Sierra Forest Legacy

Protecting Sierra Nevada Forests and Communities

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Re: Comments on the DEIS and Draft Plan for the Giant Sequoia National Monument

Dear Ms. Thomas:

These comments on the Giant Sequoia National Monument (GSNM) Draft Environmental Impact Statement (DEIS) are submitted on behalf of Sierra Forest Legacy, The Wilderness Society and Friends of the River.

Overview

We appreciate the opportunity to comment on the draft plan and environmental documents. We recognize that planning in this rich and varied landscape is complicated by biological and physical processes as well as human driven social processes. It is a daunting task to develop a plan for such an extraordinary landscape, but we agree wholeheartedly with the GSNM team that it is essential to create a comprehensive plan.

We found it especially useful in our review to have extensive information readily available of the GSNM website. This allowed us easy access to a variety of specialists report and other planning documents. The availability of electronic documents also saves on paper and postage costs, and hopefully reduces the demands of staff time. As we discussed on the phone, there is some discrepancy between pages numbers (and even the numbering of figures) between electronic and printed documents. We understand that this is the result of your use of a new tool to track comments and respond to them. We suggest that refining this tool to allow the page numbering between printed and electronic version to be identical would significantly reduce confusion during public review.

Our review focused on several aspects of the planning documents including consideration of the protection of the objects, the cohesion and structure of the draft plan, and the degree to which the draft plan and DEIS satisfy the National Forest Management Act (NFMA) and the National Environmental Policy Act (NEPA). For this review, it was particularly useful to have a single document that constituted the "draft plan." This helped to think deeply about how they plan would serve to protect the objects of interest and unifying planning in the Monument.

As is described below, there are a number of areas where we believe the preferred alternative should be improved to protect the objects of interest. We highlight a few of those areas here. We are especially concerned about meadow management and meadow associated species. We ask that you include additional conservation measures in the preferred alternative to protect these objects. A second significant concern that we have is the weak integration in the plan among resources. The habitat condition for terrestrial species depends on the disturbance regimes and the diversity of vegetation. Improved integration among these resources areas may help your team highlight how a proposed plan seeks to protect the objects. We are also concerned that a proactive response to climate change is not integrated into the plan. We have provided extensive background and suggestions on how the plan should incorporate "climate-smart" planning to develop conservation actions aimed toward conserving biodiversity in an uncertain environment.

We also note below areas where we believe the planning documents do not met the requirements of NFMA and NEPA. A chief concern in these areas is the consistency and clarity of the draft plan and alternatives. We found it challenging to understand how the land allocations, objectives, strategies, and standards and guidelines where integrated to meet the desired conditions. In turn, clarity and conflicts in the planning documents made it difficult to evaluate the alternatives. We do believe, however, that our concerns noted in these comments can be resolved by revising the documents.

As a preface to the comments below, the page number citations for the all documents except the draft plan refer to the electronic versions of the documents. For the draft plan, the page citations refer to the printed version of the draft plan issued by your office.

I. Compliance with the Proclamation

A. The Preferred Alternative Does Not Include Necessary Measures to Protect the Objects

The preferred alternative (Alternative B) adopts in some cases the conservation measures included in the 2001 Sierra Nevada Forest Plan Amendment (SNFPA) and in other cases abandons those measures for approaches that give "more flexibility" to managers. In either case, the DEIS does not consider or evaluate important conservation measures that would increase the protection or enhance the value of the objects. The preferred alternative should include additional measures to protect the objects.

1. Willow Flycatcher

Throughout the Sierra Nevada region, willow flycatcher continues to decline in numbers. (Green et al. 2003). Activities that reduce habitat quality and reduce the wetness of meadows, including grazing, are considered among the greatest stressors on this species. (*Ibid*., p. 44). There are five willow flycatcher sites within the GSNM. (Wildlife BE, p. 5). Willow flycatchers have not been detected at these sites since 2001 (*Ibid*.). The 2001 SNFPA defines these sites as "known

willow flycatcher sites."[1] (USDA Forest Service 2001, p. 62). Practices in these sites differ between the 2001 SNFPA and 2004 SNFPA. The following table illustrates this.

Table 1. Selected standards for 2001 and 2004 SNFPAs.

Practice	2001 SNFPA	2004 SNFPA
Grazing in sites were flycatcher is detected	Eliminate grazing	Late season grazing allowed
Grazing in "known" or "occupied" sites	Late season grazing allowed	Late season grazing allowed
Date of onset of grazing	September 1	August 15
Surveys not completed as directed	Prohibit grazing	No change to grazing

The direction under 2001 SNFPA is more protective of willow flycatcher for several reasons. Eliminating grazing from a meadow were the birds have been detected ensures that direct disturbance to nests and reduction in habitat quality due to grazing (ground disturbance or reduction in shrub quality) does not occur. Further, the date of onset for grazing of September 1 ensures that disturbance occurs after the time of nesting. It is estimated that the earlier date of August 15 effects as many as 10 percent of the nesting birds. (Wildlife BE, p. 28). Lastly, there are no consequences under the 2004 SNFPA for failing to conduct the required surveys. These differences between approaches result in significant differences in conservation benefit to the species and are not simply a reduction in redundancy or an improvement in consistency as suggested in the DEIS (Volume 1, Chapter 2, p. 34).

The DEIS does not consistently describe the approach being taken for willow flycatcher. In some cases, the DEIS (Volume I, Chapter 1, p. 22) claims that "current management direction for grazing will not be changing in any alternative" and in other parts identifies that "Alternative B would remove the 2001 SNFPA standards and guidelines for the great gray owl and the willow flycatcher and replace them with ones based, in part, on the 2004 SNFPA" (DEIS, Chapter 2, p. 34).

The adopted alternative should include increased protection for willow flycatcher sites as described in the 2001 SNFPA and should increase the emphasis on restoration in willow flycatcher sites. Adopted practices should also include standards that improve the hydrology or wetness of meadow systems as recommended by Green et al. (2003).

2. Great Gray Owl

The great gray owl is listed by the State of California as endangered. Sears (2006) completed a survey of 82 suitable meadows extending from the Tahoe to Sequoia national forests; great gray owl was detected at 12 sites. Although the majority of the detections were on the Sierra National Forest one detection was observed on the Sequoia National Forest. Regarding the detection on the Sequoia National Forest, Sears (2006, pp. 10-11) reports:

[1] The 2004 SNFPA revises the terminology and calls "known" sites "occupied" sites. (USDA Forest Service 2004, p. 56).

> Only two detections were obtained in the extremities of the northern and southern Sierra: a pair in Tahoe National Forest detected several times in 2004 but not in 2005, and a single male in southern Sequoia National Forest detected once in 2005. The site in Sequoia National Forest was at low elevation (4500 ft.) and early in the season (March); therefore it is probable the single male was a floater awaiting access to higher elevation sites, or a disperser seeking a suitable territory. Floaters are typical for great gray owls in the winter as they tend to move down-slope when high snow load prevents foraging and as young search for suitable unoccupied territories (Bull and Duncan 1993). Moreover, a large herd of cattle (over 100 head) grazed this site in April, which quickly degraded meadow structure and made it unsuitable for both owls and prey.

Thus, there is evidence that grazing management on the Sequoia National Forest may be related to abandonment of occupied sites.

Management of high quality habitat generally focuses on two aspects of great gray owl ecology: nesting and foraging. As summarized by Beck and Winter (2000):

- The species is dependent on dense forests in mid to late seral stage with large snags and adjacent meadows.

- These habitats have been reduced in many areas due to forest and range management. Both green tree and salvage timber harvest can eliminate potential nest trees. Grazing can remove cover necessary for prey species and degrade meadows, thereby lowering water tables and reducing productivity of grasses and forbs that are food sources for prey. In addition, prescribed burning can remove potential nest snags and downed woody material that provides small mammal habitat.

Conservation measures adopted for the GSNM plan should address all the factors likely to reduce habitat quality. Additional measures addressing the retention of snags by reducing impacts from the effects of roadside salvage on large snags by closing roads in key areas (and thereby eliminating the public safety concern without reducing the numbers of large snags), and developing standards to manage for the season long persistence of wet meadows where present historically. Conservation measures directing the creation of "nest sites" (a practice being used by the Stanislaus National Forest) in areas of suitable habitat would be another action that is likely to benefit the species. The preferred alternative does not include such measures.

The 2001 SNFPA conservation measures address to some extent the risk factors identified by Beck and Winter (200) and should be adopted in the preferred alternative. For example, the 2001 SNFPA indirectly address the objective for achieving meadow conditions with increased wetness by requiring forage heights of 12 inches or greater and covering 90 percent of the meadow or more be maintained in meadows utilized by great gray owl. (USDA Forest Service 2001, p. A-38). However, additional measures, as suggested above, should be included to increase protection for this species.

3. Meadow Management

There is significant concern about the health of meadow systems in the Sierra Nevada. (Centers for Water and Wildland Resources 1996; University of California 2007). Past and ongoing impacts from the road system, timber harvest, and grazing have degraded meadow conditions. (Centers for Water and Wildland Resources 1996). The protection and restoration of meadows, a central object named in the GSNM Proclamation, should be one of the foremost concerns for the GSNM plan, yet the preferred alternative simply adopts the range standards from the 2001 and 2004 SNFPAs and fails to consider conservation measures to improve the conditions of meadows within the GSNM.

The limited information provided in the DEIS (Volume 1, Chapter 3, p. 75) on meadow condition indicates that for twelve meadows that have been sampled "transects show vegetation and soil elements meet high- to mid-seral ecological conditions." University of California (2007), drawing on Weixelman et al. (2003), associates "mid-seral" status with moderate ecological function. Further, University of California (2007) in its assessment of meadow condition rates meadows with high ecological function significantly higher than those with moderate ecological function. Meadows with high ecological function have the desired species composition, hydrology, and disturbance levels reflective of healthy meadow systems. Thus, it appears that an unknown number of meadows have moderate ecological function and are in a less than desirable condition.

The preferred alternative should propose actions that move meadows in a moderate ecological function to a condition of high ecological function. Additional land disturbing activities, such as grazing, road conditions, etc., should be prohibited until a high ecological function is achieved and stabilized within these specific meadows.

We also want to note an approach to manage grazing and other resources to achieve a high ecological function is consistent with and supports the goals of the GSNM Proclamation. Contrary to what is implied in the DEIS (Volume I, Chapter 1, p. 22), the Proclamation does not limit the Forest Service's ability to manage grazing.

4. California Spotted Owl

California spotted owl is a Forest Sensitive Species for which a concern about population declines throughout the range of the species has been a concern over the past 25 years. Ongoing demographic and habitat studies have emphasized the importance of high quality nesting habitat in proximity to nest stands as critical to persistence and reproductive success (Blakesley et al. 2005; Chatfield 2005; Seamans 2005).

The 2004 SNFPA (USDA Forest Service 2004b, p. 142) identified that:

> Verner et al. (1992), spotted owls preferred stands with significantly greater canopy cover, total live tree basal area, basal area of hardwoods and conifers, and snag basal area, for nesting and roosting. Thus, activities that would degrade or remove any of these habitat attributes are believed to pose some level of risk to owl occupancy and

> production. It is uncertain whether the benefits of treating PACs to reduce their susceptibility to wildfire will outweigh the potential negative effects of the treatments on owl occupancy and habitat quality. In part, the uncertainty stems from a lack of knowledge about how different types of treatments or combinations of treatments will actually affect fire risk and severity within PACs and in areas surrounding PACs.

Thus, uncertainty about treatment effects and benefits lead to a limitation on the intensity of impact allowed to PACs. The preferred alternative for the GSNM abandons this caution and allows treatment in all PACs. Alternative B allows for the removal of vegetation up to 20 inches diameter at breast height (DBH) in all PACs regardless of their location on the landscape. (DEIS, Volume 1, Chapter 2, p. 31). This allowed activity has the potential to reduce canopy layering, reduce understory vegetation, and generally degrade the quality of nesting areas. The DEIS provides no evidence (e.g., monitoring results) to suggest that this approach will support or improve the persistence of owl. Nor does the DEIS provide evidence that the increased intensity of treatment in this sensitive land allocation is necessary to reduce the risk of fire.

The preferred alternative also directs habitat altering activities (e.g., greater reduction in canopy cover, simplification of understory) to areas within Home Range Core Areas (HRCAs) that occur within Tribal Fuels Emphasis Treatment Areas (TFETAs). There are significant portions of the TFETA that are outside of the wildland urban interface (WUI) on which greater reduction in habitat quality is allowed. There is no analysis provided to support the need to extend treatments in the TFETA to reduce fire risk and thus no basis to support additional habitat reduction in HRCAs.

The preferred alternative should include conservation measures that minimize impacts to areas critical to spotted owl nesting and foraging (e.g., PACs and HRCAs). The preferred alternative should also develop actions directed toward improving habitat quality through the management of high densities of large snags to support nesting and roosting and the reduction in fragmentation due to road related effects (e.g., roadside salvage of large trees).

5. Road Management

The Proclamation specifically calls out the need to address road issues in the GSNM plan and further notes roads and road management as an issue. The preferred alternative, however, provides little direction on road issues and no direction to achieve the desired maintenance levels already established for the road system. The DEIS (Volume 1, Chapter 3, p. 248) identifies that for the area within the GSNM, there are 71 miles of maintenance level (ML) 1 roads designated as "operational ML" whereas 313 miles of maintenance level 1 roads have been designated as "objective ML." This means that the desired condition is to have an additional 242 miles of roads designated as ML 1 or "closed to vehicular use." (DEIS, Glossary, p. 15).

Providing the appropriate level of access and maintenance is critical to meeting the direction in the GSNM Proclamation. The adoption of the GSNM plan should include the decision to establish the objective ML designation on ML1 roads and close them to vehicular use.

6. Conservation Measures for Fisher and Marten

Fisher and marten are both mesocarnivores associated with Sierra Nevada conifer forest; both species are on the Forest Sensitive Species list. Although concerns about species persistence and habitat alteration are well documented, there are few conservation measures proposed in the preferred alternative that address these species.

The primary conservation measure is the identification of den buffer around known den sites. As pointed out by carnivore expert Bill Zielinski in his comments for the science consistency review (GSNM Science Consistency Review, p. II-48):

> The logic of this action is indisputable in that reproduction is an important event and animals are presumed to be most sensitive to disturbance when their offspring may be at risk. However, this strategy only can be effective if there is a companion program, each spring, of fieldwork to locate new dens. Illustrative of the failure of this approach, is the fact that there is only 1 protected marten den tree on the entire monument (pg. 72, Specialist Report) despite that buffers have been employed as a conservation practice for almost 10 years. This is because there has been no direction to fund the fieldwork necessary to find new dens, and no incidental marten studies that would produce this collateral information. A 'den buffer' conservation strategy will not succeed – and worse yet will provide the concerned public false assurances – if a program of fieldwork necessary to find new dens isn't advocated by line officers and adequately funded.

Thus, one of the significant measures identified in the preferred alternative is likely to have little effect on the conservation of fishers and martens.

The existing den buffer measures should be combined with requirements to survey project areas for den sites. If surveys are not possible or effective in locating den sites, then alternative measures should be adopted. For instance, establishing a limited operating period over the entire project area during the denning period for fishers (March 1 to June 30) and martens (May 1 to July 31) would reduce the potential for disturbance during a critical time in their reproductive cycle. Further, additional measures should be proposed such as protecting large trees from hazard removal (e.g., closing roads to use instead of removing hazards), developing actions to promote the development of large trees with appropriate defects and disease that are precursors to den structures, retaining higher levels of large down wood to support movement and prey base, and identifying critical linkages across the landscape to ensure connectivity among the best quality habitats and to target areas for restoration.

The preferred alternative also does not address the range of habitat requirements for fisher. Fisher denning and resting are associated with higher levels of large snags and down wood (Zielinski et al. 2006; Purcell et al. 2010). Using estimates from these and other relevant studies, desired conditions should be developed and conservation actions to meet or restore the desired conditions for large snags and down wood should be designed. Conservation actions could include retention on site as down wood the larger green trees cut for other purposes, or to explore the creation of snags using methods recently discussed in the scientific literature.

7. Reintroduction of Mixed Severity Fire

Fire is a natural ecological process in the Sierra Nevada, equal in ecological significance to floods, volcanic eruptions, hurricanes, and other natural disturbances (Lindenmayer and Noss 2006). The Sierra Nevada experiences a mixture of fire severities ranging from low to high severity in the mixed conifer region (McKelvey and Busse 1996, Collins et al. 2007) to largely high fire severity in chaparral-dominated ecosystems (van Wagtendonk and Fites-Kaufman 2006), the variety in burn severity across the landscape provides important ecological benefits to the forest including: preparing the seedbed for germination, cycling nutrients and replenishing minerals, modifying conditions promoting wildlife habitat and forage, creating structural heterogeneity, minimizing disease and pathogens, and reducing or increasing fire hazard (Kilgore 1973).

Many managed fire projects use a uniform burn pattern and do not promote variability on the landscape. This type of uniformity does not meet many of the key characteristics of ecological burning. For example, areas of dense forest affected by high severity fire are important for many cavity-nesting birds, most notably the black-backed woodpecker. This woodpecker relies on areas of dense trees that have been burned and are abundant with wood-boring beetles that provide a food source (Hutto 1995, Hutto 2006, Hutto 2008).

Prescribed and managed fires on the GSNM should focus on creating variable burn patterns and intensities that are specific to the vegetation type. These managed fires also should promote the development of the full range of biological legacies that fire creates in the forest. Ecological roles that these legacies play include (Lindenmayer and Noss 2006):

- Enriching recovering vegetation
- Facilitating survival and population viability of various species in disturbed areas
- Providing habitat for species that eventually re-colonize a disturbed site
- Promoting plant and animal re-colonization of disturbed areas
- Providing a source of energy and nutrients for other organisms
- Modifying or stabilizing environmental conditions on disturbed sites

The description of fire regimes in the DEIS (Appendix H) provides the basis for establishing desired conditions for specific landscapes. However, as pointed out by fire specialist Carol Rice (Rice 2010)[2], there are no objectives that establish the pace of accomplishment of restoring fire as a natural disturbance process and only one strategy that directs the inclusion on "hot fires" on a limited basis. (draft plan, p. 60: "Manage some hot fires with high intensity on a limited basis and with a tolerance for relatively high mortality.")

The GSNM plan is the appropriate planning document to establish the range of acceptable outcomes for managed fires and provide the setting to allow such fires to achieve the desired results. Further, there is little guidance in the preferred alternative to support the planning necessary to support effective use of managed fire for ecological benefit. Additional direction should be included to address this issue.

[2] The declaration by Carol Rice (2010) is incorporated into these comments by reference.

8. Adaptations to Changing Climate

There has been recent and widespread attention to the identification of actions designed to address changing climate and to increase the likelihood that important structure, process and function will remain across the landscape. (See for example Millar et al. 2007; USDI Fish and Wildlife Service 2010). Some of the areas of focus include:

- Developing vulnerability assessments for key elements
- Promoting habitat connectivity and integrity
- Reducing non-climate change stressors on the ecosystem

The preferred alternative largely focuses on the mechanical removal of material to alter vegetation and provides limited guidance on other activities related to adaptation to changing climates.

Additional conservation actions should be included in the preferred alternative to address the elements noted above. As discussed in detail later in these comments, an assessment of the vulnerability of key elements to climate change should be included as part of the forest plan amendment process as a means to establish priorities for action. Using the vulnerability assessment, landscape analysis and project level planning would further address priority actions. Such planning is critical to identifying places in the landscape that may be important to connectivity (aquatic and terrestrial) and to identify opportunities to reduce stressors not driven by climate.

Lastly, the preferred alternative does not include the direction to study the effects of climate change on both the ecosystem and species of interest. Alternative C is the only alternative that proposes to "Conduct research to determine whether species shifts are occurring and whether these are associated with climate change factors, such as shifts in habitat characteristics." (DEIS, Volume 1, Chapter 2, p. 103). The objects in the GSNM include both the species and the ecosystems as a whole. The preferred alternative should be revised to include research on species shifts.

Additional comments on climate change and climate adaptation are noted below in the section on NEPA.

9. Ecological Restoration and Criteria for Tree Removal

The GSNM plan is intended to “protect the objects of interest and manage Monument resources to restore ecosystems.” (DEIS, Volume 1, Chapter 1, p. 10). Unfortunately, the draft plan and DEIS do not define ecological restoration. As a result, the criteria for tree removal (DEIS, Chapter 1, p. 52) focus entirely on enhancing tree growth, reducing tree death due to fire or pests, or tree removal for safety concerns. The tree criteria do not consider the broader array of ecosystem functions. For example, the connection between tree removal and habitat alteration is not addressed by the criteria. Actions to reduce stand density and tree mortality can result in habitat conditions with low numbers of snags or defective trees. Similarly, actions designed to reduce fire severity can result in burned landscapes of mixed fire severity being under

represented across the landscape. The tree removal criteria need to be placed in the context of the broader ecosystem and its requirements. The criteria also must be grounded on a clear definition of ecological restoration.

The need for a clear definition of tree removal and the ecological context in which it is applicable is especially important in light of the exception language in the standards for the preferred alternative. Alternative B states that "Exceptions to vegetation management standards and guidelines is [sic] acceptable for restoration activities to improve species composition and stand structure and reduce species competition for resources." This footnote is specifically applied to the table that identifies tree diameter limits for vegetation removal in the preferred alternative. (DEIS, Volume 1, Chapter 2, p. 32).

The definition of ecological restoration needs to be specific to the GSNM, should address the pace and scale of restoration, the role of process (e.g., disturbance process and hydrologic cycles) and structure in the ecosystem, and should establish priorities for action. This definition should then provide an integrated framework in which to develop criteria for tree removal as well as defining a full range of actions that met the objective of ecological restoration. .

10. Role of Wilderness Areas in Protecting the Objects

The preferred alternative does not include recommendations for wilderness designation[3] and a wilderness evaluation was not completed during the planning process. There are several inventoried roadless areas (IRAs) within the GSNM boundary. Substantial portions of these IRAs are now being proposed for inclusion in land use allocations that direct more intensive use than allowed under the existing plan. For instance, TFEFTA extend over significant areas that previously where not in WUI or other designations with a priority for fuel treatment.

The value of wilderness designation to protecting the objects of interest is emphasized by the agreement in the MSA to recommend the Moses IRA for wilderness designation. The preferred alternative, however, fails to recommend the Moses IRA as wilderness and as a result does not comply with the MSA or protect one of the objects, i.e., the Moses IRA that has been long held to be important in the GSNM. The selected alternative must include a recommendation for the Moses IRA as wilderness to meet the commitments in the MSA and to project the objects of interest.

The GSNM planning process is the best opportunity to evaluate the benefits that wilderness designation can provide to meeting objectives such as habitat connectivity, amelioration of fragmentation, and restoration of natural disturbance regimes. The DEIS should include an evaluation of the lands that meet the definition of wilderness and provide recommendations for suitable lands.

[3] Alternative E includes a "proposal" to recommend the Moses IRA for wilderness. (DEIS, Volume1, Chapter 2, p. 74).

11. Grove Specific Fuel Reduction Plans

The preferred alternative does not include the grove specific fuel reduction plans identified in the MSA. As noted in Alternative A, the grove specific fuel reduction plans combined with other management direction make it clear that fuel reduction in the groves is a priority action. In contrast, as pointed out by Rice (2010), the preferred alternative focuses fuel reduction on areas utilized more heavily by humans and provides a far lower priority on the groves and other objects. (DEIS, Chapter 2, p. 64). Establishing such a low priority for the objects of interest places them at higher risk to undesirable disturbance. Completing fuel reduction plans for each of the groves would highlight the actions needed to reduce risks from undesirable fire effects. Further, setting as a higher priority the risk reduction in the groves would improve protection of these objects.

B. Science Advisory Board and Science Consistency Review

1. The Forest Service Should Have Empanelled a New Science Advisory Board.

The following section is a summary of the comments submitted by the Sierra Club (Sierra Club 2010) on this issue; their full comments on this issue area incorporated by reference.

The Forest Service convened a Science Advisory Board (SAB) during the first GSNM planning process. This SAB provided a number of advisories designed to address a narrow set of issues crafted by the Forest Service and focused in many cases on the preferred alternative that they were developing at that time. The Forest Service considered those advisories, but did not follow all of the guidance and advice in the advisories. In 2006, the Northern District of California ruled that the plan violated NEPA and set the plan aside. *Cal. ex rel. Lockyer,* 465 F.Supp.2d, p. 919; *Sierra Club v. Bosworth*, 465 F. Supp. 2d 931 (N.D. Cal. 2006).

Despite requests from several groups, the Forest determined it would not empanel a new SAB as it had met its Proclamation obligation because it had implemented a management plan on the Monument prior to Judge Breyer's decision. In addition, the Forest Supervisor determined that a number of advisories from the earlier SAB are "still relevant" and "applicable" to the new management plan. 74 Fed. Reg., p. 11521.

The Proclamation is clear; guidance for the initial plan is required from a scientific advisory board. 65 Fed. Reg., p. 24098. Since the initial plan for the monument was found invalid by the court and is permanently enjoined from implementation, it is beyond reason for the Forest Service to determine that advice provided on a plan, the content of which was determined to be deficient, is adequate to address the direction in the Proclamation.

Further, consideration of the past advisories in the current planning process is not adequate the directives of the Proclamation for several reasons including the restricted focus of the SAB, the 6 year gap in time since those advisories were issued, the requirement for unanimous decisions to advance an advisory, and the advisories focus on a plan whose content the court found to be deficient.

Lastly, the reliance on the Science Consistency Review (SCR) is inadequate to address the purposes of the SAB described in the Proclamation. The SAB was intended to "provide scientific guidance during the development of the plan." The SCR was asked to evaluate if the information presented in the documents was consistent with science and was bound by four questions:

1. Is the relevant scientific information considered?
2. Is the scientific information reasonably interpreted and accurately presented?
3. Are the uncertainties associated with the relevant scientific information acknowledged and documented?
4. Are the relevant management consequences identified and documented, including associated risks and uncertainties?

(SCR, p. I-1). This team of scientists was not asked to provide scientific guidance or advice during the development of the plan as required of the SAB. The SCR provides only a retrospective review on a limited set of questions and was not designed to contribute to the development of the plan.

To satisfy the direction in the Proclamation, the Forest Service must empanel a new SAB to develop the management plan.

C. Formulating A Coherent and Comprehensive Plan

We agree with the purpose and need which identifies that "There is a need for a single comprehensive management plan for the Monument. The current management direction (including the Forest Plan, the 2001 SNFPA, the KRSMA, and the 2007 SNF MIS), the MSA, and the presidential proclamations provide redundant and at times, conflicting management direction." We also believe that such a document is required by the Proclamation. We reviewed the draft management plan to assess its coherency, completeness, and reliance on other documents for direction. Setting aside any disagreements we might have with the direction presented in the draft plan, the draft plan as written is not comprehensive or coherent. Further, conflicts internal to the document and between that document and the DEIS produce conflicting management direction.

1. The Draft Plan Is Not Coherent

The diagram in the draft plan (p. 8) depicting "management direction" illustrates some of the problems inherent to the development of this draft plan. The implication from this figure is that the GSNM plan is derived from various past management plan decisions, the mediated settlement agreement, and the Proclamation. In fact, the GSNM plan must meet the requirements of the Proclamation, the agreements in the MSA, and other laws/regulations. The information in past land planning decisions can inform the GSNM plan, but the plan itself has no requirement to incorporate previous direction. This figure should be removed from the plan since it inappropriately defines the relationship between the GSNM plan and past decisions.

a. Vision

The use of the term "niche" in describing the Monument is unclear. "Monument Niche" (draft plan, p. 13) is defined as "the Monument's uniqueness on a national and regional level." (*Ibid*., p. 8). There is a second use of the term "niche" as applied to recreation (appearing first on *Ibid*., p. 14 and throughout the plan). The aspects described under "Recreational Niche" are components of the Monument; they are not independent. The use of the term "niche" in the heading "Monument Niche" implies that its relationship is equivalent to "Recreational Niche" as opposed to the topic of "Recreational Niche" being subsumed under the Monument, a broader concern. Further, "niche" appears to be new terminology applied to recreational planning; its use in this is confusing when combined with the idea of "Monument Niche." We suggest that you eliminate the reference to "niche" in "Monument Niche" and simply title the section "Monument."

b. Desired Conditions

It is unclear from the DEIS or the draft plan what information served as the basis for the desired conditions developed for vegetation. Vegetation is one of the main contributors to habitat quality, but the link between the habitat needs of desired species and desired conditions for vegetation has not been made. Also, key structural elements such as understory vegetation, large snags and down wood are not mentioned at all. The draft plan also does not characterize the desired conditions for aquatic habitats and the terrestrial interface between the water and upland environments. It is also not clear how the information in the DEIS (Appendix H) on fire regimes is intended to support the desired condition statements in the draft plan. The final plan should establish a connection between the desired conditions for vegetation and wildlife to ensure that they support each other, address the habitat in the interface between water and uplands, and integrate additional information on fire regime into the desired condition statements.

There is a recurring statement about canopy cover and multilayered crowns in the desired condition statements: "Some of the large trees have multi-layered crowns, producing 60 percent or more canopy cover. (See for example, draft plan, p. 29). It is unclear what is meant by "multi-layered crowns." Tree canopies, made up of groups of trees, can be multi-layered. As an example, the California Wildlife Habitat Relationship (CWHR) classification defines multi-layered stands as "Size class 5 trees over a distinct layer of size class 4 or 3 trees, total tree canopy exceeds 60% closure." (California Department of Fish and Game 2010). The emphasis in this definition is not on the individual trees themselves having multi-layered crowns, but rather the group of trees creating a situation that is multi-layered. The draft should clarify what is meant by "multi-layered crowns."

c. Defining Land Allocations

The land allocations in a plan drive the placement of management activities on the landscape. The land allocations in the draft plan (pp. 37-38) are undefined. Loosely their definition or intent loosely can be inferred from their title or some of the text in the draft plan, but their specific desired condition, management intent, and management objectives have not been clearly stated. Examples of how such information are located in the 2001 SNFPA (USDA Forest Service 2001, beginning, p. p. A-33) or the 2004 SNFPA (USDA Forest Service 2004a, pp. 36-48).

To illustrate the problems, we evaluate three land allocations: Tribal Fuels Emphasis Treatment Areas (TFETAs), Old Forest Emphasis Areas (OFEAs), Zone of Influence (ZOI). Each of these land allocations lack a specific discussion of why these are important or critical designations. Further, the standards and guidelines do not communicate clearly what activities are relevant in these designations. For example, the standards and guidelines indicate that the TFETA allocation is to reduce severe fire effects in this area. Research has demonstrated that treatment of surface and ladder fuels results in landscapes that are likely to avoid severe fire effects, especially under the 90th percentile conditions identified in the standards and guidelines. (Stephens and Moghaddas 2005; North et al. 2009). Surface and ladder fuel treatments rarely include the removal of trees over 16" dbh, yet the diameter limits identified for the TFETA in the DEIS indicated that trees up to 20" DBH may be removed. (DEIS, Volume 1, Chapter 2, p. 31). Because of these conflicting ideas and allowed actions, the purpose and intent of the TFETA land allocation is unclear. Many other sensitive resources overlap with the TFETA (e.g., protected activity centers, fisher den buffers). The tables in the draft plan (pp. 41-42) indicate some relationship between the TFETA, PACs and den sites, but it is unclear what is meant by the notation "apply PAC & den, WUI usually apply over HRCA." There is different guidance for PACs that occur in the Defense Zone versus outside the Defense Zone. It is not clearly stated which direction is intended to apply in the TFETA?

The OFEA is another example of a land allocation that has no definition and lacks clarity in direction. This is especially the case since there are no standards that address the activities that are appropriate in this designation. The lack of definition for OFEA further affects the ability to understand the actions allowed in Home Range Core Area (HRCA). The standard for HRCAs relies entirely on actions defined for the OFEAs and simply states that "Fuel treatment standards and guidelines for California spotted owl home range core areas are identical to those presented for old forest emphasis areas above, except for the wildland urban intermix." (draft plan, p. 127).

The ZOI serves as a final example. This allocation appears to have been created to protect the sequoia groves. The draft plan directs the development of "a zone of influence (ZOI) where mechanical treatments are restricted." There is no further discussion about what restrictions would be placed on mechanical treatments or if these restrictions apply uniformly in the TFETA or Defense Zones. The figure characterizing trumping order (draft plan, p. 39) and the tables indicating "dominant management direction" (draft plan, pp. 41-42) do not mention ZOI as a land allocation. This appears to be an important allocation for the protection of the groves, yet there is no discussion about what activities to undertake in these areas.

The draft plan (p. 39) provides a figure that is intended to illustrate the "trumping order" of various land allocations. Setting aside the lack of definition noted above for land allocations in general, this diagram fails to address all land allocations (e.g., TFETA and other allocations are missing). Further confusing matters, this figure refers repeatedly to standards and guidelines contained in the 2001 SNFPA (including page numbers to the Record of Decision) and fails to link the actions allowed to the actual standards that are being proposed for the GSNM. This figure should be revised to be inclusive of all land allocations and to refer only to the specific standards that are being included in the draft plan.

In some cases, there is direction in the standards and guidelines that applies to a certain land allocation or condition, but since the condition is undefined it can not be determined where to apply the direction. For example, there are standards identified for "Forested Stands of Large Trees with Moderate to Dense Canopy Cover." (draft pan, p. 122). There is no definition provided for "Forested Stand of Large Trees." This is not listed as a land allocation so it does not appear in the tables indicating how it relates to other land allocations. As a result it can not be determined where the listed standards should apply.

d. Standards and Guidelines

The section on Design Criteria (draft plan, p. 79) states that "design criteria" include standards and guidelines," yet this section does not include the standards and guidelines. These are instead placed Appendix F and are not referenced in the "Design Criteria" section. The standards and guidelines should be removed from an appendix and integrated into the section on "Design Criteria."

e. Conflicts Between the Draft Plan and DEIS

There are numerous conflicts in intent and direction between the draft plan and the DEIS. Some examples are noted above, but these are not exhaustive. As an additional example, there is a table in the DEIS identifying the strategy for determining where tree removal is "clearly needed." (DEIS, Volume 1, Chapter 2, p. 52). This table is absent from the draft plan. The final plan should to be internally consistent and consistent with the final EIS.

2. The Draft Plan Is Not a Stand Alone Document

The extensive referencing to the 2001 SNPFA, 2004 SNFPA, and MSA in the draft plan undermine the function of the document as a stand alone and comprehensive plan. We recognize that the plan was developed based on a review of various plan amendments, yet the final plan is intended to be applied with out reference or consultation to these previous plans. Documentation of the relationship to previous plans or agreements is appropriate as an accounting exercise in the DEIS, but its inclusion in the draft plan is confusing and in some cases incorrect in the present draft.

The draft plan should be revised to remove references to previous plans and to incorporate all necessary information to execute the plan into one document.

II. Compliance with the National Forest Management Act

Land management planning for the Forest Service is governed by the National Forest Management Act (NFMA) and the implementing regulations. The adopted GSNM plan must comply with NFMA and the implementing regulations. Our review of the documents indicates that the draft plan and planning process do not comply with NFMA in a number of ways.

A. Desired Conditions

In many ways, the statements about desired conditions are the heart of a management plan. These statements establish the condition of the landscape that is desired now and in the future and provides the basis for determining what might constitute ecological restoration. The statements should provide a sufficient level of detail so that it can be understood what is desired and to allow assessment of the achievement of those conditions. The desired conditions for several of the resource areas do not provide much information on the condition to achieve. Further, the desired condition of several of the resource areas depends on conditions that affect other resources areas, yet this crossover or integration among resource areas is weakly addressed.

The desired conditions for fire and fuels provide an example of some of the difficulties presented in the draft plan. The desired conditions for fire and fuel do not specifically indicate the natural condition that is desired. The DEIS indicates, in part, that:

> Fire occurs in its characteristic pattern and resumes its ecological role. Frequent fire maintains lower, manageable levels of flammable materials, especially in the surface and understory layers. There is a highly diverse vegetation mosaic of age classes, tree sizes, and species composition and a low risk for uncharacteristic large, catastrophic fires.

This statement focuses on ecological role and characteristic pattern of fire. To understand the context for these attributes, it is essential to determine what effects of fire would be determined to be fulfilling the "characteristic pattern of wildfire." There is some additional definition provided in the last sentence indicating that "large, catastrophic fires" would be uncharacteristic. This phrase, however, still lacks sufficient definition. Defining this condition is especially important for the GSNM because "characteristic patterns of fire" in the Sierra Nevada included "catastrophic" or high severity fire. (van Wagtendonk and Fites-Kaufman 2006). The management plan needs to be clear about what the desired condition is so that one can take action to avoid that condition or understand that the outcomes from managed or prescribed fire are within the range that is acceptable. This concept is well stated in Hessburg et al. (2007, pp. 123-124):

> Our results suggest that low, mixed, and high severity fires each occurred in dry (and moist) mixed conifer forests of eastern Washington. The scope of management and restoration activities could be broadened to not only accept many such wildfire effects, but to manage for them. This should be good news for forest managers because it suggests that some contemporary wildfire effects will meet management objectives, and a broader suite of forest structural conditions and a broader range of patch sizes supported native fire regimes of mixed conifer forest.

The fire management plan for Yosemite National Park provides an example of how a plan can more clearly define desired conditions and to set criteria for managing within them. (USDI National Park Service 2009a).

We can look at the modeling results for the fire and fuels effects to illustrate further the importance of defining desired conditions in ways that are specific. The modeling results in the

DEIS indicate that, with the exception of Alternative D, there is no difference in the amount of lethal fire expected over the next 7 decades, regardless of treatment approach. (DEIS, Chapter 4, p. 65). This result could suggest that desired conditions for introducing wildlife to the landscape would be met by these alternatives. However, since the desired conditions for fire are not quantified, we have no ability to judge this potential result as successful or not.

If one concluded that this level and effects of burning was desirable, but that avoiding the more severe effects in specific locations was critical for some resource areas, it could be specified that for certain resource areas fire effects of a specific type and location would not be consistent with achieving desired conditions. For example, there may be locations in the GSNM where fisher habit is narrowly distributed and has the potential to constrain dispersal. If movement in this area is particularly important and more important than developing the structural characteristics resulting from fire, calling out the avoidance of severe fire effects in key locations could be integrated into the desired condition statement or objectives for fisher. In this way, the resources could be integrated to recognize the beneficial effects of a disturbance process, yet establish locations where the range of conditions should be limited for competing management concerns. To some extent this approach is taken for areas affecting public safety.

We ask that the desired conditions be revised to clarify the acceptable level of disturbance and more fully define what it would mean to achieve the desired conditions.

B. Management Indicator Species (MIS)

1. 2007 MIS Amendment Does Not Apply to the GSNM Plan

The 2007 Management Indicator Species (MIS) Amendment applied to the Sequoia National Forest, but not specifically to the planning area defined by the GSNM. At the time that the 2007 MIS amendment was adopted, the GSNM was, by court order, governed by the 2001 SNFPA. As stated in the DEIS:

> In the interim, and until the Forest Service issues a new Management Plan, the Monument shall be managed consistent with the Monument [Clinton] Proclamation of April 15, 2000, and in accordance with direction from the 1988 Sequoia National Forest Land and Resource Management Plan, as amended by the 1990 Mediated Settlement Agreement and the 2001 Sierra Nevada Forest Plan Amendment ["2001 Framework"].

(Volume 1, Chapter 1, p. 9). The order specifically limits the amendments to the 1988 Land and Resource Management Plan to the 1990 MSA and 2001 SNFPA. The 2007 Amendment is not allowed by this order. Thus, the Forest Service lacks authority to apply the 2007 MIS Amendment as current management direction for the Monument in the same way that it lacks the authority to apply the standards and guidelines of the 2004 Framework as current management direction to Monument.[4]

[4] The 2004 SNFPA ROD (p. 15) states: "The existing land and resource management plans contain many standards and guidelines that are not amended by this decision. All standards and guidelines from the 2001 SNFPA ROD are replaced by the standards and guidelines in Appendix A. This decision does not affect the direction in the following plans and projects: . . . • Giant Sequoia National Monument Plan . . . " (emphasis added)

There is potential harm to the objects of interest by the inclusion of the 2007 MIS amendment into the GSNM plan. The 2007 MIS amendment fundamentally changes and weakens monitoring requirements for a number of species considered to be objects of interest in the Proclamation (e.g., great gray owl, peregrine falcon, several rare amphibians, and western pond turtle). Further, the 2007 MIS Amendment makes discretionary the task of completing monitoring. With the 2007 MIS Amendment, the Forest Service is no longer obliged to complete monitoring to support project level decisions, i.e., project level decision are allowed to be made and implemented regardless if the monitoring for MIS has been completed. Thus, there are no checks in place to ensure that the Forest Service conducts monitoring in advance of activities and considers these results in project level decisions.

For these reasons, the DEIS and draft should remove reference 2007 MIS Amendment and address the MIS species and species at risk named in the 2001 SNFPA.

2. The Plan Area Was Not Evaluated

Setting aside any debate about the applicability of the 2007 MIS amendment to the GSNM plan, the evaluation of MIS in the DEIS does not meet the direction in NFMA to evaluate habitat and populations for selected MIS to inform management across the planning area. (36 CFR 219.19). The "planning area," i.e., the area encompassed by this plan, is the GSNM boundary. Contrary to the direction to evaluate populations and habitat trends for the planning area, the DEIS evaluates potential changes to population trends relative only to the Sierra Nevada bioregion as a whole. The evaluation does not address how the plan will affect population trends within the planning area of the GSNM. In most cases, the potential effects on MIS from the GSNM plan influence much less than 1% of the Sierra Nevada bioregion. This effect on habitat and in turn population trends region wide is deemed to be negligible. For example, for California spotted owl, marten and flying squirrel, the DEIS (p. 559) states:

> Relationship of Plan-level Habitat Impacts to Bioregional-scale Trends: Because the alternatives will result in, at most, a reduction in tree canopy closure and reduction in large snags on less than 1 percent of existing late seral, closed canopy coniferous forest habitat in the Sierra Nevada, this plan is unlikely to alter the existing trend in the habitat or lead to a change in the distribution of California spotted owls, American martens, or northern flying squirrels across the Sierra Nevada bioregion.

The area of evaluation is within the "planning area" and not across the bioregion. It is clear that when comparing the GSNM plan area to the bioregion the MIS selected in the 2007 MIS amendment will never indicate anything about management since the comparison of a 330,000 acre planning area to an 11,000,000 acre bioregion will always produce a small relative effect.

This approach has rendered useless the direction in the regulations to use MIS to evaluate management in the planning area and to ensure viable populations of desired species across the planning area.

The evaluation of MIS in the planning area is also inadequate since the effects were evaluated only for the activities expected in the Defense Zone. Activities in the Defense Zone represent a fraction of the landscape and about half of the acres scheduled for treatment in the first decade for some alternatives. (Silviculture Report, pp. 75-76). The MIS analysis should be revised to include an evaluation of all activities across the planning area.

3. Selected MIS Not Appropriate

On their face, the MIS adopted from the 2007 MIS amendment are not appropriate for the GSNM planning effort. The purpose and need for the GSNM is to create a plan that protects the objects identified in the Proclamation. The MIS species identified in the 2007 MIS are unlikely to inform us about the degree to which the plan maintains viable populations across the planning area because the selected species are not responsive to changes in the plan area. For example, macroinvertebrates were selected as a group of species to indicate something about conditions in "Riverine & Lacustrine" environments. (MIS report, p. 5). The evaluation, however, finds that "The direct, indirect, and cumulative effects of Alternatives A, B, C, E, and F will result in changes in flow, sedimentation and water surface shade that will be too small to be measured." (*Ibid*., p. 10). Thus, the selected indicator is not capable of detecting changes across the plan area even though alterations in habitat are estimated.

At a minimum, it is necessary to evaluate a suite of species for selection as MIS relevant to the GSNM planning area, which may include the MIS identified in the 2007 MIS Amendment, and determine their suitability for the purposes of the Proclamation and the implementing regulations.

3. MIS Not Properly Evaluated.

Black backed woodpecker was selected as an MIS due to its association with snags in burned forests. The variability in snag generation among alternatives due to the differing emphasis on the priority for using prescribe and managed fire and the range of fire severity expected was not considered in the evaluation. For example, the modeling for Alternatives C and D indicates that these will produce more wildlife (Alternatives C and D) or more lethal fire (Alternative D). These outcomes would create more favorable conditions for black backed wood pecker compared to other alternatives. These benefits were not recognized.

Pacific Tree frog was selected as an MIS to represent wet meadow habitat. (MIS report, p. 5). An evaluation of tree frog is missing from the MIS report and the DEIS.

C. The Proclamation Direction Requires A Plan Revision

The implementing regulations for NFMA direct the revision of a forest plan "on a 10-year cycle or at least every 15 years" (36 CFR 219.10). The regulations also direct the revision of a plan when "conditions or demands in the area covered by the plan have changed significantly or when changes in RPA policies, goals, or objectives would have a significant effect on forest level programs." The GSNM should be based on a plan revision because the length of time since the

creations of the plan exceeds 15 years and there have been significant changes to the demands in the planning area.

The forest plan for the Sequoia National Forest was adopted in 1988. In the 22 years since the adoption of that plan there have been significant changes in the setting and demands on the plan area. Foremost among the changes is the Proclamation that affirmatively states that commercial timber production is no longer an objective on the GSNM land base. This is a significant change from the direction in the Land and Resource Management Plan (LRMP) for the Sequoia National Forest and in the determination of the land base that is suitable for timber production.

III. Compliance with NEPA

The DEIS fails to comply with NEPA for the reasons stated below. The Forest Service should revise the DEIS to address these concerns and circulate the revised DEIS for additional public comment.

A. Issues Not Appropriately Identified or Addressed

1. Science Advisory Board (SAB) and Science Consistency Review (SCR)

As explained in detail above, the Forest Service must empanel a new SAB to develop the management plan as directed by the Proclamation.

2. Livestock Grazing.

The DEIS (Volume 1, chapter 1, p. 22) states that "Livestock grazing as an issue will be eliminated from detailed study because current management direction for grazing will not be changing in any alternative." This statement is incorrect. Changes to livestock grazing from the existing direction are proposed in the preferred alternative as well as others. As described above for willow flycatcher and great gray owl, the standards for managing habitat quality in meadow systems are significantly different between the existing direction (2001 SNFPA) and the proposed changes.

The discussion under this issue also seems to suggest that the Proclamation prevents any change to grazing management. Such a conclusion is incorrect. The Proclamation affirms that grazing is an allowable use. The Proclamation, however, does not state that grazing as a use cannot be managed.

The response to this issue should be revised to reflect that changes in grazing management are being considered in the DEIS. Further, alternatives that address this issue and increase the protection of the objects should be proposed. Specific additional measures to include in an alternative include the conservation measures proposed above for willow flycatcher, great gray owl, and meadow management.

B. Alternatives

1. The Alternatives Are Not Clearly Defined

The alternatives presented in the DEIS are not clearly and consistently defined. As noted above, there are conflicts among the DEIS, specialist reports, and the draft plan in the descriptions of the various alternatives. Numerous examples of the inconsistencies are noted above and include failure to define the land allocation, lack of clarity in management intent for the allocations, and inconsistencies or lack of clarity on actions to take in overlapping land allocations.

One outcome of the lack of clarity is that those reviewing the documents, as well as the specialists evaluating the alternatives, can not understand or may be mistaken about what the alternatives actually propose. As a result, the effects cannot be estimated or evaluated properly.

2. The Alternatives Do Not Address The Purpose And Need

The alternatives do not meet the purpose and need to "create a single comprehensive management plan." As noted above, the draft plan relies as fundamental to the planning direction information not contained in the draft plan. Further complicating matters, references to other documents or decisions is sometimes not accurately reflected in the draft plan. The incoherencies and inconsistencies within the plan also undermine its ability to satisfy the requirement for a "single comprehensive management plan."

3. Basis For The Desired Conditions

Desired conditions are not clearly linked to the scientific literature. There are no references cited to support their development or adoption. The desired conditions for vegetation also are not clearly linked to habitat requirements for sensitive species or to the disturbance regimes that are important to the development of vegetation structure and habitat. As a result, there is no evidence presented to support the conclusion that the desired conditions will support viable populations of the affected species.

C. The Analysis Of Effects Is Not Adequate

The Forest Service must take a "hard look" at the environmental consequences of a proposed action and the requisite environmental analysis "must be appropriate to the action in question." *Metcalf v. Daley*, 214 F.3d 1135, 1151 (9th Cir. 2000); *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 348 (1989). NEPA requires that the agency analyze impacts in comparison to an accurate determination of baseline data, such that the Forest Service adequately and accurately describes the "affected environment." 40 C.F.R. § 1502.15; *see also Half Moon Bay Fisherman's Marketing Ass'n v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988). Finally, under NEPA's implementing regulations: "If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement." 40 C.F.R. § 1502.22.

The lack of clarity in the description of the alternatives noted above undermines the ability to effectively analyze the impacts of the alternatives on the environment. The analysis that is provided often does not quantify the effects of the alternatives or use tools currently available to estimate effects. Lastly, the summaries of effects in the DEIS and the specialist report often do not support their analyses with information from the scientific literature. This last concern also was raised in the Scicence Consistency Review (SCR, p. I-3).

There is also a lack of integration between the evaluations of effects on various resources. The following serves as a significant example of the failure to integrate the analysis of effects across resource area. The fire and fuels analysis indicates the proportion of the GSNM modeled to be affected by lethal fire. Alternatives A, B, C, E, and F all have similar levels of lethal fire, whereas, Alternative D results in more lethal fire. (DEIS, Chapter 4, p. 65, Figure 4, Lethal Fire). Examination of the total wildfire modeled indicates that Alternatives A, B, E, and F have about the same levels of total wildfire, Alternative C has slightly more wildfire, and Alternative D has slightly more than Alternative C. (*Ibid*., Figure 3 Wildfire). These results indicate that Alternative C results in lethal wildfire to the same extent as Alternatives a, B, E, and F, yet produces more fire that is beneficial to the ecosystem. The Soils Report states that "The impacts of severe wildfires pose one of the greatest risks to soil productivity in the Sierra Nevada." (Soils Report, p. 13). However, despite there being no difference in the area affected by severe wildfire, the Soils Report concludes that Alternative C results in a greater risk to large, severe wildfire compared to Alternatives A, B, E, and F. (*Ibid*., p. 14). The Silviculture Report, in turn, adopts the position that Alternative C will have a greater adverse impact on soils due to fire effects. The conclusions in the Silviculture Report and the Soils Report conflict with the results in the fire and fuels analysis that indicates there is no difference in fire effects between Alternatives B, C, and F. This suggests that fundamentally there is a lack of understanding or agreement among the specialists about the desired condition for fire "to occur in its characteristic pattern" and resume "its ecological role." (DEIS, Chapter 2, p. 62).

In combination, the lack of clarity and inconsistency makes it impossible to evaluate the effects of the alternatives on the environment as required by NEPA or evaluate the degree to which the actions would move the landscape toward the desired condition as required by NFMA.

1. Vegetation and the Silviculture Report

We want to acknowledge that there is a great deal on information provided in the Silviculture Report (pp. 12-24) on baseline conditions in the sequoia groves. We appreciate the opportunity to review this level of detail and understand that this information will be extremely valuable in the development of restoration strategies for each of the groves.

Apart from the detailed information provided for each grove, there is very little quantitative information presented to characterize baseline conditions and to evaluate the effects of the alternatives on vegetation. Further, scientific literature rarely is used to support the conclusions in the DEIS or report. This comment was noted by the SCR, but it is unclear what was done to modify the report or DEIS to address this concern. Despite this lack quantitative and scientific support, the Silviculture Report (pp. 24-28) makes broad and wide ranging statements about the likelihood of effects under each alternative.

A. Analysis of Carbon Storage and Emissions

The U.S. Department of Agriculture recognizes the important interaction between carbon, forests, and public lands. "Carbon dioxide uptake by forests in the contiguous United States offsets 11 percent of total carbon dioxide emissions. Forests and other ecosystems are carbon sinks, as they absorb CO_2, thereby removing it from the atmosphere. Forest management activities will play a critical role in ensuring that forests remain a net carbon sink." (USDA Forest Service 2010a).

Despite the critical role that forest management plays in addressing this global problem, the Forest Service's analysis of carbon sequestration on the Monument fails to use the research and tools available to estimate effects. The discussion of carbon exchange is so weakly tied to the scientific literature that it lacks credibility. As will be discussed below the Silviculture Report provides no analysis to support the claim that more logging will result in the maximum amount of carbon stored. Further, there are recent studies suggesting that increased logging will not increase carbon storage. Lastly, the analysis fails to place carbon in the context of the ecosystem and the carbon exchange process that is essential to restoring and enhancing the ecosystems contained within the GSNM.

The Forest Service's evaluation of carbon sequestration is entirely speculative. For example, the Forest Service states that Alternative F will minimize the loss of carbon as a greenhouse gas and maximize the carbon sequestered by managing fewer, larger, and sounder trees. (Silviculture Report, p. 51). This conclusion, however, is contrary to the recent findings in Reinhardt and Holsinger (2010) for several forest types in the Rocky Mountains that "fuel treatments decreased fire severity and crown fire occurrence and reduced subsequent wildfire emissions, but did not increase post-wildfire carbon stored on-site. Conversely, untreated stands had greater wildfire emissions but stored more carbon." The outcomes of fuel treatments, wildfire, and growth on carbon stocks in a system with complex disturbance regimes are not intuitive. The complex interactions operating in this system require the use of additional tools to support any evaluation.

There are tools available to quantify carbon sequestration under different management alternatives, yet they were not employed in the analysis. Reinhardt and Holsinger (2010) Hurteau and North (2009), and Meigs et al. (2009) each provide examples of approaches and tools to evaluate carbon exchange. Common themes among these studies include the ideas that significant amounts of carbon are retained on site following wildlife, the productive capacity of the site influences strongly the rate at which post disturbance (logging or fire) carbon accumulates, and untreated stands stored more carbon than treated stands. In each of these studies, the full accounting of carbon cycle was discussed in detail. The Forest Service itself also has developed tools that could have been used for accounting purposes (http://www.nrs.fs.fed.us/carbon/tools/). The Forest Service should have done a carbon accounting that projected the carbon accumulation and losses (sequestration and emissions) over the time covered by proposed management plan and for several decades beyond. These estimates should at a minimum account for the following:

- Additional carbon accumulation in forest stands that are not harvested

- Carbon removal with harvest and the fate of that carbon (losses in manufacturing, use and disposal and associated emissions to the atmosphere)
- Production of dead organic matter by harvesting (includes slash, stumps, roots of harvested trees; usually the amount is similar to that removed from site) and its fate (decomposition over time and emissions to the atmosphere)
- Carbon emitted during wildfire
- Carbon accumulated post-wildfire

Such an analysis is feasible and necessary to support any conclusions about the efficacy of a particular treatment to carbon storage and emission.

The discussion in the Silviculture Report also depends on conclusions about the fates of carbon removed as biomass (i.e., all living material) that are not substantiated. For instance, the report states that Alternative F will sequester the most carbon because by logging trees it will encourage the use of biofuels and replace fossil fuel consumption. (Silviculture Report, p. 51). There is no assurance that biomass generated from management will be used for biofuels or as an energy source. In fact, the potential for biomass to be utilized as a biofuel is highly jeopardized in the current market for energy. (See *Sierra Sun* (August 10. 2010), http://www.sierrasun.com/article/20100820/NEWS/100829987). Other assumptions about the amount and duration of sequestration also are made in the report that are unsubstantiated. These assumptions bear heavily on any estimates for carbon storage and must be based on evidence in the scientific literature.

The analysis of effects of the alternatives on carbon exchange in the GSNM planning documents should be revised to consider the issues above. We also ask that the Forest Service engage qualified experts within and outside the agency in the development of the appropriate analysis to estimate the complex interactions inherent to the carbon exchange process.

B. Analysis of Vegetation Structure And Function

The Silviculture Report reflects is overly focused on management driven by the mechanical removal of material (and in many cases trees greater than 20" DBH) as a means to provide the greatest management flexibility. One consequence of this focus is that the report fails to closely examine the benefit of using fire to manage for structural diversity and heterogeneity.

The use of tools such as managed fire or hotter prescribed fire tends to be viewed as risky or resulting in negative effects. For example, the Silviculture Report states that "Although Alternative C provides opportunity for maintaining or creating more early seral phase, Alternatives E and F "allow flexibility to manage stocking levels and canopy gap size and distribution and to reduce fuels to protect from catastrophic fire in and outside of defense zones." (Silviculture Report , p. 27). Contrary to this assumption, Alternative C, however, provides the opportunity to mechanically reduce surface and ladder fuels and to reduce fuels to a level that will accommodate prescribed fire. (DEIS, Volume 1, Chapter 2, p. 38). Further, modeling results indicate that the level of lethal fire is the same between Alternatives A, B, C, E, and F. This information does not support the conclusions in the Silviculture Report that the fire effects under Alternative C are more intense and resource damaging when compared to other alternative.

Another example of treatment bias is illustrated by the belief that Alternative C provides "inadequate protection of structure and soils." As noted above, the Silviculture Report provides no evidence to support this conclusion and analysis elsewhere provides information to the contrary. Further, examples of outcomes in the national parks in the southern Sierra Nevada indicate that a management approach that places a priority on using prescribed and managed fire to achieve restoration and ecological resilience can be successful. (Keifer et al. 2000; Collins and Stephens 2007; Collins et al. 2007; USDI National Park Service 2009a; see also GSNM DEIS Science Consistency Review, p. II-50).

The effects analysis for vegetation also should include a more extensive discussion about existing snag and down wood levels and understory conditions. The development of these habitat attributes is critical to numerous wildlife species. The development of snags and down wood depends on the interaction with disturbance processes such as fire, disease, and insects. The focus in the Silviculture Report on reducing tree loss from these stressors, in the name of achieving "resilience", conflicts with the development of these structures for the benefit or structural diversity and habitat quality. The DEIS should evaluate the current levels of these important habitat elements and consider the effects of the various alternatives to providing desired levels of these attributes.

The Silviculture Report also makes conclusions about sequoia regeneration that do not take into consideration the opportunity for regeneration following managed or wildfire. These disturbances can result in the bare mineral soil, moisture, and light environments more favorable to sequoia regeneration. Approximately 10-15% of the GSNM is modeled to be affected by wildfire each decade with some portion of that as lethal fire. (DEIS, Volume 1, Chapter 4, p. 65) Managed and prescribed fires also are expected to occur. It is unclear why the analysis did not consider these as opportunities for regeneration. Given that Alternatives C and D potentially result in more area affected by wildfire, they have a greater potential to support sequoia regeneration in these area compared to the other alternatives.

2. Wildlife

The analysis of effects to wildlife rarely quantifies the effects of the alternatives and intentionally does not incorporate the details from the SPECTRUM analysis into the effects analysis. The evaluations also tend to address suitable habitat as a whole without making distinctions among quality of habitat. This lack of detail in the characterization of the habitat and in the estimate of effects makes it difficult to evaluate the effects of the alternatives on wildlife.

This is particularly important when considering the effects of the alternatives on habitat elements such as snags, down wood, and understory structure. Baseline conditions for these important attributes are not described and the effects of the alternatives on snags are addressed superficially. Generally, the wildlife biological evaluation (BE) found that snags and down wood may be lost in the short term, but only a small portion of the GSNM would be treated and the effects for all alternatives would be small (See for example Wildlife BE, p. 52). Further, the wildlife BE focuses the discussion on the potential to remove snags and down wood, but does not address the differences among alternatives in the development of future snags and down wood. Because there are differences among the types of disturbance anticipated among the

alternatives, e.g., more prescribed or managed fire in some or more large tree removal in others, it can be expected that these differing management approaches would result in different levels of snags and down wood. For instance, prescribed fire is generally low intensity by design. This type of fire is less likely to generate the density of burnt snags required by black backed woodpeckers or damage larger trees thereby providing points of entry for disease and pests. In contrast, managed fire or prescribed fire designed to be of high intensity can achieve these outcomes. These differences among the alternatives should be addressed.

The lack of examination of the existing conditions also limits the development of measures to mitigate the impacts of land management on critical habitat attributes and limits the development of restoration approaches to enhance current levels of these attributes. For example, since the wildlife BE does not examine the current levels of snags and down wood, there is no ability to identify areas where the density of these attributes is low or to propose actions in those areas to restore desired levels of the attributes. There are similar concerns about the examination of the existing habitat condition for other species, including willow flycatcher, fisher, marten and great gray owl. Restoration or conservation measures that address the current quality of the habitat and identify actions or strategies to improve conditions rarely are defined for these species.

Habitat connectivity is another issue that is not addressed in the DEIS or specialist report. As described in the section below on climate adaptations, reducing fragmentation and increasing habitat connectivity are critical to ensuring that species are able to occupy and move thorough the landscape under changing climate. Recent studies in the southern Sierra Nevada have emphasized the importance of habitat connectivity and have defined areas of specific importance to maintaining or achieving habitat connectivity.[5] (California Department of Fisher and Game 2010). This project identifies area important to connectivity that are within and adjacent to the GSNM. The evaluation of effects and design of conservation measures should incorporate and address this information.

As noted above, there is significant concern about the health of montane meadows systems in the Sierra Nevada. Aside from a brief reference in the rangeland section in Chapter 3, there is no information provided about the existing habitat quality in montane meadow systems or the effects of the alternatives on montane meadows in the DEIS. (DEIS, Chapter 3, p. 75). The DEIS indicates that several meadows are known to need restoration and indicates that others should be surveyed, but there is no discussion about the current condition of these meadows. (DEIS, Chapter 2, p. 70). Although there are objectives identifying the need to restore specific meadows, none of the alternatives restrict activities in these degraded areas or establish any consequences for not achieving the restoration objectives. Strategies to limit additional disturbance in areas determined in need of restoration should be included in the preferred alternative.

We also note that the determination of effects on willow flycatcher is not rational or consistent with previous findings. The wildlife BE finds that:

> It is my determination that these Alternatives of the Giant Sequoia National Monument Management Plan Draft Environmental Impact Statement would have **no effect** on

[5] For details of the California Essential Habitat Connectivity Project see http://www.dfg.ca.gov/habcon/connectivity/

willow flycatchers. Known sites would continue to be protected following the 2001 or 2004 SNFPA guidelines. No changes in management of meadows, riparian areas or additional recreational development of potential willow flycatcher habitat are proposed, so there would be no direct, indirect or cumulative effects to this species.

The current management direction is to follow the 2001 SNPA. As noted above, there are significant differences between the 2001 SNFPA and the 2004 SNFPA that lead to greater potential for risk to nest sites in the 2004 SNFPA compared to the 2001 SNFPA. Thus, there are changes to management of willow flycatcher habitat among the alternatives. There also are effects to willow flycatcher under any of the alternatives; this was previously recognized in the 2001 SNFPA and 2004 SNFPA. (USDA Forest Service 2004, p. 214). Lastly, the 2004 SNFPA found that activities associated with the 2001 SNFPA and the 2004 SNFPA may affect willow flycatcher. (USDA Forest Service 2003). The DEIS and specialist reports should be revised to reflect the above information.

D. Fire and Fuels

Based on the review by fire specialist Carol Rice (2010) and others, we find that that are numerous issues in the documents and specialist reports that should be addressed in the GSNM plan and EIS.

1. The Wildland Urban Interface Is Overly Expansive

The alternatives in the DEIS, at their most expansive, identify over 50% of the GSNM as wildland urban interface (WUI). In addition to this vast area, the preferred alternative also identifies another 56,643 acres as TFETA lands. There is some overlap between the WUI and TFETA designations, but large areas of the TFETA are outside the WUI and located in areas currently identified as IRAs. Desired conditions for all alternatives indicate that "Fuel reduction treatments in the wildland urban intermix (WUI) zones are focused on developed areas within these zones." (DEIS, Chapter 2, p. 62). However, the analysis of effects for all alternatives anticipates treatment through out the WUI and does not support the much more limited application of fuel treatments described in the desired conditions.

The focus of such treatments around structures noted in the desired conditions makes sense since as indicated by Cohen (2008) and others, the risk occurs within the ignition zone which is 100-200 feet from the structure.[6] Treatments intended to provide a reduction in risk to structures must be implemented in close proximity to the structures. The Defense Zone, as delineated in the DEIS, often occurs at the Forest Service property boundary and is not adjacent to structures. Treatment in these distant areas will not provide a reduction in risk to the structure. (Rice 2010).

There are certainly management activities that would reduce the risk of undesirable fire effects on habitat or vegetative that could be undertaken outside of the ignition zone, but ignition zone-style actions are not needed away from structures.

[6] For additional information on this topic see declaration by Rice (2010).

2. Tribal Fuel Emphasis Treatment Area (TFETA)

The DEIS is entirely silent about the existing condition and strategy that drives the delineation of the TFETA that covers over 56,000 acres of the GSNM. The TFETA includes substantial areas currently defined as inventoried roadless areas (IRAs) indicating that much of the area is remote to development. The tactical or strategic reasons driving the location of intensive fuels treatments in this vast area should be disclosed in the DEIS.

The DEIS should also provide an analysis of the tribal lands themselves and identify the contribution to risk that they impose on the objects of interest in the GSNM.

3. Desired Conditions and Protection of Humans and Property

Aspects of the desired condition statement for fire and fuels are confusing and contradictory. The desired conditions include the statement that "The need to maintain fuel conditions that support fires characteristic of complex ecosystems is emphasized and allows for a natural range of fire to lower fire intensity and protect human life and property on lands in and adjacent to the Monument." (DEIS, Chapter 2, p. 62). This indicates that management intends to focus on achieving outcomes that result in low intensity fires, yet the affected ecosystems are ones that experience a range of fire effects, including high severity fire effects. (Rice 2010). As presently drafted, there are conflicting ideas within the desired condition statement that potentially prevent fire from occurring "in its characteristic pattern and resume its ecological role."

The focus on achieving low intensity fire undermines the importance of accomplishing other fire effects for ecological benefit. The GSNM plan should specifically promote a variety of fire effects that would be expected to occur naturally on the landscape as opposed to only promoting low intensity and high frequency fires. Van Wagtendonk and Lutz (2007) identified that "There is some concern that prescribed fires are not sufficiently intense to mimic naturally occurring fires (Miller and Urban 2000). They discovered that even though the fire program is one of the most active in the nation, the rotation is still 213 years." They recommend that "…attempts should be made to burn with higher intensities. This will result in a greater proportion of the area being burned with moderate and high severity, better mimicking the natural fire regime." (*Ibid*.). Van Wagtendonk and Lutz (2007) specifically address this issue noting "Because the objective for these burns was to incrementally reduce heavy accumulations of fuels, the prescriptions were more conservative than conditions for naturally occurring fires. The use of prescribed fire alone could not restore the forest to its historic structure and condition."

The DEIS should provide additional detail (e.g., objectives, strategies, standards) that support the use of managed fore to achieve ecological objectives. The DEIS should also define more clearly, as noted above, the desired conditions for fuels that reflect the "characteristic patterns" of this ecosystem.

4. The Key Term Fire susceptibility Is Undefined.

As noted in the SCR (p. II-41), the term "fire susceptibility" is undefined. This term does appear in the glossary:

> Relative ranking of hazard, risk, and severity of large severe fires. An assessment of the susceptibility of forest lands to wildfire.

DESI, Glossary, p. 11). It's meaning, however, remains opaque. (Rice 2010). It appears that it is a composite ranking, but there is no explanation of how hazard, risk and "severity of large severe fires" are integrated to create the ranking. The "high susceptibility" to fire is used repeatedly in the DEIS to set priorities for fuel treatments. Providing a clear definition of this term and providing a map that locates these areas is critical to a review of the ranking system as an effective approach to achieve the desired conditions and to evaluate the effects of the alternatives on other resources.

5. Fire Effects for Alternative C

Similar to the situation with other resource areas, there is little quantitative information disclosed in the DEIS with respect a comparison of fire effects among the alternatives. The DEIS does show the trends in the amount of wildlife and amount of severe wildfire over 7 decades. (DEIS, Chapter 4, p. 65). These trends indicate that Alternative C results in the greatest level of burning in low and moderate severity (a desirable condition) and the same amount of high severity fire as would result from Alternatives A, B, E, and F. This combined increase of low to moderate severity fire with limiting increases in high severity fire best matches the desired conditions. Despite this resonance with the desired conditions, the DEIS and specialist reports consistently identify Alternative C as less desirable than Alternatives B or F.

The DEIS should address fully the fire effects reported for Alternative C and explain how this alternative does not better meet the desired conditions for fire and fuels compared to other alternatives.

E. Climate Change and Climate Adaptation[7]

Climate change is the biggest conservation challenge facing the Forest Service in the 21st century and contributing to global efforts that help forests mitigate and adapt to climate change is a priority for the Forest Service in California.

Randy Moore, Pacific Southwest Regional Forester
(http://www.fs.fed.us/r5/climate/activities/sequoiapartnership.php)

1. Background on Climate Change

It is now undisputed that global climate change poses serious risks to human health and the environment.[8] Warmer temperatures, more severe droughts and floods, and sea level rise, which

[7] The comments is this section were developed in collaboration with the Sierra Club.
[8] *See* http://www.ipcc.ch/ipccreports/assessments-reports.htm; EPA, Ground-Level Ozone: Health and Environment, March 6, 2007, http://www.epa.gov/air/ozonepollution/health.html
; EPA, Particulate Matter: Health and Environment, January 17, 2008,
http://www.epa.gov/air/particlepollution/health.html; Jonathan A. Patz, et al., Impact of Regional Climate

are just some of the results of climate change, will affect important economic resources such as agriculture, forestry, fisheries, and water resources. All these stresses can add to existing stresses on resources such as land-use changes and pollution. The U.S. EPA determined, based on a full review of the scientific evidence and focusing on impacts within the United States, that six greenhouse gases (including carbon dioxide (CO_2) endanger both the public health and the public welfare.[9] In making this finding, EPA pointed to risks to human health associated with changes in air quality, increases in temperatures, changes in extreme weather events, increases in food- and water-borne pathogens, and changes in aeroallergens. As the EPA stated:

> The evidence points ineluctably to the conclusion that climate change is upon us as a result of greenhouse gas emissions, that climatic changes are already occurring that harm our health and welfare, and that the effects will only worsen over time in the absence of regulatory action. . . . In both magnitude and probability, climate change is an enormous problem.[10]

The effects of climate change include "heat waves, more wildfires, degraded air quality, more heavy downpours and flooding, increased drought, greater sea level rise, more intense storms, harm to water resources, harm to agriculture, and harm to wildlife and ecosystems."[11]

EPA's recent pronouncement is based on well-established facts that the international scientific and regulatory community has known for over a decade. The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and the United Nations Environment Programme in 1988 to comprehensively and objectively assess the scientific, technical, and socio-economic information relevant to human-induced climate change, its potential impacts, and options for adaptation and mitigation.[12]

New evidence suggests that even the alarming estimates of the dire threat of the pending global climate meltdown by the IPCC are too conservative and that the threat of global warming may be even more imminent than originally anticipated. A recent study found that from 2000 to 2006, the average growth in GHG emissions was 3.3% per year, compared to 1.3% per year during the 1990s.[13] The study estimates that the climate meltdown is happening faster than previously feared, and attributes this to recent growth in carbon intensity, and decreasing efficiency in carbon sinks on land and in oceans.

Change on Human Health, Nature, 438, 310-317, November 17, 2005, http://www.nature.com/nature/journal/v438/n7066/full/nature04188.html; EPA, Climate Change, Health and Environmental Effects, December 20, 2007, http://www.epa.gov/climatechange/effects/health.html; *See also*, Centers for Disease Control, CDC Policy on Climate Change and Public Health, available at: http://www.cdc.gov/climatechange/pubs/Climate_Change_Policy.pdf.

[9] U.S. Environmental Protection Agency, Final Rule, Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act, December 7, 2009, Docket ID No. EPA-HQ-OAR-2009-0171; http://www.epa.gov/climatechange/endangerment/downloads/FinalFindings.pdf.

[10] EPA Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Proposed Rule, 74 Fed. Reg. 18886, 18904 (April 24, 2009)

[11] *Ibid.*

[12] More information about the IPCC is available at: http://www.ipcc.ch/about/index.htm.

[13] *See* http://www.ucar.edu/news/releases/2008/climate-threat.jsp.

The certainty surrounding climate change has spurred national and state governments into action, including the Forest Service. Forest Service Chief Tom Tidwell has emphasized that every program and unit in the Forest Service must play a role in responding to climate change. (*See* Office of the Climate Change Advisor, U.S. Forest Service, available at: http://www.fs.fed.us/climatechange/climate-update.shtml.) In fact, the new USDA Strategic Plan for 2010-1015 sets a departmental goal to "Ensure our national forests and private working lands are conserved, restored, and made more resilient to climate change, while enhancing our water resources." (*Ibid.*) To achieve that goal, all national forests are to come into compliance with a climate change adaptation and mitigation strategy. To guide the Forest Service in achieving this goal, the agency has issued numerous directives, including the Roadmap for Responding to Climate Change. (*Ibid.*, USDA Forest Service 2010a.) The DEIS and draft management plan were not developed using many of the planning tools and guidance provided by the Forest Service.

2. The Forest Service Failed to Consider Climate-Related Research and Planning Tools that were Relevant to the Monument

In its promulgation of new management direction for the GSNM, the Forest Service has an important opportunity to address and incorporate climate adaptation considerations into an effective, science-based, climate-driven management strategy. Unfortunately, the DEIS and draft management plan ignore important climate science and policy and present a suite of alternatives that fail to adequately prioritize adaptation concerns or include management direction that effectively protects objects of interest in an era of anticipated rapid climate change.

Climate change is expected to significantly affect the health and vitality of forests and to create environmental conditions never before experienced by forest ecosystems, including those of the Sierra Nevada (Innes et al. 2009, Millar et al. 2007, North et al. 2009, Redmond 2006). Incorporating climate adaptation concerns into the forest planning process proactively, before major ecosystem changes occur, will likely be less expensive and more effective than a reactive management approach in achieving forest management goals (Blate et al. 2009). The Forest Service must incorporate climate adaptation strategies at both the programmatic and operational planning level in order to achieve the goal of sustainable forest management (Innes et al. 2009). While uncertainties related to climate change demand the development of a robust and ongoing research, monitoring, and adaptive management plan, land managers should take certain precautionary steps now to provide interim protections for species and ecosystems while long-term needs are identified and dynamic plans implemented (Mawdsley et al. 2009; Hannah and Hansen 2005).

There is a general scientific consensus, supported by a large and growing body of literature, that climate change demands a new, dynamic resource management approach with a strong emphasis on the preservation of biodiversity (*see, e.g.,* USFWS 2010, Hannah et al. 2002, Innes et al. 2009, Mawdsley et al. 2009, Moritz et al. 2008, Millar et al. 2007, Joyce et al. 2006, Mohr 2009, Kettunen et al. 2007, Loarie et al. 2009, Stralberg et al. 2009, Mansourian et al. 2009, Heller and Zavaleta 2009)**.** These studies consistently indicate that climate change is one of the largest threats to biodiversity today. Scientists predict significant shifts in habitat and range for

individual species, along with potentially dramatic changes in community composition, under a variety of climate modeling scenarios.

Climate change poses a particularly daunting challenge for the current biodiversity crisis and already imperiled species. This challenge heightens the importance of near-term efforts to protect existing populations from other short- and long-term stressors in order to ensure genetic diversity and reduce extinction risk (Hannah et al. 2002, Hampe and Petit 2005, Traill et al. 2009, Moritz et al. 2008). Therefore, while it must be proactive and responsive to changing conditions, forest management in an era of anticipated rapid climate change and heightened uncertainty must above all be rooted in a precautionary approach to ecosystem management. "Reducing current sources of ecosystem stress (e.g., pollution, invasive species, habitat fragmentation, and extractive activities) is perhaps the most important and effective option for building ecosystem resilience" (Blate et al. 2009, p. 60). Given the uncertain but likely significant additional vulnerability of resources and ecosystems in a changing climate, other near-term impacts to habitats, individuals, and populations must be avoided whenever possible. To the extent that stressors such as tree removal, road building, and continued or expanded recreational use are allowed to continue, their likely amplified effects upon ecosystems and species must be carefully and thoroughly re-evaluated in light the near- and long-term risks posed by climate change

In light of the numerous threats to biodiversity and ecosystem health from climate change, responsible resource management must assess the vulnerability of ecosystems and their constituent elements. The GSNM Management Plan and associated documents should include a risk assessment for Monument resources that "employs the best available science to characterize vulnerability, uses state-of-the-art modeling to assess likely exposure to climate change and its effects, and documents sources of uncertainty" (Aplet et al. 2010, p. 33). Vulnerability assessments, discussed in more detail below, are fundamental to the forest planning process in the face of climate change. They are used to examine forest resources and determine which elements are sensitive and which have the ability to adapt, while also identifying the likely consequences to those resources from anticipated climate change (Aplet et al. 2010). Management informed by vulnerability assessments would prioritize project-level actions designed to reduce vulnerability of key local resource values through such strategies as reduction of anthropogenic stressors, establishment of reserves, regulation of recreational use, and habitat restoration (*Ibid.)*.

Because ecosystems are so complex, it may be impossible to evaluate the vulnerabilities of every population, species, community, or other element of the system in question. Instead, vulnerability assessment can focus on particular, high-priority elements or "key vulnerabilities." In its 4th Assessment Report, the IPCC (Schneider et al. 2007) suggested the following criteria for identifying key vulnerabilities:

- magnitude of impacts,
- timing of impacts,
- persistence and irreversibility of impacts,
- likelihood of impacts and vulnerabilities,
- potential for adaptation,

- distributional aspects of impacts and vulnerabilities,
- importance of the system(s) at risk.

In other words, key vulnerabilities are likely to occur where the effects of climate change are large and intense, imminent, long-lasting, highly probable, and likely to limit the distribution of highly valued systems or system elements. Running and Mills (2009) suggest that the most vulnerable elements of ecosystems are those that are (1) rare; (2) long-lived (with fewer generations in which to evolve); (3) isolated; (4) dependent on special habitats (especially those directly affected by climate, such as deep snow and ephemeral wetlands); and (5) susceptible to the kinds of disturbances likely to result from climate change (fire, floods, extreme drought). In addition to these "highly vulnerable" species, they recommend focusing on (a) species with "a high public profile;" (b) "data-rich" species; and (c) "strongly interacting" species (keystone and dominant species). Species with a high profile are those that are appreciated for their strong contribution to ecosystems services, providing utilitarian, recreational, and aesthetic value. "Data rich" species provide the information necessary to devise potential conservation strategies, and "strongly interacting" species, by definition, control ecosystem function. Running and Mills apply their criteria specifically to species, but similar considerations may apply to features, such as glaciers, rare soils, riparian vegetation, and old growth forests. A vulnerability assessment should explicitly examine species and other ecosystem elements that meet these criteria and explore the factors that make them vulnerable.

Concurrent with vulnerability assessment, a climate-conscious Monument Plan should call for the identification and conservation of current and potential future habitat and refugia via regional reserve networks of high-quality habitat that are connected across landscapes (*see, e.g.,* Hannah et al. 2002). This network of reserves "must be wed with effective modeling of future climate change and managed specifically for climate change" (*Ibid., p.* 267). Maintaining and re-establishing connectivity of healthy habitats across landscape gradients to facilitate climate-induced species migration and dispersal will increase the potential for successful adaptation in the face of both climate variability and experimental management strategies (Blate et al. 2009, Moritz et al. 2008, Innes et al. 2009). Such regional landscape management should be implemented for the Monument at the programmatic level such that it can help guide the design, analysis, and approval of individual projects. There are numerous recent and ongoing efforts to map current and future habitat connectivity within the State of California, some of which highlight the high value of the habitat in the Monument and surrounding area, that should inform management direction of and planning for the GSNM; unfortunately, none of these are referenced in the DEIS or supporting documents (*see, e.g.,* Spencer et al. 2010; Kreitler 2010 (California Landscape Conservation Cooperative project description); Loarie et al. 2008).

The focus of successful forest management strategies in an era of rapid climate change will likely shift from maintaining forest structure and composition to supporting ecological process and ecosystem function (Millar et al. 2007). For example, the importance of fire in shaping the Sierran mixed-conifer ecosystem suggests that adaptive management designed to manipulate the process of fire could enable our regional forests to reach dynamic equilibrium under modern changing climate conditions, increase forest heterogeneity, and bolster resilience to climate change. In an era of rapid and uncertain change, management designed to restore natural fire processes and support biodiversity throughout the Monument (on a landscape level) will likely

be more successful than the perpetuation of different management prescriptions for distinct "static" land allocations, such as an overly broad Wildland-Urban Interface or Tribal Fuels Emphasis Treatment Area.

Whenever more active and/or "adaptive" management of forests is employed to limit exposure to climate impacts or create resilience in the face of those impacts, additional care must be taken to minimize negative impacts of management actions on high-value habitat elements for high-risk species and other Monument resources. For example, moist microclimates supporting high tree densities are of critical importance to many highly vulnerable species (North et al. 2009) and should receive added protections in light of their sensitivity and increased vulnerability in a rapidly changing climate. Similarly, modeling of stream flow, snow, soil moisture and related deficits, and potential evapotranspiration under regional warming scenarios has shown that Sierra Nevada mountain meadows are likely to experience "significant changes in hydrologic conditions" that should inform management decisions and direction *(see* http://www.aswm.org/calendar/wetlands2008/abstracts_4.htm). Sensitive microclimates will likely be more geomorphically unstable as climate stressors intensify, which may make intact ecosystems more suitable for passive rather than active management (*see, e.g.,* Bakke 2009) while increasing the urgency of climate-smart restoration for these habitats when they are impaired. Unfortunately, the DEIS proposes moving management in the opposite direction, using anticipated climate-associated changes to justify more aggressive or status quo management action in high value and sensitive microclimates (*see* DEIS Volume 1, p. 433; DEIS Science Consistency Review, p. II-51). Climate-smart management of sensitive habitats must comprehensively evaluate current and future stressors, minimize these stressors wherever possible, and prioritize restoration of impaired ecosystems to maximize habitat redundancy in light of the likelihood of future loss due to warming.

Despite the urgency with which Region 5 has opted to highlight climate change as its primary challenge and priority, the large body of scientific literature and planning tools available, and an analysis of climate trends in Appendix C to the DEIS, the Draft plan and DEIS rarely incorporate climate concerns into their management framework and analysis. This is a particularly embarrassing failure for Region 5, given that other Forest Service Regions undergoing parallel forest planning processes are addressing and incorporating climate-smart strategies and analysis into their programmatic documents. One such example is the George Washington National Forest in Virginia, which has produced both a draft appendix ("Climate Change Trends and Strategies for the George Washington National Forest") and a draft description of alternatives for its forest plan revision process that explicitly identify climate adaptation strategies and generally note how, if at all**,** these are incorporated into various programmatic management directions (*see* USDA Forest Service 2010b (Draft Appendix), p. 14-17; USDA Forest Service 2010c (Draft Description of Alternatives)). While the alternatives developed for the George Washington National Forest vary in their approaches and effectiveness as climate-smart strategies, and the full environmental analysis has yet to be completed, the Forest Service in this instance has at least established a climate-driven framework that facilitates analysis and public review.

3. The Forest Service Must Revise the DEIS to Incorporate These Adaptation Strategies.

a. The Forest Service has a Legal Duty to Address the Impacts of Climate Change.

The DEIS acknowledges that climate change is expected to have a profound impact on the Monument (*see* DEIS, Vol. 1, p. 414 and Appendix C thereto). The DEIS concedes that "[c]limate change will cause changes in the distribution of individual species and of forest and rangeland ecosystems" (DEIS, p. 488). It nevertheless concludes: "The precise effects of climate change on individual species are difficult to predict and will not be addressed in the effects analysis" (*Ibid.)* This approach does not satisfy NEPA.

The Forest Service has a legal duty to address the impacts of climate change both from land management actions and to the resource area in the Plan. In addition to a genuine analysis of impacts, it is imperative that the Forest Service craft strategies for addressing and adapting to impacts from climate change.

Courts have also made it increasing clear that environmental analyses must consider the effects of an action in the context of climate change. For example, courts have rejected biological opinions prepared under the Endangered Species Act, because they did not consider the impact of the federal action in light of climate change. *See, e.g., Natural Res. Defense Council v. Kempthorne,* 506 F. Supp. 2d 322, 368-370 (E.D. Cal. 2007); *Pacific Coast Fed'n of Fishermens' Ass'ns v. Gutierrez* , 606 F. Supp. 2d 1122, 1183-1184 (E.D. Cal. 2008); *South Yuba River Citizens League v. National Marine Fisheries Serv.*, ___ F. Supp. 2d ___, 2010 WL 2720959, p. *22-23 (E.D. Cal. 2010).

Along the same lines, CEQ's 1997 draft climate change guidance recognized that NEPA documents must address not only the potential for federal actions to themselves influence climate change, but also the potential for global climatic change to affect federal actions (*see* Memorandum from Kathleen A. McGinty, Chairman, White House Council On Environmental Quality to Heads of Federal Agencies 6 (Oct. 8, 1997), p. 1). The guidance states: "Long range decisions concerning agriculture, forestry, and coastal zone resources, as well as decisions regarding sites for proposed facilities, need to be supported by EAs or EISs which analyze, to the extent possible, the reasonably foreseeable impacts of global climate change" (*Ibid.*, p. 7).

To begin, the Forest Service must address the fact that an action is occurring in an environment that is experiencing dynamic changes due to global warming by analyzing the direct and indirect effects of the proposed action – including those effects that contribute to climate change, as discussed above – and the various action alternatives against a baseline that incorporates climate change impacts over time. An accurate baseline is critical to NEPA analyses of potential impacts, because "without establishing . . . baseline conditions . . . there is simply no way to determine what effect [an action] will have on the environment, and consequently, no way to comply with NEPA." *Half Moon Bay Fishermans' Mktg. Ass'n v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988); *see also Am. Rivers v. F.E.R.C.*, 201 F.3d 1186, 1195 n.15 (9th Cir. 2000); *Ctr. for*

Biological Diversity v. Bureau of Land Mgmt., 422 F. Supp. 2d 1115, 1163 (N.D. Cal. 2006) (the baseline is the "heart of the EIS" and must "be accurate and complete"). CEQ guidance states:

> The concept of a baseline against which to compare predictions of the effects of the proposed action and reasonable alternatives is critical to the NEPA process. The no-action alternative is an effective construct for this purpose, but its characterization is often inadequate for analyzing cumulative effects. Much of the environment has been greatly modified by human activities, and most resources, ecosystems, and human communities are in the process of change as a result of cumulative effects. The analyst must determine the realistic potential for the resource to sustain itself in the future and whether the proposed action will affect this potential; *therefore, the baseline condition of the resource of concern should include a description of how conditions have changed over time and how they are likely to change in the future without the proposed action.*[14]

Where there is scientific uncertainty, NEPA imposes three mandatory obligations on the Forest Service: (1) a duty to disclose the scientific uncertainty; (2) a duty to complete independent research and gather information if no adequate information exists unless the costs are exorbitant or the means of obtaining the information are not known; and (3) a duty to evaluate the potential, reasonably foreseeable impacts in the absence of relevant information, using a four-step process. Unless the costs are exorbitant or the means of obtaining the information are not known, the agency must gather the information in studies or research. 40 C.F.R. § 1502.22. Courts have upheld these requirements, stating that the detailed environmental analysis must "utiliz[e] public comment and the best available scientific information." *Colorado Environmental Coalition v. Dombeck*, 185 F.3d 1162, 1171-72 (10th Cir. 1999) (citing *Robertson v. Methow Valley Citizens' Council*, 490 U.S., p. 350).

Predicting the impacts of climate change over the life of a land management plan will often involve forecasting and considerable uncertainties. As courts have long recognized, forecasting is an inherent part of NEPA analyses. *See Save Our Ecosystems v. Clark*, 747 F.2d 1240, 1246 (9th Cir. 1984) ("'The basic thrust of . . . NEPA is to predict the environmental effects of proposed action before the action is taken and those effects fully known. Reasonable forecasting and speculation is thus implicit in NEPA, and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as 'crystal ball inquiry.'") (quoting *Scientists' Inst. for Pub. Info. v. Atomic Energy Comm'n*, 481 F.2d 1079, 1092 (D.C. Cir. 1973)).

As the Supreme Court has explained, while "policymaking in a complex society must account for uncertainty," it is not "sufficient for an agency to merely recite the terms 'substantial uncertainty' as a justification for its actions." *Motor Vehicle Manufacturers Ass'n v. State Farm Mutual Automobile Ins. Co*., 463 U.S. 29, 52 (1983). Instead, "[w]hen the facts are uncertain," an agency decision-maker must, in making a decision, "identify the considerations he found persuasive." *Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d 506, 520 (D.C. Cir. 1983), *quoting Ind. Union Dept., AFL-CIO v. Hodgson*, 499 F.2d 467, 476 (D.C. Cir. 1974).

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[14] *Considering Cumulative Effects Under The National Environmental Policy Act, p.* 41, http://www.nepa.gov/nepa/ccenepa/ccenepa.htm, emphasis added.

The duty to evaluating reasonably foreseeable significant adverse impacts includes "impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason." 40 CFR 1502.22(b); *see also San Luis Obispo Mothers for Peace v. Nuclear Regulatory Comm'n*, 449 F.3d 1016, 1033 (9th 2006). Such impacts are especially significant in the face of climate change.

The Forest Service must provide the public with an explanation of both the data used in analyzing the potential effects of management alternatives and the methods used to conduct the analysis, as well as an opportunity to provide comments and propose corrections or improvements.

b. The Forest Service Should Have Conducted a Climate Vulnerability Assessment.

The Intergovernmental Panel on Climate Change ("IPCC") defines vulnerability as "the extent to which climate change may damage or harm a system," and says that vulnerability "depends not only on a system's sensitivity but also on its ability to adapt to climactic conditions" (Watson et al. 1996). Vulnerability boils down to two basic elements – sensitivity and exposure. Sensitivity is a measure of how climate change will likely impact a focal species or ecosystem. Exposure measures the extent of climate change a species or ecosystem is likely to face.

By conducting a vulnerability assessment, land resource managers would: examine the species and physical elements of the Monument and surrounding area and determine which elements are sensitive, which have the ability to adapt, and what the likely consequences would be of anticipated changes in climate. After identifying those species and habitats most likely to need management actions to mitigate the impacts of climate change managers must develop adaptation strategies tailored for those species and habitats; foster collaboration with other agencies and organizations to develop and provide a shared understanding of impacts and management options; and target scare resources in the most effective and efficient way possible.

Noting the importance of a vulnerability assessment, the Forest Service has said that the "first step in addressing climate change is to carefully assess the associated risks and vulnerabilities for natural and human communities alike" (USDA Forest Service 2010a, p. 5).

Despite its importance, the Forest Service never conducted a vulnerability assessment for the GSNM. While there is no standardization yet for a vulnerability assessment, we recommend that the Forest Service revise the DEIS to include a vulnerability assessment with the following elements (Lawler and Stein 2009):

- **A clear articulation of the need for the assessment.** In this case, to aid in the preparation of the management plan.
- **A clear articulation of the target of the assessment.** In this case, the suite of resources covered and protected by the management plan.

- **A determination of spatial and temporal scale.** Identify the geographic boundaries of the assessment, the ideal spatial and temporal resolution for relevant data and the level of specificity required to obtain useful results.
- **Inclusion of stakeholder input.** Identify products of the assessment that users will find most useful, such as maps, tables, etc.
- **Inclusion of regional expertise.** Draw from both inside and outside of the U.S. Forest Service for expert input.
- **Inclusion of existing efforts.** Utilize existing relevant information in addition to developing new information sets.
- **A clear articulation and, if possible, quantification, of any uncertainties in the results.**

The Forest Service has undertaken such an analysis for Wisconsin forests. On the Chequamegon-Nicolet National Forest in Wisconsin, managers have completed an "Ecosystem Vulnerability Assessment and Synthesis," independent of the forest planning process. This assessment focuses on the vulnerabilities of different forest types in Northern Wisconsin to climate change, comparing the current landscape with project climate change at the end of the 21st century. It includes predictions of possible changes in the suitability of Northern Wisconsin for 76 different trees species and an examination of how ecosystem processes may change in the future.

c. The Forest Service Should Consider Multiple Likely Climate Change Scenarios and Ecological Conditions.

The second step that the Forest Service should take in its climate change analysis is to evaluate multiple likely climate change scenarios and ecological conditions, with an emphasis on what the landscape could look like under these different scenarios.

The Forest Service should consider the following topics in relation to the different climate scenarios:

- The likely impact of climate change for each key vulnerability identified in the vulnerability assessment, including species and habitat range shifts, behavioral responses, and potential evolutionary response;
- The likely impacts of climate change on hydrology and aquatic ecosystems; and
- The probable change in community vulnerability to wildfire.

As with every element of the agency's analysis thus far, the Forest Service has narrowly focused on wildfire vulnerability to the exclusion of almost everything else (*see* DEIS, Volume 1, Chapter 4, pp. 430-439; DEIS, Volume 2, Appendix C). For instance, the Forest Service never analyzed how the Pacific fisher, American marten, or California spotted owl would respond under different climate change scenarios (*id*.). The agency never analyzed how climate might shift the habitat range for these species or the potential evolutionary response of these species. Moreover, the Forest Service never determined how Sequoia groves would likely respond to climate change. The Forest Service's climate change analysis is inadequate because it never took a hard look at the impact to these resources.

d. The Forest Service Should Revise the Management Plan so that it Implements Climate-Smart Management Practices.

The Forest Service's climate change analysis essentially consisted of looking at various climate change models and concluding that climate change will lead to warmer temperatures, reduction in snow depths, early snow melts, draughts, and increased likelihood of wildfire. However, the agency never took the analysis to the next step and determined how these changes would affect focal species, such as the Pacific fisher and other objects of interest, in the Monument. This is a completely inadequate analysis under NEPA, which requires the agency to take a hard look at all the environmental consequences of the proposed action.

The Forest Service should redo its climate change analysis to include an evaluation of climate-smart management practices. This should include analyzing whether the agency should establish climate refugia and mitigation corridors for focal species, determining whether the management plan needs to reduce ecosystem stressors to ensure species resistance and resiliency, requiring monitoring to assess how focal species are responding to climate change and the management direction, and assessing whether cross boundary management is appropriate.[15] A variety of practices to consider are described below.

First, the best defense against climate change is to protect large wild places and surrounding buffer areas which are connected to other protected core areas. This connected wildlands network will allow imperiled species to move to more hospitable habitats as the climate changes, thereby increasing their chances of survival. Historically, land managers drew up boundaries for proposed protected areas based upon what met strict historic criteria for parks or wilderness areas, and presumed the climate would remain stable. Going forward, the Forest Service and other land managers should designate refugia after identifying areas likely to shelter a broadly representative and sustainable collection of species (identified in the vulnerability assessment) and communities under future climate projections (done under the second step listed above). The agency should design refugia that are large, relatively wild, and largely unfragmented. The agency may determine that a core area exists in a protected park, wilderness area, or refuge, or it may exist on private lands. The agency may need to consider opportunities for strategic land acquisitions or public-private partnerships.

Second, species and ecological communities will move in response to climate change. The Forest Service should facilitate these movements by working to connect discontinuous areas of similar terrestrial and aquatic habitat and by establishing protections for likely movement corridors. (*See, e.g.*, USDA Forest Service 2010a, p. 27–28: "Collaborate with partners to develop of land management plans that establish priority locations for maintaining and restoring habitat connectivity to mitigate effects of climate change. Seek partnerships with private landowners to provide migration corridors across.") In establishing these mitigation corridors, the Forest Service should ensure there is a continuous pathway between nearby core areas.

[15] See generally USDA Forest Service 2010a, which discusses building resistance to climate-related stressors, increasing ecosystem resilience by minimizing the severity of climate change impacts, reducing the vulnerability and/or increasing the adaptive capacity of ecosystem elements, and facilitating large-scale ecological transitions in response to changing environmental conditions.

The Forest Service has implemented these mitigation corridors on other federal lands. For instance, the Forest Service amended the Bridger-Teton National Forest Plan in 2008 to designate an area of the forest a Pronghorn Migration Corridor. The purpose of the amendment creating the area was "to ensure that projects, activities, and facilities authorized by the Forest Service on National Forest System lands within the corridor allow for continued successful pronghorn migration." The amendment sets a management standard for the area requiring "all projects, activities, and infrastructure authorized within the designated Pronghorn Migration Corridor be designed, timed, and/or located to allow the continued successful migration of the pronghorn that summer in Jackson Hole and winter in the Green River Basin."

Third, habitat fragmentation, pollution, invasive species, overharvest, and other human-induced stressors on an ecosystem work in synergy with climate related stress to threaten species with extinction. To build ecosystem resilience, land managers need to limit or eliminate non-climate stressors, including those associated with management actions, so that species have a fighting chance (*see* USDA Forest Service 2010a, p. 19). Therefore, managing for climate adaptation should begin by reducing the impacts of human-caused stressors on the affected ecosystems such as removing unneeded roads and thereby restoring watershed integrity. Grazing, recreation, mechanical treatments, and all other forms of human disturbance will have intensified ecosystem and species impacts under future climate scenarios, and management direction must appropriately mitigate these impacts.

Finally, climate change also gives us new compelling arguments about the importance of coordinating climate-smart management across land management agency jurisdictions. In fact, the Forest Service itself has recognized the importance of such partnerships: "The Forest Service has accordingly embraced an all-lands approach to conservation through cross-boundary partnerships. Landscape-scale conservation is a logical extension of the collaborative approaches that have evolved over the past 100 years in wildland fire management and cooperative pest management, with State and Federal partners jointly setting policy and sharing resources to address cross jurisdictional challenges" (USDA Forest Service 2010a, p. 15).[16] While the DEIS and draft plan reference the interagency "Strategic Framework for Support of Science in the Southern Sierra Nevada Ecoregion" (*see* DEIS Volume 1, p. 45, 72-73, 103-104; draft plan, p. 52), the interagency coordination discussed therein related entirely to joint research efforts and does not explicitly address collaborative, cross-boundary management. There is inadequate explanation of how the draft plan is informed by or implements the climate-driven priorities outlined in the Framework and associated Memorandum of Understanding (*see* USDI et al. 2008, USDI National Park Service et al. 2009b).

The Forest Service's analysis in the DEIS is inadequate because it never incorporated the above climate-smart strategies, even though many of them are elements of the Forest Service's Roadmap towards addressing climate change. For instance, the Forest Service never analyzed whether, in light of species and habitat range shifts, the agency should designate refugia to support the long term resistance and resiliency of focal species, such as the Pacific fisher and the

[16] Secretary of Agriculture Tom Vilsack, in a speech in August 2009, stated: "The threats facing our forests don't recognize property boundaries. So, in developing a shared vision around forests, we must also be willing to look across property boundaries. In other words, we must operate at a landscape-scale by taking an all-lands approach." USDA Forest Service 2010a, p. 17.

California spotted owl. In addition, the agency never mapped possible habitat shifts for focal species under different climate change scenarios to determine if it should establish mitigation corridors. The agency also never evaluated whether it needed to step-down stressors to improve the odds that focal species will survive. On the contrary, the preferred alternative embraces a more aggressive management strategy that admittedly will increase stressors on key habitats and focal species, including additional negative impacts on key climate-smart priorities such as habitat connectivity and quality (*see, e.g.*, DEIS Volume 1, p. 489, 500, 504, 507, 510, 513, 517, 521, 532).

e. The Forest Service Should Develop a Robust Adaptive Management and Monitoring Program that Explicitly Addresses Climate-Driven Uncertainties.

In some cases, protecting adequate space and connectivity and reducing the stressors will not be enough to ensure survival of species. Ecologically based habitat manipulation (such as prescribed burning), captive breeding and reintroduction, control of pests or disease, and other management interventions may be appropriate in certain circumstances based on the best available science. As repeatedly acknowledged in the DEIS, "The precise effects of climate change on individual species are difficult to predict." (*See, e.g.,* Wildlife Biological Evaluation, p. 21; DEIS Volume 1, p. 488, 543, 567.) While this is not an adequate reason to ignore the broad body of scientific literature and tools available to analyze and model likely climate change impacts on Monument resources, as discussed above, any adaptive management framework designed to maximize the effectiveness and responsiveness of management actions in light of climate-driven uncertainties must be (1) grounded in sound science and vulnerability analysis, (2) targeted to climate concerns; (3) inclusive of sufficient protections to buffer possible impacts of active management strategies, and (4) justified on the basis of continuous monitoring of its impacts.

Adaptive management is a climate adaptation strategy that can be used to responsively and dynamically study and manage ecosystems that are in flux as a result of climate change (Innes et al. 2009). In theory, adaptive management involves careful monitoring of forest resources against a clear set of criteria so that unforeseen events can be identified and addressed in a timely fashion by modifying existing standards and guidelines (*see, e.g.,* Schreiber et al. 2004). In practice, however, adaptive management plans designed by the Forest Service have been noncommittal, unclear, unenforceable, and have not resulted in meaningful reassessment and adjustment of standards.

The Forest Service must incorporate an effective adaptive management strategy into the management plan that assesses likely risk to key local ecosystem values from climate change in combination with other stressors, outlines responsive management actions for various levels of predicted impacts, monitors the real-time impact of climate change and other stressors on key Monument species and ecosystems, and establishes enforceable benchmarks for evaluating and adjusting management (North et al. 2009, Bark et al. 2010, Schreiber et al. 2004). In addition to management prescriptions, essential elements of an adaptive management strategy include (1) a monitoring strategy; (2) a mechanism and schedule for review of monitoring data; (3) a mechanism for public involvement in the adaptive management process; and (4) a clear set of

criteria and process by which the management process itself can be evaluated and modified (*Ibid.*). Additionally, the management plan should identify the critical research questions guiding adaptive management, recommend management actions to facilitate their experimental approach to adaptation at a landscape scale, and include a detailed plan for accomplishing the necessary research. The agency should articulate adaptive management strategies in the management plan, which it can implement within existing budgetary constraints and transparently execute with full public involvement.

While the impacts of climate change may or may not manifest themselves over the life of the forest plan revision, the goal of a climate-smart adaptive management strategy is to test and refine responsible management strategies in light of evolving science, anticipated future climate conditions, and monitoring results in order to better inform future management efforts, guide ecosystem response to climate change as it unfolds, and effectively manage risk to our forest resources. Although climate change makes it more difficult to predict future conditions and heightens the need for effective adaptive management, many trends and challenges over the life of a forest plan are reasonably foreseeable. Whenever there is a probable link between experimental manipulation and outcomes, adaptive management that incorporates experiments into modeling is possible.

To better inform adaptive management, and to make clear when new management strategies are needed, the management plan should include comprehensive monitoring systems to better understand the changing forest system over time, including critically important species-level monitoring. The Forest Service should establish a formal system for regularly evaluating monitoring and research data, and for triggering forest plan amendments based on major changes detected through monitoring. Robust monitoring of ecosystems and forest management responses provides both a basis for vulnerability and risk assessments and a means of evaluating the effectiveness of strategies to reduce stressors and adapt to changing conditions (Blate et al. 2009, Innes et al. 2009). In light of anticipated increased demands for effective collection, analysis, and interpretation of environmental information, the agency should assess existing monitoring systems and strengthen were necessary, which may include cross agency coordination. (Mawdsley et al. 2009; *see also* USDA Forest Service 2010a). Both stand- and forest-level monitoring are necessary for adaptive management to be truly effective (Innes et al 2009). Formal evaluations of ongoing monitoring results by Forest Service staff as well as independent scientists should be required at least every five years, with shorter, annual assessments in place to ensure major changes are detected early.

The Forest Service noted the importance of monitoring in its Climate Change Roadmap by stating: “Monitoring will be key to the program’s success. Monitoring paves the way for assessments to be updated and validated, revealing critical new issues. A unified, multiscale monitoring system capable of detecting and evaluating national, regional, and local trends will enable land managers to develop and adjust adaptation and mitigation strategies to improve their effectiveness across landscapes and land ownerships” (USDA Forest Service 2010a, p. 9). The agency then goes on to discuss three different types of monitoring it could implement, systematic, targeted and effectiveness monitoring.

If resources are not available for effective and ongoing monitoring, the Department of Interior guidelines recommend that adaptive management not be employed (Williams et al. 2009). "Simply put, adaptive management is not possible without effective monitoring" (*Ibid., p.* 12). Unfortunately, four out of five action alternatives in the DEIS, including the preferred alternative, do not include "research to determine whether species shifts are occurring and whether these are associated with climate change factors, such as shifts in habitat characteristics" (DEIS Volume 1, p. 103, Table 13). The generally weak suite of strategies and objectives for scientific study and adaptive management presented in the DEIS provides an inadequate platform for a robust and dynamic management strategy that can protect Monument resource values in an era of rapid climate change (*Ibid., p.* 103-104). Moreover, the full monitoring plan outlined in the draft plan contains no reference to climate adaptation concerns or any of the strategies and objectives outlined separately in the DEIS (*see* draft plan, p. 92-104).

Courts have made clear that agencies cannot rely on adaptive management strategies that are entirely discretionary to address environmental impacts. For example, in *Western Watersheds Proj. v. United States Forest Serv.*, No. 05-189, 2006 WL 292010 (D. Idaho Feb. 7, 2006), the plaintiffs challenged Forest Service plans that relied on adaptive management to address impacts from grazing. The Forest Service had not defined the protocols that it would use for adaptive management, but instead explained that an adaptive management strategy "would be developed and implemented through an iterative process." *Ibid.*, p. *2. The court held that this approach violated the National Forest Management Act. *Ibid.*, p. *10. *Western Watersheds* is consistent with other cases in which courts have rejected plans that rely on ill-defined and unenforceable adaptive management to protect wildlife. *See Natural Res. Defense Council v. Kempthorne*, 506 F. Supp. 2d 322, 356 (E.D. Cal. 2007) (rejecting an adaptive management plan that had "no quantified objectives or required mitigation measures"); *Animal Welfare Inst. v. Beech Ridge Energy*, 675 F. Supp. 2d 540, 580 (D. Md. 2009) (rejecting an "entirely discretionary adaptive management" plan). Unfortunately, the DEIS and draft plan do not discuss how they will enforceably address climate-related environmental impacts of management direction through monitoring and evaluation, because the climate-related strategy and objectives are not integrated into the monitoring plan or performance measures (*see* draft plan, p. 92-104; DEIS Volume 1, p. 103-104). The agency must fully integrate climate concerns in the adaptive management framework, with explicit performance measures; otherwise the management plan is legally deficient.

The Monument is a national treasure and should be a model of climate-smart management. In the face of one of the biggest suite of challenges our public lands have ever faced and its attendant uncertainties, the Forest Service must develop and implement a comprehensive, concrete, climate-driven management strategy. The strategy must be grounded in research and precautionary activities to maximize the potential for the Monument and its objects to successfully adapt to the synergistic stressors of human activities and climate change. As the Forest Service's own *Draft Report on Sustainable Forests: 2010* notes, "[t]he next five years may be the period of most significant change in our Nation's forests since the 1870s" (US Department of Agriculture 2008, p. 5-9). Near-term actions "to help define the paths forward for adapting forests to climate changes . . . have the potential to shape for future generations the forests they will have to manage, conserve, protect, and use. Will future foresters and citizens 130 years from now be able to look back at this point in time and say, Well done! Will forest

historians and policy makers then be able to point to actions taken now as turning points in the sustainable management of the Nation's forests? We hope so. But it will take brisk action from all of us" (*Ibid.*). The Forest Service has identified the conservation of biological diversity as the first indicator of sustainable forest management (*Ibid., p.* A-8). The climate-smart actions identified above represent fundamental programmatic direction that the Forest Service must implement today to prioritize the preservation of biodiversity and the capacity of the Monument and its objects to adapt in light of the climate risks already identified and the uncertainties it must responsibly accommodate.

IV. Summary

We ask that the draft plan, DEIS, and other planning documents be revised to address the issues noted above. We also ask that a preferred alternative be developed that protects the range of objects of interest in the GSNM incorporate and fully addresses the variety of stressors on this ecosystem, including climate-driven and other human driven stressors. We believe that this necessary revision is sufficiently substantial as to require a recirculation of the draft documents for public review.

Thank you for the opportunity to comment on the GSNM draft plan, the DEIS, and specialist reports. If you have questions or want to discuss these comments please contact Susan Britting (britting@earthlink.net; (530) 295-8210).

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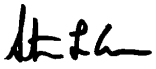

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