 2011

On-site field trips anticipated include:

- Water field trip northern - November 2010
- Water field trip southern – Fall 2011
- Implementation field trips (north and south) – field season 2011

5) Research Products in 2010

Newsletters:


Research Briefs

- Challenges and Approaches in Planning Fuel Treatments across Fire Excluded Forested Landscapes, Brandon M. Collins, Scott L. Stephens, Jason J. Moghaddas, and John Battles
- Topographic Variability and Lidar Sampling Density on Several DEM Interpolation Methods, Qinghua Guo, Wenkai Li, Hong Yu, and Otto Alvarez


Publications:

- Reducing wildland fire impacts: research to learn what treatment strategies work best. Forestland Stewardship Newsletter put out by CalFire and Placer County RCD.
- Perceptions of forest health among stakeholders in a Sierran Adaptive Management Project (preparing for submission)
- Participatory management of natural resources: the Sierra Nevada Adaptive Management Program from an institutional viewpoint (preparing for submission)
• Mutual learning and adaptive management in SNAMP (under development)
• A third party role in adaptive management for public forests: SNAMP (under development)

Posters:
• Society for Range Management Annual Meeting, Denver, CO
• Annual Meeting for the Association of Natural Resource Professionals in Extension – ANREP, Fairbanks, Alaska

White papers:
• Description of SNAMP and program components (2010)
• SNAMP and co-management (2008)
• Adaptive management and SNAMP (2007)
• Historical overview of the SNAMP study area (2006)

6) Current and Near-term Challenges
We do not foresee any significant obstacles to meeting our goals for 2011.

Please see next pages for Tables 1-3.
Table 1. SNAMP Public Participation Meetings. Meeting notes are posted to the SNAMP website.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Location</th>
<th>#</th>
<th>Description and Agencies/Organizations Represented</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 20, 2009</td>
<td>Annual Public Meeting with whole UC Science Team</td>
<td>Sacramento and webinar</td>
<td>65</td>
<td>The meeting was held to promote shared understanding of the current status of the SNAMP project and findings, and to allow for public interaction and involvement with the project. The morning session included an overview of the methods and findings of each of the 7 SNAMP science teams. The afternoon session included small group discussions for the public with each science team. The meeting was attended by 34 people from diverse groups and agencies including: USFS, CalFire, CDFG, CDFA, California Resources Agency, California Energy Commission, CADWR, California Academy of Sciences, USF&amp;W, Sierra Nevada Conservancy, Sierra Business Council, California Forestry Association, Sierra Pacific Industries, Quincy Library Group, Sierra Forest Legacy, Defenders of Wildlife, Ebbetts Pass Forest Watch, Protect American River Canyons, Central Sierra Environ. Res. Center, and the Georgetown Fire Dept.</td>
</tr>
<tr>
<td>February 19, 2010</td>
<td>Fire and Forest research team Integration Team meeting</td>
<td>Davis and webinar</td>
<td>49</td>
<td>The goal of the meeting to share the results of SNAMP sponsored research on the difficulties and effectiveness of implementing landscape scale fuels treatment reduction projects. The meeting was attended by 49 people from diverse groups and agencies including: USFS, CalFire, CDFG, Placer County Air Pollution Control Dist, Lahontan Regional Water Quality Board, USFWS, California Forestry Association, Quincy Library Group, Sierra Forest Legacy, Defenders of Wildlife, Tahoe Resource Conservation District, and El Dorado Fire Safe Council.</td>
</tr>
<tr>
<td>July 22, 2010</td>
<td>Fisher research team Integration Team meeting</td>
<td>Fresno and webinar</td>
<td>74</td>
<td>The goal was to share the latest findings from the UC SNAMP fisher team after three years of study and review issues arising in fisher research. The meeting was attended by 49 people from diverse groups and agencies including: USFS, CalFire, CDFG, USFWS, National Park Service, Conservation Biology Institute, California Forestry Association, Southern California Edison, Society of American Foresters, Sierra Forest Products, Sierra Forest Legacy, Defenders of Wildlife, CSERC, Sierra Club, Central Sierra Watershed Committee, Madera County, Yosemite Sequoia RCD, and the Tule River Tribe.</td>
</tr>
<tr>
<td>Annual meeting and IT meeting contacts</td>
<td></td>
<td></td>
<td>188</td>
<td></td>
</tr>
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Table 2. Local Field Trips and Workshops

<table>
<thead>
<tr>
<th>Date</th>
<th>Event/ Location</th>
<th>#</th>
<th>Description and Organizations Represented</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 8, 2010</td>
<td>Water Team at Reedley college</td>
<td>32</td>
<td>Sarah Martin from the Water Team and Anne Lombardo from the Public Participation Team presented to Kent Kinney’s watershed ecology class.</td>
</tr>
<tr>
<td>March 18, 2010</td>
<td>Fisher team at Yosemite High school</td>
<td>60</td>
<td>Rick Sweitzer presented at to science students. Many of the kids live in fisher territory and a few think they have seen it.</td>
</tr>
<tr>
<td>June 15, 2010</td>
<td>Spotted owl field trip, Blodgett Forest, Georgetown</td>
<td>17</td>
<td>Public discussion of research methods and practices in the Eldorado Demographic Study Area, owl viewing. Attendees included USFS personnel, Sierra Pacific Industries, and National Forest Foundation. Owl field trip sizes must be kept small to minimize impacts on birds.</td>
</tr>
</tbody>
</table>

Field trip / workshop contacts 109

Table 3. Presentations about SNAMP to other organizations

<table>
<thead>
<tr>
<th>Date</th>
<th>Group</th>
<th>Location</th>
<th>Attending</th>
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</thead>
<tbody>
<tr>
<td>10/10/09</td>
<td>CABY Meeting</td>
<td>Auburn</td>
<td>40</td>
</tr>
<tr>
<td>10/29/09</td>
<td>Sierra Nevada Conservancy forum</td>
<td>Oroville</td>
<td>12</td>
</tr>
<tr>
<td>10/30/09</td>
<td>Caltrans</td>
<td>Coarsegold</td>
<td>3</td>
</tr>
<tr>
<td>11/5/09</td>
<td>Macro invertebrate study</td>
<td>Oakhurst</td>
<td>8</td>
</tr>
<tr>
<td>11/18/09</td>
<td>Auburn Host Lion Club</td>
<td>Auburn</td>
<td>25</td>
</tr>
<tr>
<td>11/19/09</td>
<td>Oakhurst Elementary School</td>
<td>Oakhurst</td>
<td>35</td>
</tr>
<tr>
<td>1/5/2010</td>
<td>Yosemite High School</td>
<td>Oakhurst</td>
<td>60</td>
</tr>
<tr>
<td>1/11/10</td>
<td>Indian Dispute Resolution Services Inc.</td>
<td>Sacramento</td>
<td>1</td>
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<tr>
<td>1/27/10</td>
<td>El Dorado County FSC Annual Gathering</td>
<td>Cameron Park</td>
<td>42</td>
</tr>
<tr>
<td>1/27/2010</td>
<td>Yosemite Artists</td>
<td>Ahwahnee</td>
<td>5</td>
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<tr>
<td>2/8/2010</td>
<td>Forest Service Tribal program</td>
<td>Clovis</td>
<td>1</td>
</tr>
<tr>
<td>2/23/10</td>
<td>Sierra Club General Meeting</td>
<td>Auburn</td>
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<td>Sierra County FSC &amp; Watershed Council</td>
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<td>8/3/2010</td>
<td>Presentation to Amador County BOS</td>
<td>Jackson</td>
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<td>9/1/10</td>
<td>Acorn masting study</td>
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Outreach contacts 769