

Memorandum of Understanding Partners Response to Final Report

Agencies that signed the original 2005 Memorandum of Understanding (MOU), which led to the Sierra Nevada Adaptive Management Project (SNAMP), constitute the MOU Partners: USDA Forest Service, USDI Fish and Wildlife Service, and the California Natural Resources Agency (hereinafter “Partners”). Funding for SNAMP came largely from these organizations; therefore, the Partners have a significant interest in the outcomes of SNAMP. This response was created for the record to document our evaluation of SNAMP in terms of both process and monitoring results.

This response was produced from contributions by each of the Partners. The process was to first draft individual agency sections (see below), which were shared with all Partners to allow for interagency collaboration. As consensus emerged from collaboration, that consensus was brought forward to the first section on Consensus Response. Each agency also addressed the three questions in the Consensus Response section.

The response is structured around the Recitals in the 2005 MOU <http://snamp.cnr.berkeley.edu/static/documents/wp-uploads/MOU-SNAMP-Feb2005.pdf> that initiated SNAMP and a series of questions about the Recitals posed below. The response will begin with a Consensus Response Section that addresses Recitals G and H and any responses to questions for which consensus can be achieved. The Consensus Response will be followed by sections written by the respective agencies that highlight an evaluation of their own recital; an evaluation of the remaining recitals, as appropriate; specific responses to the questions; and any other agency-specific assessments of SNAMP processes or products. The Consensus and Agency sections will start with an assessment of how well SNAMP fulfilled the objectives articulated in the Recitals. The intent of this document is to provide an assessment of the success of SNAMP and “lessons learned” that other groups might consider in designing a similar collaborative adaptive management project.

Consensus Response

The individual Partners prepared their responses to the SNAMP process and results. Where consensus was reached among Partners, the response is included in this section. There were two recitals in the MOU that described mutual interests of the Partners, repeated here.

“There is mutual interest in understanding how various projects will look and function at the stand level as well as across larger landscapes. All Parties share the same general objective of balancing wildlife habitat needs and water quality considerations with reducing expected wildfire losses, and improving overall forest health and structure. A collaboratively developed and refined adaptive management strategy of annual monitoring, evaluation and accountability should inform management and interested stakeholders whether direction is being implemented as described, whether management practices are resulting in expected outcomes, and whether desired

conditions are being met over appropriate timeframes. The adaptive management strategy should also offer a shared basis for designing and tracking changes or improvements at the stand and/or larger landscape levels. The refined SNFPA adaptive management and monitoring process will be coordinated with other monitoring processes under the Healthy Forests Initiative, the Wildland Fire Leadership Council, the December 23, 2004 NFMA planning regulations, and other ongoing SNFPA studies and research.” (2005 MOU)

How well did SNAMP fulfill this objective?

By design, SNAMP was able to achieve some balance between wildlife habitat, water quality, forest health, and fire reduction considerations. Although the monitoring conducted by the Science Team focused on individual resource areas, the integration modeling achieved the necessary balance in the final product. The process led by the Science Team also achieved the collaboration objective, particularly by facilitating meetings that engaged stakeholders in the conduct of SNAMP. During the life of SNAMP, a collaborative adaptive management approach was used to continuously monitor, evaluate, and adjust the progress of work by the Science Team and the Forest Service. This approach helped organize the field treatments and SNAMP study projects and make adjustments to changing conditions over time.

Adaptive management is an ongoing strategy that extends beyond the lifetime of a single project like SNAMP. Nevertheless, for the eight to ten years of SNAMP, the shared basis for designing and tracking changes within the study areas was achieved. Monitoring results have informed us about expected outcomes of the fuel treatments implemented. The evaluation and implementation steps of adaptive management are outside the purview of the Science Team and remain to be observed. With additional time, implementation, and monitoring, we will be able to identify additional benefits and effects of fuel treatments. Furthermore, as a result of SNAMP and other studies, we continue to adjust management to incorporate new information. Sometimes, changes in management practices may outpace the adaptive management process of a long-term study like SNAMP.

In Chapter 5 of the final report, the Science Team made recommendations in terms of “If your goal is to... [then]...”, which acknowledges that there are potential conflicts among SNAMP findings and that the Partners must sort out those potential conflicts. Furthermore, our management decision-making process is complex and requires us to reconcile competing priorities and objectives. Science does not always prevail over organizational, socio-political, or experiential considerations.

“In light of the long history and debate over land and resource management planning on public and private lands in the Sierra Nevada, both stakeholder and expert deliberation throughout the process of developing and applying a refined and active multiparty adaptive management and monitoring system consistent with the SNFPA is necessary to enhance the Parties’ collective ability to find lasting solutions to these inherently difficult management decisions. In addition, the Parties’ ability to find such lasting solutions will be improved by working with a neutral third party to assist in the development of an adaptive management and monitoring system, implement the system, and then use the information obtained through this development and implementation process to inform the implementation of adaptive management and

monitoring processes for future projects involving different areas. The third party must have impeccable scientific credentials as well as the skill and experience to sort through often apparently contradictory data and trends. In addition to their technical expertise, the party must also have the trust and respect of a wide variety of stakeholders. By virtue of its diverse teaching, research, and extension responsibilities, the University is both qualified to provide the depth of technical expertise and is highly regarded as an institution in its own right.” (2005 MOU)

How Effective was the University of California as a Neutral Third Party?

The University of California was engaged by the Partners to conduct monitoring and evaluation of the SNAMP project as a neutral third party. The Science Team consisted of faculty and staff of the University of California, Berkeley, Davis, and Merced; the University of Minnesota; and the University of Wisconsin.

Overall, the Science Team performed well as an independent, neutral third party, and developed a “Statement of Neutrality” to clarify their neutral role. Complete neutrality proved difficult to achieve. On a few occasions, some Science Team members were perceived to have violated that role by expressing personal views about the Forest Service to the public, the press, or in comments submitted as part of the NEPA process. Perceived breaches of neutrality were addressed promptly by the Science Team, followed by discussion with the Partners and subsequently with stakeholders at public meetings. In part, the neutrality policy developed by the Science Team was intended to insure that the monitoring conducted by Science Team did not influence Forest Service implementation of fuel treatments. However, the NEPA process requires the Forest Service to consider available information, especially as it applies to standards and guidelines for at-risk species. Thus, the pre-treatment data on fisher nest sites acquired by the Science Team was necessary to complete NEPA and implement the Sugar Pine treatment, and complete neutrality could not be achieved. Perhaps future endeavors will be able to craft a neutrality stance that is more realistic and allows for suitable release of information needed to complete the process – in a sense, adaptive.

Monitoring by the public participation team helped answer the question of how well the Science Team worked as a neutral third party. Participant surveys generally confirm that the Science Team succeeded as a neutral third party by achieving a high level of confidence in the science. Stakeholders as a group expressed mixed expectations and levels of satisfaction.

How can funding needs be met for future endeavors?

Lack of assured funding is not unique to SNAMP; indeed it is a hallmark of many long-term monitoring and adaptive management programs. Funding SNAMP proved to be a challenge partly due to the “Great Recession” that occurred in 2007-2008. Due to time lags, the impact of the recession for SNAMP was most acute for subsequent years, when budgets of the state and federal agencies were impacted significantly. All agencies struggled to meet their planned contributions within the laws and regulations that govern their actions. Despite declines in the budget for the Forest Service, which provided most of the SNAMP funding, during the SNAMP years, the Forest Service met its commitment for funding. Furthermore, the NEPA process and decreased demand for wood during and following the recession delayed implementation of treatments. As a result, the Science Team was forced to make adjustments to insure completion

of the study objectives. Future endeavors are unlikely to encounter exactly the same set of fiscal challenges; nevertheless, some recommendations can be made from the perspective of the Partners.

One key lesson is that expecting all parties to make significant contributions from their annual budgets for many years is not the best model for long-term, multi-agency monitoring. Challenges associated with annual funding created an atmosphere that undermined the good will that had been created among the Partners, Science Team, and stakeholders. Rebuilding that good will took several years. A better approach would be to secure full project funding before the project begins through some mechanism that ensures a stable funding for the life of the project. This approach will likely limit the size of the total project. Additionally, selecting projects that are closer to “shovel-ready” and having a more realistic assessment of NEPA process timelines would improve likelihood of success. Regardless of intent to remain neutral, future efforts should be aware that the collection of pre-treatment data may extend the NEPA process.

For future endeavors, it is important to know that the funding documented in the various SNAMP reports is only a partial accounting of the total costs. There were additional costs associated with implementing treatments, monitoring conducted historically or outside SNAMP, and providing various in-kind support that contributed to the success of SNAMP. These costs must be considered in planning future projects.

Individual Agency Responses

In the 2005 MOU, each Partner stated objectives for entering into the MOU, and each objective is quoted in the following sections. In sections below, each Partner first addresses how well the Science Team and the SNAMP process fulfilled the stated objective. In addition, each Partner was asked to address the following topics:

- How well did SNAMP fulfill the objectives for other agencies, from their own perspective?
- Effectiveness of the collaborative process
- Value of new information from SNAMP Science to the agency
- Lessons learned specific to the agency

Where consensus among Partners was achieved, these responses were summarized in the Consensus Response section above.

These sections will also discuss any perspectives that differ from the consensus response.

USDA Forest Service

“The Forest Service is interested in building stakeholder understanding and trust in the implementation of the [2004 Sierra Nevada Forest Plan Amendment] ROD. The Forest Service and State recognize the value of using the University of California (“University”) as a neutral third party with expertise in projects of this sort to assist in developing a process with the Forest Service and interested stakeholders to refine an active adaptive management and monitoring system. This refined adaptive management and monitoring process will inform and contribute to the improvement in implementation of land management practices, as prescribed, that will restore and

protect valued natural resources and reduce the threats to them and communities at risk.” (Quote from 2005 MOU)

How well did SNAMP fulfill this objective?

To paraphrase, the objective was to develop a collaborative adaptive management and monitoring process involving the Forest Service and stakeholders. Furthermore, this “refined” and “active” process would contribute to improvement in implementation of prescribed land management practices. For SNAMP, the management practices were fuel treatments prescribed in the 2004 Sierra Nevada Forest Plan Amendment (“Framework”) intended to reduce threats of fire to resources and communities.

In terms of a collaborative adaptive management process, SNAMP excelled at fulfilling the objective. Implementation of SNAMP treatments involved a larger community of stakeholders than forest treatments have in the past. Stakeholders played an active role and demonstrated their interest in a shared learning experience with the monitoring conducted by the Science Team. The Science Team actively fostered shared learning through public meetings and field trips, and the results are well-documented in the final report.

The second part of this objective was an adaptive management experiment to evaluate effectiveness of SPLATs (Strategically-Placed Land Area Treatments) to reduce fuel for fires and effects of SPLATs and fire on forest ecosystems, wildlife, and water. This objective was accomplished with the monitoring and modeling discussed in some detail in the final report. As frequently noted, evaluation and improvement of land management practices have not yet been fully accomplished. Most results are too new to have been evaluated by the Forest Service and the other Partners, let alone implemented. Information presented at SNAMP meetings and in publications has contributed to Forest Plan revisions and development of Conservation Assessments and Strategies for fisher and California spotted owl. We expect that science produced by SNAMP will contribute to the design of future fuel treatment projects.

How well did SNAMP fulfill the objectives for other agencies, from the perspective of the Forest Service?

Although not specifically stated in the MOU, the Forest Service shares the interest of US Fish and Wildlife Service and the California Natural Resources Agency in the welfare of species like California spotted owls and Pacific fisher. Of necessity, the effect of fuel treatments on owls was assessed in a 20-year retrospective study that combined a variety of fuel treatments and other medium-intensity timber harvests. Thus, the results inform management in a general, rather than specific, way. Additional ongoing modeling should improve the utility of the owl team results. Monitoring the effects of the Sugar Pine fuel treatment on fisher is not yet complete; results to date are promising in terms of providing science we can use. The fisher monitoring has provided a wealth of information about fisher demography and causes of mortality, which has been helpful in developing a Conservation Assessment and Strategy for this species.

Effectiveness of the Collaborative Process

The example set by Science Team for collaboration is the hallmark of SNAMP. Increasingly, the Forest Service is expanding its collaboration with stakeholders through efforts like the Sierra Cascades Dialog sessions on topics important to the Forest Service and stakeholders. At a local

level, training sessions on collaborative adaptive management offered by the Public Participation Team will likely be helpful for forests and ranger districts.

The collaborative process also helped stakeholders learn about how the Forest Service manages natural resources. The SNAMP website and public meetings reached people who commonly engage with resource management and others who ordinarily do not. The Science Team actively monitored shared learning at public meetings and field trips, and the results are well-documented in the final report. The SNAMP process led to learning for members of nearly all the stakeholder groups, to varying extents. Specific learning included changes in perceptions of forest health and of forest responses to fuel treatments. Thus, SNAMP had some influence on stakeholder opinions.

Value of New Information from SNAMP Science to the Forest Service

The value of SNAMP science will develop over time as we plan and implement projects. Elsewhere in this document, we have discussed how new information from SNAMP is being used for planning and conservation. The value of other new information from SNAMP is yet to be determined because there has not yet been sufficient time to consider how the new information might be used. Use of the various report chapters and appendices will require more in-depth study by more specialists than could be accomplished during the review period. Increased collaboration and understanding about how the Forest Service works, documented in the report, helps us build good will that we are working to continue.

The value of SNAMP science to confirm the relative effects of fire and fuel treatments on the selected resources in different timeframes cannot be underestimated. We continue to struggle with how we can protect resources over both long-term and short-term horizons in the context of historic decisions and likely future conditions.

Lessons learned specific to the Forest Service

In addition to the science lessons from SNAMP, the biggest lesson from SNAMP for the Forest Service may be the challenges and value of collaborative management. Bringing parties together to examine topics of significant debate and uncertainty is a far better option than litigation. Working together to understand basic information about disagreements works better than continuous arguments that don't improve understanding by the participants.

USDI Fish and Wildlife Service

“The Fish and Wildlife Service is interested in participating in the adaptive management process at both a technical and management level, in order to ensure that post-treatment and post-fire conditions offer multi-species habitat enhancement and the conservation of Federal threatened, endangered and candidate species. This process would include the development and review of individual project implementation monitoring and involve a feedback mechanism to ensure that appropriate changes are implemented when desired conditions and conservation goals are not being met at an individual project and landscape level.” (2005 MOU)

How well did SNAMP fulfill this objective?

The SNAMP has provided valuable information regarding the California spotted owl and the fisher that will be useful to inform future adaptive management of forest habitats for the conservation of these two species. SNAMP also provided important basic information to increase our understanding of the relative risks of vegetation management (e.g. ongoing versus SPLATs) and forest management practices relative to use and survival of these two species in a dynamic (and changing) landscape. However, because of the delay in the implementation of the two projects and the end of the multi-year study (truncating the post-treatment monitoring window), some of the desired outcomes regarding a more definitive feedback mechanism towards adaptive management have not been fully achieved.

How well did SNAMP fulfill the objectives for other agencies, from the perspective of the Fish and Wildlife Service?

The SNAMP process fulfilled the objectives of providing a powerful, transparent, and open forum for stakeholders, agencies, and researchers to discuss research. University researchers gained a valuable perspective and interaction with stakeholders and agencies, where normally they conduct much of their research in collaboration with other researchers or in isolation. From our perspective, the same positive interaction held true for all the agencies.

Effectiveness of the Collaborative Process

The Collaborative Process was one of the most important outcomes of SNAMP. The project provided a level of coordination with numerous agencies, researchers, and stakeholders that was unique and powerful. The Public Outreach component provided helpful information and insight on how to conduct an open process that all parties could use in the future.

Value of New Information from SNAMP Science to the Fish and Wildlife Service

The Fish and Wildlife Service acknowledges the difficulties inherent in multi-year applied science studies and implementation of science-driven adaptive management, which must implement decision-making in ecologically-relevant timeframes in a complicated management environment, and often with high attendant uncertainty. It is not a secret, nor a surprise, that SNAMP encountered obstacles along the way. Nevertheless, progress was made as inquiry into the management questions before the participating agencies yielded new information and recommendations. In particular, we find these excerpts from the final report may be useful moving forward for future implementation:

Specifically, we recommend that the USFS continue its current policy that restricts timber harvest within spotted owl Protected Activity Centers (PACs), which contain ≈ 309 acres (≈ 125 ha) of the best habitat used by owls for nesting and roosting over long time periods (Berigan et al. 2012). Furthermore, designing and strategically placing SPLATs to limit the spread of high-severity fire into PACs could benefit owl populations (p. 29).

We found that SPLATs caused an immediate 6% reduction in potential fisher habitat. However, they also moderated the impact of fire, resulting in greater available fisher habitat within 30 years. In the absence of simulated fire, the amount of habitat steadily increased over time due to forest succession, and was actually slightly greater on the

treated landscape in year 30 than in year 0. The net benefits of SPLATs for the Pacific fisher will depend upon the true, but unknown, probability that high-severity fire effects will occur on a given portion of the landscape. However, future probabilities for specific fire behaviors (e.g., crown-fire initiation) are difficult to estimate, and it is therefore difficult to quantify trade-offs associated with SPLATs in absolute terms (Finney 2005). We further note that the SPLATs that were implemented at Sugar Pine appeared to have relatively modest impacts on forest structure and simulated fire behavior, and that it may be necessary to evaluate additional SPLATs of different intensities over a larger scale to fully assess the effects of SPLATs on fisher habitat (p. 34).

Thus, we recommend that managers consider the existing amount and spatial distribution of high-canopy-cover forest before implementing SPLATs and that SPLATs be accompanied by a rigorous monitoring program within an adaptive-management framework (Appendix C, p. 2).

In sum, future research on the short- versus long-term benefits of fuels treatments would benefit from a greater understanding of the probability of fire under various climate change scenarios, and linking replicated fire and forest-growth simulations to spotted owl population dynamics at landscape scales using spatially explicit population models (Appendix C, p. 63).

We recommend continuous monitoring of the status of fisher populations in the southern Sierra Nevada region. Development of ways to mitigate for major threats to fisher survival and fisher habitats and population viability analyses are necessary for evaluating the long-term prospects for fishers in the southern Sierra Nevada (Appendix D, p. ix).

The wildlife data, especially empirical data from extensive monitoring of the fisher, provided new information that will be useful for ongoing conservation management. It is important that somehow the monitoring and data analysis continues in order to take advantage of the baseline information and data gathered, the understanding of the various parties in using the various monitoring and modeling tools made available, and the assessment and interpretation of risk and our underlying scientific understanding of the dynamics of forest management and fire history as they affect behavioral and population responses of our trust species.

Lessons learned specific to the Fish and Wildlife Service

It is highly difficult for an agency to keep engaged and motivated in a multi-year study. The original purpose and enthusiasm wanes as the years progress. It is important that Fish and Wildlife Service have multiple team members so that when staff leaves there is an understanding of the study objectives and purpose of the project.

California Natural Resources Agency

This summary is based on contributions from the California Natural Resources Agency and its Departments of Fish and Wildlife, Forestry and Fire Protection, and Water Resources. The Natural Resources Agency elected to use a format for this response that differs from that used by the USDA Forest Service and USDI Fish and Wildlife Service.

“The State is interested in increasing progress across the Sierra Nevada to reduce the risk of catastrophic wildfire to the communities, and associated destruction of wildlife

habitat, water quality and adverse impacts on air quality in the region. The State is also interested in ensuring that the technical and management activities of the Forest Service, currently managing 11.5 million acres in the Sierra Nevada on behalf of the public, are effectively achieving broadly agreed upon goals weighing wildlife habitat needs with reducing expected wildfire losses, and improving overall forest health and structure and protecting municipal water supplies on a watershed basis. This objective is best achieved by full engagement by the Forest Service in a collaborative adaptive management and monitoring process with interested federal, state, local stakeholders, government agencies, Native American Tribal representatives and the scientific community as full partners directed previously by Congress and consistent with the WGA 10-Year Comprehensive Strategy and Implementation Plan. This adaptive management approach can improve forest management practices on lands owned and managed by other entities, both public and private.” (2005 MOU)

The Natural Resources Agency’s goals align well with the MOU Partner agencies’ consensus goals, which also were reported in Chapter 1. A decade later, these goals remain fully relevant to the Natural Resources Agency and the Sierra Nevada region today, with perhaps the only missing salient issue being recognition of climate change, its impacts on the forests and the need for mitigation and adaptation strategies to respond to it. Our recent experience with large fires in the Sierra Nevada forest (e.g., the 257,000-acre Rim Fire in 2013, the 98,000-acre King Fire in 2014, and the 152,000-acre Rough Fire in 2015) has only reinforced the need to address the risk of fire on these lands.

Natural Resources Agency Comments

As one of the MOU agencies that launched SNAMP, the Natural Resources Agency first and foremost wants to say *Thank You* to the entire SNAMP team. The team has done some very challenging and very useful research under some very difficult circumstances, particularly with respect to budgetary delays, lack of funding, drought, and wildfire.

We particularly want to applaud the team for the efforts that they have made to integrate their work and to make it comprehensible to a broad audience. It was clear from some of the early meetings that integration in particular was a real challenge, and the team clearly rose to it, both in the way that Chapter 4 was developed and as reflected elsewhere in the document.

The long-term nature of SNAMP made it very challenging for the Natural Resources Agency to remain fully engaged with the project over its life. SNAMP started in 2005, which is 10 years, two governors, and three Natural Resources Secretaries ago. In other words, a program of this length is a very long time, institutionally for a state agency, especially where that agency’s primary role is more one of policy setting than of management. So, part of the institutional learnings from SNAMP should be that government agencies with a policy involvement but not a direct management involvement in a piece of land or a landscape have a hard time staying engaged (whether in terms of staffing or funding) with a major project for such a long period.

In taking another look at the SNAMP MOU recently, the anticipated focused experiment piece was there, but the dominant theme of learning about how to do collaborative adaptive management as a central focus very much stood out. In part there is a flavor of how to successfully conduct adaptive management at the National Forest or Sierra-wide scale.

To quote from the MOU consensus goals:

A collaboratively developed and refined adaptive management strategy of annual monitoring, evaluation and accountability should inform management and interested stakeholders whether direction is being implemented as described, whether management practices are resulting in expected outcomes, and whether desired conditions are being met over appropriate timeframes. The adaptive management strategy should also offer a shared basis for designing and tracking changes or improvements at the stand and/or larger landscape levels.

Having the knowledge needed to successfully conduct collaborative forest management at the landscape level is particularly relevant at this time. Currently, the Natural Resources Agency, and our primary involved units at the Department of Forestry and Fire Protection and the Sierra Nevada Conservancy, are working closely with the Forest Service and other partners to launch landscape-level collaborative efforts in the Sierra Nevada.

These efforts offer more challenges than SNAMP not just because of their larger spatial scale, but also because of the multiple landowners involved. Further making collaborative adaptive management a timely topic is that the Forest Service is developing its first wave of new forest plans in California.

To apply a perhaps unscientific method, a tally of the management recommendations in Chapter 5 shows that that about 2/3 (20 of 31) were related one of the five biophysical research areas and 1/3 (10) were related to the collaborative adaptive management processes research area. This metric may indicate that the project provided a relatively high payback of learnings related to collaborative adaptive management.

SNAMP provides some very useful learnings regarding collaborative adaptive management. And there is some recognition in Chapter 5 that the SNAMP project had a limited scale in terms its applicability to collaborative adaptive management for larger landscapes such as whole National Forests, large mixed-ownership watersheds (e.g., the South Fork of the American River), or the Sierra Nevada range-wide.

SNAMP makes it clear that collaborative adaptive management has both a scientific and social component. The science in SNAMP was a set of new experiments. I think it also is valuable to recognize that the science synthesis work that the Forest Service Pacific Southwest Research Station has done in the form of General Technical Reports 220, 237, and 247 has provided a substantial source of scientific information that is highly accessible and that a wide range of stakeholders relies on in its discussions regarding forest management in the Sierra Nevada. Having this broadly accepted source of science synthesis is thereby supportive of collaborative adaptive management at various scales, including scales larger than those addressed in SNAMP. It also is worth pointing out that the ongoing series of Sierra-Cascade Dialogues that the Forest Service has been holding is a form of very high level collaborative adaptive management.

Going forward, the biophysical science that SNAMP has done to address a number of important management and policy issues is very valuable. But we still have a lot to sort out for how to do meaningful collaborative adaptive management at the scale of a National Forest, or a large mixed-ownership watershed, say. One of the particular challenges here is monitoring, as mentioned in a number of the comments below.

California Department of Fish and Wildlife (CDFW) Comments

As noted above, the State MOU goals focused strongly on reduced risk of catastrophic wildfire to wildlife habitat, water quality and air quality, and on adaptive management and monitoring process. All signatories on the MOU shared “the same general objective of balancing wildlife habitat needs and water quality considerations with reducing expected wildfire losses, and improving overall forest health and structure”.

Over the last 10 years, CDFW has participated in the SNAMP process at varying degrees. This is due to a variety of factors, including changes in staff, limited resources and the multitude of tasks associated with other high priority species. Even though, we have remained well informed through the transparent process the SNAMP afforded.

California Spotted Owl CDFW funded, in part, the research associated with collecting data and data analysis for the Spotted Owl Team and has remained continuously engaged at that level.

Considering the MOU goals for the California spotted owl, it is clear SNAMP produced high quality data informing the effects of habitat management and loss (timber harvest and wildfire) on owl fitness and key owl habitat. These results have the ability to drive how SPLATs are implemented on the landscape while maintaining owl reproduction, survival, population growth and occupancy. Even though SPLATs were not implemented on the landscape, the SNAMP proved successful at modifying treatment methodology to meet the ever-changing reality of forest management. The results were able to prove useful for managers past and future regarding how management (SPLATs and timber harvest) can be implemented, in the face of wildfires, while still retaining important owl nesting/roosting and foraging habitat features in and near owl activity features.

If SNAMP’s integrated recommendations are followed, SPLATs, as well as other management activities, may be applied on the landscape in such a way to provide neutral or added benefit to owls and their habitat. It is apparent that for any adaptive management or monitoring process to be successful, managers should be cognizant of the resources required over time, and plans made accordingly.

Fisher CDFW finds the following related to the fisher component of SNAMP:

- The fisher research study goals and objectives were mostly achieved.
- The research was remarkably intensive and relatively long term, resulting in a tremendous increase in robust scientific information on this elusive species.
- The SNAMP process and products, and results of the scientific research on fisher helped inform CDFW’s recently completed Status Review of fisher in California in response to a petition to list the species as threatened or endangered under the California Endangered Species Act.
- Reports and publications produced by SNAMP fisher researchers and cooperating efforts (Kings River Project, Southern Sierra Fisher Conservation Assessment) substantially increased our knowledge of fisher range, distribution, population size and trend, demography, phenology, dispersal patterns, threats, habitat associations and use, causes of mortality, and ecology in the Sierra Nevada.

- Reports and publications will aid CDFW Timber Harvest Review staff in making more informed management recommendations. Implementation and monitoring of forest treatments will further aid CDFW management recommendations and help conserve fisher.
- While CDFW is disappointed the effect of SPLATs and other fuel reduction treatments on fisher habitat could not be accurately assessed due to limited extent and intensity of fuel reduction treatments within the study area, we understand the factors that led to that situation.
- CDFW supports continued studies of effects of forest management techniques on fisher to help assure conservation of the species and a more resilient and ecologically-sound forest environment.
- Effective monitoring and adaptive management will be key to the long-term success of achieving the ultimate goals of SNAMP, and to help contribute to the long-term goal of ensuring the presence of a self-sustaining fisher population in the Sierra Nevada.

Department of Forestry and Fire Protection (CAL FIRE) Comments

The Final Report did a good job of addressing:

- How to effectively have collaborative involvement of varied stakeholders.
- The impacts of forest fuels management (specifically the use of SPLATs) on three essential natural resources: forest ecosystem health, wildlife (more specifically, California Spotted Owl and fisher), and water.

Topics (repeatedly) addressed in the MOU but not sufficiently discussed in the final report:

- How to design and apply an adaptive management and monitoring system, particularly:
 - how to monitor project implementation;
 - how to adjust management in response to new information (the feedback mechanism).

Useful info that was indirectly addressed, that would have been valuable to have had addressed more directly:

- Challenges to consider when applying adaptive management:
 - long-term funding of projects;
 - staff and stakeholder participant turnover and changes;
 - unforeseen and uncontrollable events (fire, drought, etc.);
 - delays -- things not always occurring exactly as scheduled;
 - difficulty in getting large enough sample sizes or getting population-level information when addressing wildlife with large home ranges.
- Aspects of the SNAMP work plan address adaptive management in a useful way, but these aspects are not really discussed in the final report.
- What would have been useful?
 - A section on lessons learned regarding planning for an adaptive management project and for the monitoring phase of an adaptive management project. For example:
 - The original plan for a BACI design did not completely work out. Does this indicate that it might be an unrealistic choice for the monitoring phase of

future adaptive management projects? Or are there particular steps that are advised to make it work despite likely challenges?

- How to choose a comparable control area, especially if the location of treatment areas is already decided (example: when to use single adjacent vs split adjacent vs alternatives, how to select, size, etc.).
- How management should be or might be changed from what was actually done based on the results of the monitoring (the feedback part).
- Whether or not this monitoring timeframe was good. Does it need to be longer before applying any modifications based on the feedback? Should changes be made based on feedback each year of monitoring?
- Which monitoring methods were most or least useful, and which would be most or least reasonable to use in a subsequent project? What are the tradeoffs to consider when selecting monitoring methods?
- Was the monitoring scale appropriate (i.e., the fireshed level)? Why or why not? What things should a manager consider when choosing a monitoring scale, based on what you found?
- The two study sites were chosen because they represented “opposite” management histories. Based on your results, would you subsequently recommend different management strategies or monitoring strategies depending on the management history of a project site?
- The report mentioned that treatments “were modified at Sugar Pine to protect wildlife habitat.” How? What lessons can be learned about how and when to do this when this issue comes up for future projects?
- What lessons can be learned from working with an expanded site for monitoring (as opposed to the originally designated monitoring area) where there was less control over how much treatment occurred and when? Were the methods used recommended for similar situations that could arise for future projects?
- Recommendations for how to handle (or how not to handle) funding issues, participant changes, and other challenges that threaten success?
- How much of what you learned herein can apply to non-SPLAT related management?
- Value of New Information from SNAMP science to CAL FIRE:
 - Research on effectiveness of fuel treatments and understanding the influence of treatments on valued resources and co-benefits continues to be a very relevant topic. The findings and management recommendations from SNAMP are a valued addition.
- Lessons learned to CAL FIRE:
 - Evaluating treatment effects from fuel reduction and other stand treatments takes a long-term monitoring commitment, pre- and post-treatment monitoring, and there can be many confounding factors that influence the certainty of results. Also, fuel treatments that are strategically placed can be effective and implemented with minimal adverse environmental impacts.

Department of Water Resources Comments

The SNAMP final report adequately captures the efforts of the science team during the SNAMP program. The water section of the final report was delayed in being received in part because the water team relied upon the results of the other teams to complete their modelling. It seemed that getting the information from the other teams into a format that the water team could use for their modelling was not a straight-forward process. The drought definitely impacted the data collection for the water team. It limited the range of runoff conditions that the water team could use in the calibration and validation of their model. These issues impacted the detail of the findings of the water team. In the end, the results presented in the report were organized much more along the lines of a thesis than a report addressing the issues of interest to the Department and Agency. That organization of material limited the value of the research findings to the Department. In conversations with the water team, efforts are in progress to improve alignment of report findings to DWR programs.

The SNAMP process itself was a challenge to navigate over the time period of the study. Uncertain budgets and difficulties in making connections from study objectives to program issues and priorities persisted throughout the study. Drought conditions further challenged the goals of the water research. However, in spite of those issues, there was value gained from the effort. There are new and improved connections between the Department and other agencies and departments and improved connection and communication with the water research team which may continue with other projects.