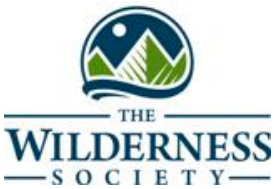

October 16, 2013

Kevin Elliot
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Sequoia National Forest
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Sent via email: comments-pacificsouthwest-sequoia@fs.fed.us

Re: Feedback on Draft Sequoia Forest Assessment

Dear Mr. Elliot:

Thank you for the opportunity to comment on the Draft Forest Assessment for the Sequoia National Forest (SQF).

We found many aspects of the SQF assessment to be similar to the Sierra National Forest (SNF) forest assessment. Because of this quite a few of our comments are similar or exactly the same as comments we made on the SNF assessment. To the extent that we provide additional comments on the SQF assessment that are global and general in nature, they apply equally to the SNF forest assessment. We plan to share this perspective with the Regional Planning Team.

I. Overview

The following comments are offered in the spirit of problem solving and the development of the best possible revised land management plan for the SQF. We believe that integration among resource areas is one of the first steps to solving complex natural resource issues. As you will see from our comments below, we find that the themes in each of the 15 chapters are not sufficiently integrated. For instance, Chapters 1 through 5 are the basis for evaluating the ecological condition of the landscape. Chapters 6 through 15 largely relate to the social, cultural

and economic drivers that affect the environment and that are important to people. At a minimum, the assessment would benefit from an additional section that integrates the conditions and trends from Chapters 1 through 5. The integration might best be achieved through the use of a series of tables that reflect the condition and trend by habitat type and that identify:

- A definition of the attribute (e.g. key ecosystem characteristic) being evaluated
- The indicator(s) used to evaluate trend or condition, including how it will be measured for the purposes of evaluating the effectiveness of current and future forest plan components
- The stressors or drivers affecting this element, and
- A clear statement of trends and conditions under the current plan, as well as a description of reference conditions (using NRV or other valid methods to estimate) for ecosystem characteristics

In addition to narrative, we believe this information could be summarized in tables. An example of how some of the information could be summarized in tabular form can be found in the WIKI for the Sierra National Forest (Table 1.6 in WIKI Chapter 1, line 979; July 2, 2013 snapshot). The table presented in that chapter could be expanded upon to include the additional information noted above. Creating tables such as this would integrate information and ensure that there is consistency among these first five interdependent topics. We also believe this would provide an opportunity to clearly link at-risk species with the principle habitat types and habitat elements (i.e. key ecosystem characteristics) that affect their distribution and persistence. Integration among these first 5 topics (chapters) also will improve our ability to identify changes in management/existing plan components that are needed to provide for ecological sustainability and to support the ecosystems services that are largely addressed in Chapters 6 to 15.

In addition to this issue about integration, we are very concerned that the Draft Forest Assessment (dated September 2013) does not provide the information necessary to evaluate the need to change the direction in the current forest plan. The introduction to the forest assessment (p. 5) indicates that:

> "This document represents the assessment stage and is designed to rapidly evaluate readily available existing information about relevant ecological, economic, and social conditions, trends, and sustainability **and their relationship to the current land resource management plan** within the context of the broader landscape." (Emphasis added.)

The forest assessment presents information on trends and conditions, but rarely addresses how, specifically, the current forest plan affects, either positively or negatively, those trends and conditions. For example, the lack of fire is identified in Chapter 1 as negatively affecting ecological integrity. However, the forest assessment does not evaluate the ability of the forest plan to support managed fire[1]. In this example, we know that there are social constraints on the use of managed fire (e.g., air quality, human safety, human perceptions, etc.), but the forest

[1] We define managed fire as any ignition, i.e., intentional, planned, human-caused, or naturally-caused, that is managed for ecological benefit.

assessment leaves unaddressed whether there are barriers in the plan to using managed fire. For instance, prohibitions on the use of managed fire could be embedded in the goals, objectives, land allocations, suitability of uses, or standards in the current forest plan[2]. For those ecological conditions exhibiting negative trends, we must be able to evaluate the degree to which the current forest plan contributes to or alleviates that condition. This information will enable us to focus on those areas of the current forest plan that may need to be revised in order to reverse trends and improve conditions.

Furthermore, in order to facilitate a meaningful need for change analysis and determination, as well as to develop future plan components that are responsive to changing conditions, the assessment should more strongly consider the effects of possible future scenarios for stressors and other relevant factors beyond control of the agency (including climate change) on target planning resources (e.g. necessary ecological conditions or key ecosystem characteristics) under the current plan. Likely future scenarios should be systematically applied to the target planning resources, and the scenarios should be based on the best available scientific information.

We are also concerned that the assessment does not adequately lay the groundwork for an effective monitoring and adaptive management program. According to the planning rule, the assessment should be used to inform the development of the monitoring program (219.5(a)(3)). The monitoring report must in turn be used to "inform adaptive management of the plan area" (219.12(d)(2)). Adaptive management must therefore be built into the design of the assessment by using existing information to establish hypotheses for testing. Further, the draft directives explicitly direct assessments to advance adaptive management. Chapter 40 states that during the assessment phase, responsible officials should "gather and evaluate information to form a basis for plan decision making, and identify key assumptions, areas of uncertainty, and risks" (FSH 1909.12, 41). We feel that the assessment could have a more robust discussion of underlying assumptions and areas of uncertainty, including a discussion of how effectiveness monitoring of plan components could verify assumptions and reduce uncertainty. For example, on p. 33 the assessment states that "There is some uncertainty about the effects of fire severity on these species (Keane 2013 and Zielinski 2013)." This type of uncertainty should be documented and flagged as an adaptive management question that pertains to plan components associated with vegetation diversity and species condition/persistence. Generally, uncertainty and assumptions regarding the relationship between ecosystem level plan components and species persistence need to be flagged for attention to facilitate future viability determinations and effectiveness monitoring strategies.

As a general matter, the assessment should identify the capacity of the Forest Service to implement ecological restoration. Capacity to accomplish work can be defined in a variety of ways and can be limited by a number of factors, including social/cultural limitations, technical limitations, geographical or environmental conditions, as well as the commonly considered budget limitations. In our comments below, we call out some of the instances where the factors affecting implementation are too narrowly defined or not identified at all. The assessment is the opportunity to examine the factors that limit the ability to undertake ecological restoration and to

[2] Below, we will address fire as an ecological process, in addition to other resource areas and what we see as barriers in the forest plan to reversing this negative ecological trend.

begin to identify practices or actions that would improve implementation. We expect that budgets in the future will continue to decline and have even greater effects on the capacity to undertake restoration. We suggest that partnerships among the Forest Service and other stakeholders may hold the best promise for accomplishing ecological restoration in the future. Because of this, we ask that the assessment explore the variety of issues affecting implementation, so that we are better able to define solutions.

Multiple times, the text refers to information included in specific lines in the August 2, 2013 snapshot of the Sequoia NF Living Assessment instead of including the information directly in the assessment. We understand the desire of the SQF to limit the length of the forest assessment by referring to the Living Assessment web page. However, the forest assessment is intended to be a comprehensive record of the condition of the forest at the time of the revision available through the lifetime of the plan. It is highly doubtful that a snapshot of a Living Assessment will similarly endure, and the referenced information will be lost. Hence, we ask that you include all information necessary to identify a need for change and inform plan components in the assessment document.

In the sections below, we identify additional information for specific topics that we find missing from the assessment, yet is critical to include. We also provide comments on aspects of the forest plan we believe need to change to address adverse trends and conditions and to improve the delivery of ecosystems services. Many of the changes to the forest plan that we recommend below were identified in *National Forests in the Sierra Nevada: A Conservation Strategy* (Britting et al. 2012; http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/SN_Conservation_Strategy_web3-14-13.pdf). In addition to recommendations on changes to the forest plan, the conservation strategy provides recommendations on changes in policy and practice aimed to improve the management of natural resources. For convenience, we have organized these comments by the topic areas and in the order that they appear in the Draft Forest Assessment.

II. Chapter 1: Ecological Integrity

A. A systematic process for conducting ecosystem integrity assessments is needed.

It is not clear whether the assessment considered the direction provided in the draft directives pertaining to identifying and selecting key ecosystem characteristics (FSH 1909.12 12.14) and assessing ecosystem integrity (FSH 1909.12 12.15).

The process, as we understand it, includes a number of sequential steps that should be systematically followed and described in the assessment report, including a documentation of how best available science information was applied (the steps are outlined in FSH 1909.12 12.11). The procedural steps include (for each targeted ecosystem): 1) selection of key characteristics; 2) description of reference conditions for the key characteristic (using NRV or another approach); 3) evaluation of the current condition and trend for the characteristic *under the current forest plan components*; 4) status of integrity for the ecosystem being evaluated (a comparison of future integrity under the current plan to reference conditions. Or, in other words,

an evaluation of whether *current plan components* will maintain or restore ecosystem integrity moving forward.). Although it is not appropriate for the assessment to determine a need to change plan components, the assessment *should* clearly identify future ecosystem integrity conditions under the current plan (considering likely future environments and stressors) and compare those parameters to reference conditions (NRV or otherwise), so that a meaningful need for change analysis can occur during the planning phase.

The Sequoia assessment divulges criteria used to select ecosystem characteristics for assessment (p.24), including, interestingly, that the characteristic not be covered in another assessment chapter. This qualifier actually may result in a failure to integrate the evaluation of future conditions under current plan components. The directives suggest, and we agree, that the critical criteria for selection of key ecosystem characteristics is that the characteristic be important for establishing new plan components (*and evaluating existing plan components*) that support "conditions necessary to maintain or restore the ecological integrity of ecosystems." Therefore the assessment should describe *why* the selected key characteristics are best suited to evaluate and plan for future ecosystem integrity.

Criteria are provided in the directives 12.14, and include consideration of ecological principles such as representativeness and redundancy. Furthermore, and of particular importance to our comments below, the target characteristic should describe "ecological conditions needed for threatened, endangered, proposed, candidate or species of conservation concern" (12.14). This is the key consideration that links the at-risk species evaluation to the selection, evaluation, and eventual development of coarse-filter plan components that will sustain individual species.

The Sequoia assessment selects five categories of characteristics (NRV of vegetation, vegetation diversity, special habitats, fire, and connectivity), but does not explain how these are *best suited* for evaluating and developing plan components to sustain integrity, nor how they are important for sustaining at-risk species. The assessment is confused by the application of NRV to vegetation, while it is our understanding that NRV (or another valid approach to describing reference conditions) should be described for *each* selected characteristic.

The discussion that follows in the assessment (for terrestrial ecosystems, pp. 25-44) is interesting and information rich, and generally divulges that target ecosystems are "outside of NRV", but is limited in application to determining whether there is a need to change current plan components, or alternatively, what future conditions will be for the selected characteristics if the current plan continues, given external forces (i.e. climate change). For example, for the foothill zone, the assessment states that "vegetation is mostly out of the NRV" (p.25). This is only of marginal utility for evaluation and development of forest plan components. Similarly, for the montane zone, the assessment states that: "Forest density is higher, canopy cover of trees more uniformly higher, small and medium tree density is higher and large tree density if lower. Within stand variation in tree size density has decreased" (p.26). This information is interesting, but to meaningfully contribute to forest plan component evaluation and development, the reference condition (using NRV or other methods) for each of these characteristics should be described in measurable terms, and their future condition under the current plan should be evaluated within that context.

By definition a desired condition is "a description of specific…ecological characteristics" that "must be described in terms that are specific enough to allow progress toward their achievement to be determined" (36 CFR 219.7). To evaluate the current plan, the assessment must describe projected future conditions for each selected key ecosystem characteristic under the current plan in specific terms so that the need to change the plan component can be effectively evaluated. And to build an effective desired future condition plan component, the assessment must *describe reference conditions* (using NRV or another valid method) for each selected key ecosystem characteristic in similarly specific and measurable terms. The assessment does not systematically present information on the reference condition or future trend of key characteristics that strongly contributes to the evaluation and development of concise plan components, including desired conditions, objectives, standards and guidelines. Information (including uncertainty and assumptions) should be concisely and systematically packaged and presented around *each* selected key characteristic, so that effective future plan components, and monitoring questions, can be built around each key ecosystem characteristic.

B. Integration of ecosystem characteristics and species needs

We are very concerned about the lack of integration between ecosystems/habitat types and species (at-risk or otherwise). The new planning rule adopts "a complementary ecosystem and species-specific approach to maintaining the diversity of plant and animal communities and the persistence of native species in the plan area" (36 CFR 219.9). The ecosystem aspect of the new approach is "intended to provide the ecological conditions to both maintain the diversity of plant and animal communities and support the persistence of most native species in the plan area." (Ibid.) In addition, if the ecosystem approach is not sufficient to provide for at-risk species, additional species-specific approaches are to be incorporated into the forest plan (Ibid.). The combination of the ecosystem and species-specific approaches are intended to ensure for both ecological integrity and ecological diversity (Ibid.).

Currently, the forest assessment does not provide the synthesis of ecosystem, habitat, and species conditions necessary to evaluate the current plan's contribution to ecological integrity and ecological diversity, or to build effective and sufficient coarse-filter plan components to meet regulatory diversity requirements. Assessments that fail to integrate necessary ecological conditions for species conservation into the ecosystem assessment will yield forest plans that are forced to rely too heavily on single species based plan components. To a limited extent, the forest assessment characterizes species at-risk (Chapter 5), but neglects to link those species (as well as less vulnerable species) to the ecosystems/habitat types and their reference or future condition under the current plan (i.e., their structure, function, composition, and connectivity), and drivers/stressors that are (or should be) identified in Chapters 1-3. This is a critical and fundamental integration step in the assessment, as described in the relevant sections of the draft directives (12.14 and 12.55). It is critical for the assessment to establish the connection between coarse-filter ecosystem characteristics/habitat conditions and the species that depend upon them for persistence so that one can:

- Discuss reference conditions and evaluate the condition and trend of the landscape; and
- Use the assessment to then determine if the likely future condition under the current plan satisfies the requirements for ecological integrity and ecological diversity established in

the planning rule, including whether future ecological conditions under the current plan will meet species diversity requirements (e.g. viability of species of conservation concern).

It is critical that the connection between ecosystem characteristics/habitat conditions and species persistence be established in order to evaluate the effect of the current forest plan and to form the basis for a determination of whether other plan components should be designed to ensure that ecosystem and species conservation requirements under the planning rule will be met.

In particular, the assessment should evaluate the connection between ecological conditions (current and expected future conditions under the current plan) and changes to species populations, as outlined in the draft directives (FSH 1909.12 12.55). The assessment should project long-term conservation outcomes for at-risk species, factoring in selected scenarios for uncontrollable stressors (e.g. climate impacts). For species of conservation concern, the assessment should project viability using the parameters found in the definition of viability in the planning regulation (i.e. under present plan components, will future distribution of species of conservation concern be sufficient for the population to be resilient and adaptable to stressors and likely future environments?). Without this information, it will be challenging to develop plan components to sustain at-risk species. The assessment should document the assumptions inherent in the relationship between ecological conditions and changes in population so that those can be tested through monitoring and adaptive management.

It is also appropriate for the assessment to evaluate focal species, since the stated purpose of focal species is to make inferences and provide information about ecological integrity and ecological conditions. Therefore focal species should be part of the overall strategy for identifying species at risk and key ecological conditions.

We suggest that tables or matrices be used to organize the available information on ecosystem condition and to relate this information to species needs. We suggest that a table similar to one presented in the WIKI for the Sierra National Forest (Table 1.6 in WIKI Chapter 1, line 979; July 2, 2013 snapshot) could be used to evaluate the connection between species needs and broad scale habitat trends. Table 1, below, is an excerpt of this table that would need to be populated with information relevant to the SQF.

Table 1. Example of how the estimated trends in amount and condition of habitat types on the SQF from 2001 to 2010 could be organized. Table format excerpted from SNF WIKI Chapter 1, Table 1.9 (snapshot taken July 2, 2013).

Habitat Type	**Proportion of SQF**	**Estimated Trends 2001-2010**
Lakes and Riverine	TBD	To be determined (TBD)
Wet Meadow	TBD	TBD
Sagebrush	TBD	TBD
Shrublands (Chaparral)	TBD	TBD
Oak-associated Hardwoods and Hardwood	TBD	TBD

Habitat Type	Proportion of SQF	Estimated Trends 2001-2010
Coniferous Forest, early seral	TBD	TBD
Coniferous Forest, Complex Early Seral	TBD	TBD
Coniferous Forest, Mid Seral	TBD	TBD
Coniferous Forest, Late Seral, Closed Canopy	TBD	TBD
Coniferous Forest, Late Seral, Open Canopy	TBD	TBD
Other Land Cover	TBD	TBD
Total	100	

By associating the habitat types in the table above with the species that are dependent on them, one can begin to evaluate linkages between specific measurable ecosystem characteristics and habitat condition/trend and species condition/trend and persistence over time.

We developed the following tables as examples of how species and critical habitat elements could be related to ecosystem types/habitat types. As examples, we evaluated the species associated with two habitat types: wet meadows and closed canopied, late-seral coniferous forests (Tables 2a and 2b). We also identified several finer scale habitat elements that are critical to examine when assessing if habitat needs are being met for these species. These should be considered examples of how to associate given species with specific habitat conditions and should not be interpreted as exhaustive for either the species representing the habitat condition or the habitat attributes essential to the species. Also, please note that the examples are not limited to species at risk. We included northern flying squirrel and pileated woodpecker as examples of important species to consider in relationship to broad scale habitats trends even though these species are not presently view to be at risk. Nonetheless, it is important to consider these species to ensure that the forest plan provides for habitat conditions because their population health directly contributes to the health of some of the species at risk. For instance, northern flying squirrel is a key prey species for California spotted owl and pileated woodpecker serves as an essential "engineer" by creating large cavities that can be used by secondary cavity occupiers such as fisher and marten.

Table 2a. Species associated with wet meadows and some essential habitat elements.

Habitat Type	Species	Essential Habitat Elements				
		Standing Water	Willows and other shrubs	Complex meadow edge	Large trees or snags	Adequate grass height
Wet Meadow (some in poor condition, decreasing trend)	Great grey owl			X	X	X
	Mount Pinos Sooty Grouse		X		X	X
	Willow flycatcher	X	X			
	Sierra yellow-legged frog	X				
	Kern River Rainbow Trout	X				
	Little Kern Golden Trout	X				

Table 2b. Species associated with late seral, closed canopy coniferous forests and some essential habitat elements.

Habitat Type	Species	Essential Habitat Elements				
		Large Live Trees	Large Snags	Large Downed wood	Complex Understory	Riparian Interface
Coniferous Forest, Late Seral, Closed Canopy (very low amounts, uncertain trend)	Marten	X	X	X	X	X
	Fisher	X	X	X	X	X
	California spotted owl	X	X	X		
	Flying squirrel	X	X	X		X
	Pileated woodpecker	X	X			X

Determining the common habitat elements (i.e. key ecosystem characteristics or necessary ecological conditions) required for a variety of species is one way to establish a foundation for guidance in the forest plan that moves away from single species management to considering a group of species and for evaluating the variety of species that would benefit from conservation of these habitat elements. We note that the draft directive system (FSH 1909.12, Ch. 10, 12.54) offers this as one approach to evaluating at-risk species. We ask that you develop information, where applicable, that clearly links the necessary ecological conditions of the species covered in Chapter 5 to the key ecosystem characteristics, habitat types and attributes described in Chapters 1-3. This information will be needed to determine if the unique habitat elements required by at-risk species can be generally provided for using the ecosystem approach or if species-specific plan components need to be developed.

C. Additional information or clarification needed

We appreciate that a connectivity analysis was presented in this chapter.[3] We believe, however, that information on roadless areas was underrepresented since only the Inventoried Roadless Areas were used in the analysis. We ask that you also include the Citizen Roadless Areas identified by California Wilderness Coalition.[4] We also ask that this connectivity analysis be extended to aquatic systems. In addition, the analysis would benefit from additional summary statistics using representative species associated with specific habitat types. For example, we expect the connectivity analysis for forest carnivores (reflected in one of the four panels) to be quite different from an analysis that used Mount Pinos sooty grouse (associated with open, later seral forests with adjacent meadows) or willow flycatcher (associated with wet meadows with dense willow shrubs). Assessing connectivity for a variety of ecosystems and species is critical to evaluating ecological integrity. To facilitate the evaluation of current plan components and development of future connectivity plan components, landscape scale fragmentation and patch characteristics/metrics (including a description of reference conditions) should be evaluated under the current forest plan and related to the ecological conditions necessary to support at-risk species such as California spotted owls and fisher.

[3] Please include a legend for the resilience values on the connectivity map on page 51 for the "fire resilience and old forest species" map.

[4] We provided the GIS data for the Citizen's Roadless Areas to the resource staff on the Sequoia National Forest.

There is lack of consistency in graphics provided in the assessment. On p. 30 the text in the assessment and the graph for size classes distributions and canopy covers is not classified in the same way. Categories in the text are 0-6", 6-12", 12-24", and >24" and this classification in the graph are 0-6", 6-11", 11-24", and >24". The diameter categories in the graph should be classified in the same way.

The draft assessment displays the percent of total fire area that burned at high severity for the Bull, Piute, McNally, Lion, and Sheep Fires (p. 43) and states that the graph is derived from the Composite Burn Index maps (p. 42). The title for the graph indicates that it is reporting "high severity" effects, but it is not specific as to soil or vegetation effects. Please clarify by noting in the title of the figure that it reflects high severity fire effects for vegetation. This analysis and discussion would benefit from a discussion of other environmental factors (e.g., weather conditions) of these fires that may have contributed to fire severity. Please provide brief summary of weather conditions for each fire and locations of the fire and address why there are differences in the amount of severity for the managed fires compared to the uncontrolled wildfires. This information is important since it could form the basis for additional criteria to evaluate opportunities to allow a fire to burn for resource benefit.

Fire is an important disturbance process for riparian ecosystems. We ask that you recognize this in the discussion on p. 48.

The section on "Aspen, Willow, Alder" (p. 49) outlines some stressors on these ecosystems and states, "In the intermountain west, decreased aspen growth has already been attributed to higher temperatures and expended drought." The section appropriately points to fire exclusion and overgrazing as key factors in the reduced extent of these species, however these stressors are not mentioned in Chapter 3. Please add a discussion of grazing and fire suppression as a stressor to these important forest types.

The trends and conditions discussed for early seral vegetation (p. 53) are not consistent with those reported in the table on p. 52. The table indicates reports that "Fragmentation of Forest Types has a trend of increased fragmentation for old forest and decreased for early seral with expected changes in climate and fire." In contrast, page 53 indicates that "[High intensity fire] will have unknown effects on the extent and quality of early seral vegetation." We believe that changes that result in extended fire seasons and more variable fire severity will lead to increase early seral habitat. Please explain in greater detail why this result is unknown or would not be the likely outcome.

Lastly, we are very concerned about the lack of ecological condition/function and trend information provided in this chapter or in Chapters 2 and 3 on meadow ecosystems on the SQF. Statements about the ecological conditions of the meadows on the forest tend to focus on "range condition" (See Chapter 8, p. 141-142) or refer to generalized information from the bioregion as a whole. This omission of ecological information is especially a concern since there are several species associated with wet meadow ecosystems that are in decline (e.g., one federally listed, one state listed, one proposed for listing) and elsewhere the degraded quality of and threats to meadows has been highlighted. See for example the Meadow Business Plan developed by

National Fish and Wildlife Foundation, USDA Forest Service and partners in 2010[5]. We are also aware that the California Department of Fish and Wildlife is currently reviewing meadow system in an update to the State Wildlife Action Plan. Their focus is on montane meadows systems, yet there is no mention of this work in the assessment.[6] As it stands, it appears that the SQF is not able to report on results of meadow monitoring collected since 2004. The forest assessment and WIKI refer to incomplete studies or unpublished manuscripts as forthcoming at some unspecified time in the future. We now identify this as a chronic problem since results from this meadow condition analysis were first reported in March 2013 in the bioregional assessment and then withdrawn. This was followed by the promise from Forest Service staff of a report of meadow condition in July 2013, and now it appears that delivery has been postponed again. This is unacceptable given the high ecological value of meadow resources and their importance in maintaining ecological integrity and diversity on SQF.

B. Comments on the Conclusion Section

The conclusions for this chapter should be revised to include information on species diversity and trends with an integration of habitat types and associated species. The integration of this information is necessary to evaluate ecological integrity. Further, additional information needs to be provided in the assessment to support the following claim presented in the conclusion that "This has decreased the overall biodiversity of song-birds, woodpeckers, small mammals, and understory plants adapted to light and fire." (p. 216).

C. Changes to the Forest Plan to Improve Resource Conditions

Based on our review of the SQF forest plan, we recommend that the forest plan be revised to more clearly and proactively take action to improve conditions and reverse specific trends. In Table 3 below, we identify conditions reported in the forest assessment about which we are concerned, the action to take, and offer examples of recommended changes to the forest plan. Additional recommendations for changes to make to the forest plan as well as other policy and planning actions to take are provided in the *National Forests in the Sierra Nevada: A Conservation Strategy* (Britting et al. 2012). The web links to relevant sections of this document have been provided below Table 3 and full website link are also provided below Table 3.

[5] http://www.nfwf.org/sierranevada/Documents/Sierra_Meadow_Restoration_business_plan.pdf

[6] We are also aware of a meadow working group in which the Forest Service and other stakeholders are developing criteria to assess meadow restoration and prioritize future restoration actions. This ongoing work is an example of one way to extend the capacity of the Forest Service to undertake restoration and should be mentioned in the assessment.

Table 3. Ecological conditions that indicate a need to change the current forest plan, including the practice to be changed and a sample of recommendations on how the forest plan could be changed to affect this practice. The table below contains hyperlinks to the specific sections of Britting et al. (2012) that contain additional recommendations.

Condition	Change in Practice	Examples of Changes to Forest Plan and Policy to Support Practice
Lack of periodic fire	Increase use of managed fire[7]	Change objectives/strategies to emphasize use of managed fire of all types; set targets for the accomplishment of managed fire Allow use of managed fire in nearly all land allocations (i.e., change suitability of use for this practice) Revise limitations in den buffer allocation to provide greater latitude to use managed fire. For additional recommendations see Restoring Fire as an Ecological Process (in Britting et al. 2012)
Stands are homogeneous and uniform	Increase within stand complexity	Use managed fire to enhance understory species Limit tree planting and herbicide use to allow development of early seral species For additional recommendations see Structural Diversity of Forest and Adjacent Habitats (in Britting et al. 2012)
Large structures (trees, snags, and downed logs) are missing	Adequately recruit and retain large elements Manage insects and pathogens to produce desirable levels of activity, decay, and rot	Limit removal of trees >20" dbh to clearly defined restoration purposes Retain larger green trees cut for restoration purposes as snags or downed wood Manage tree density to provide ecologically beneficial levels of density induced mortality Limit removal of snags to those necessary to address safety For additional recommendations see the following sections in Britting et al. (2012) : Structural Diversity of Forest and Adjacent Habitats Maintain and Restore Old Forest Habitats and Associated Species Conservation of Species at Risk and Appendix A: Species Assessments and Conservation Measures

[7] We define managed fire as any ignition, i.e., intentional, planned, human-caused, or naturally-caused, that is managed for ecological benefit.

Condition	Change in Practice	Examples of Changes to Forest Plan and Policy to Support Practice
Lack of complex early seral stages	Manage post-fire wildfire environment to enhance and protect complex early-seral conditions	Limit post-fire salvage to that necessary to address public health and safety Avoid road construction in post fire environments Develop planting strategies only for areas that clearly indicate the local seed source is no longer available Planting strategies incorporate principles of heterogeneity and stand variability For additional recommendations see Structural Diversity of Forest and Adjacent Habitats (in Britting et al. 2012)
Species movement compromised by human-caused events such as wildfire, climate change, development of roads, logging, water diversions and other development	Provide for movement and connectivity for a variety of species and ecosystems	Develop a connectivity network as a land allocation Includes both terrestrial and aquatic ecosystems in the connectivity network Utilize data from the Citizen's Roadless Inventory completed by CWC to assess connected landscapes Incorporate special designations into connectivity network (e.g., special interest areas and resource natural areas, wilderness areas) Evaluate representation of habitat types and determine gaps in representation Include both terrestrial and aquatic habitats in the connectivity network For additional recommendations see the following sections in Britting et al. (2013) : Restore and Maintain Aquatic Ecosystems Conservation of Species at Risk and Appendix A: Species Assessments and Conservation Measures Species Movement and Habitat Connectivity Protecting Roadless Areas and Recommending New Wilderness Area Special Interest Areas and Research Natural Areas
Drying of meadows	Reduce disturbances that lead to compaction, channel incision, and stream bank degradation	Prohibit grazing in wet meadows systems with incised channels or early drying Relocate trails and roads that disrupt meadow hydrology Rehabilitate incised channels and restore natural channel(s) For additional recommendations see Restore and Maintain Aquatic Ecosystems (in Britting et al. 2012)
Loss of shrub cover in wet meadow systems	Increase water availability and limit hedging	Prohibit grazing of willows and other shrubs For additional recommendations see Restore and Maintain Aquatic Ecosystems (in Britting et al. 2012)

The following are web links for sections of *National Forests in the Sierra Nevada: A Conservation Strategy* (Britting et al 2012) that are cited in the table above.

Restoring Fire as an Ecological Process
http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/IV_A_Restoring%20Fire%20as%20Ecological%20Process.pdf

Structural Diversity of Forest and Adjacent Habitats
http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/IV_B_Structural%20Diversity.pdf

Maintain and Restore Old Forest Habitats and Associated Species
http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/IV_C_Maintain%20and%20Restore%20OG%20Forest.pdf)

Restore and Maintain Aquatic Ecosystems
http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/IV_D_Restore%20and%20Maintain%20Aquatic%20Ecosystems.pdf

Conservation of Species at Risk
http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/IV_E_Conservation%20Species%20at%20Risk.pdf

Appendix A: Species Assessments and Conservation Measures
http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/Appendix%20A%20Species%20Revised.pdf

Species Movement and Habitat Connectivity
http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/IV_F_Species%20Mvmt%20and%20Habitat%20Connectivity.pdf

Protecting Roadless Areas and Recommending New Wilderness Area
http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/IV_I_Roadless%20Areas%20and%20New%20Wilderness.pdf

Special Interest Areas and Research Natural Areas
http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/IV_K_SIAs%20and%20RNAs.pdf

III. Chapter 2: Assessing Air, Water, and Soil Conditions

A. Information that is missing

We ask that you present recent information on the effects of grazing on water quality. Although simply noted as an information gap (p. 66), we think this evades an issue that has been examined in recent research. The impacts of grazing on water quality have been examined in recent studies (Myers and Whited 2012; Roche et al. 2013). Both studies found that the water quality standards set by the State of California were exceeded in locations where grazing was active. Whited and Meyers (2012) conservatively estimated that between 41 and 68 violations occurred annually (for

the samples they processed) between 2009 and 2011. Roche et al. (2013) found that 83% of their samples violated water quality standards for the State of California. We ask that you include this information in Chapter 2 and also address this information as a stressor on aquatic systems in Chapter 3.

The discussion on soil conditions (p. 58-59) does not address livestock grazing as a stressor on soil condition. The focus in this section is on sedimentation from vegetation management and roads; however, there are additional stressors including grazing that can degrade ecological sustainability of soils. We ask that you include the impacts from gazing in this discussion of soil sustainability.

B. Changes to the Forest Plan to Improve Resource Conditions

Information presented in this chapter and elsewhere indicates that aquatic and riparian (including meadow habitats) have high ecological value with current conditions that range from low/degraded to high quality. Further, estimates of future trends indicate that climate change and other stressors have the potential to heighten negative trends or slow recovery. Based on our review of the SQF forest plan, we recommend that the forest plan be revised to more clearly and proactively take action to improve conditions and reverse specific trends for aquatic and riparian communities. In Table 3 (pervious section) we identified several concerns about aquatic systems and presented recommendations on changes to the forest plan. Additional recommendations are located in Britting et al. (2012) (Restore and Maintain Aquatic Ecosystems http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/IV_D_Restore%20and%20Maintain%20Aquatic%20Ecosystems.pdf). Maintaining fire as a beneficial disturbance process is also critical to the sustainability of aquatic and riparian resources. Please see our comments on Chapter 3 for recommendations on how to increase the use of managed fire in order to re-establish an appropriate fire regime and to ensure the ecological integrity of the affected ecosystems.

IV. Chapter 3: Assessing System Drivers and Stressors

A. Information that is missing

It appears that a significant portion of the text related to stressors (climate change but also probably fire) was omitted from the draft assessment. Page 68 introduces the topic of climate models, but does not complete this presentation and page 69 begins mid-sentence on the topic of climate change and WUI. Please include the missing sections in the next draft of the assessment.

1) Climate Change

We were pleased to see that the assessment mentions climate change in multiple contexts, including as a threat to ecological integrity, to special habitats, to multiple at-risk species, and other resources. However, the discussion of climate change is, in most cases, broad, general, and speculative, and lacks supporting references. Page 16 describes climate change as an "uncertainty," which misrepresents the scientific consensus about the reality of climate warming; while there are indeed uncertainties associated with climate change impacts, these would be

better discussed in the discussion of specific effects, rather than giving climate change an overall status as "uncertain." There are multiple other instances in the document where climate change is discussed as an "uncertain" or "unknown." In addition, the mentions of climate change in the document are usually limited to lists of stressors, such as this one on page 32: "[Special habitats] are impacted by invasive plant species, habitat fragmentation, uncharacteristically frequent fire, surface mining, post-fire disturbance, illegal marijuana cultivation, and climate change." These very general references are not sufficient to give the reader a clear picture of the threat posed by climate change, let alone to allow consideration of how adaptation options might be developed and implemented.

The assessment would benefit from a fuller and more science-based elaboration of climate change projections in the region, and their potential impact on the assessment topics. For instance, the assessment states that certain habitat types will be "vulnerable" to climate change, like blue oak woodlands, meadows and alpine areas, and trout and salmon, but provides very little detail. A more detailed summary of the cited research is needed, including elaboration about the projections used, the results, and the management implications.

Furthermore, the assessment would be improved considerably by the inclusion of a broader range of climate change impacts within each topic area. For instance, one effect of climate change is an increase in the incidence of extreme precipitation events, which has already been documented and projected to continue to increase (USGCRP 2009). The assessment discusses high intensity precipitation in the context of landslide hazard, but does not mention it in discussions of aquatic biodiversity, at-risk species, water quality, infrastructure, or other places where it is clearly relevant.

In short, the assessment could be much more thorough and specific about what is known and projected about the different ways that climate change will affect forest resources, through increased temperatures, changing seasonal patterns, severe precipitation events, etc., and about the full range of species, habitat, and human impacts that these changes will very likely have within the SQF.

2) Fire

Among all national forests in the bioregion, the SQF has been the most successful in using managed fire to achieve ecological benefits (Silvas-Bellanca 2011). We are concerned that the system and driver chapter does not adequately represent the current condition of landscapes on the SQF that have been managed with fire. In turn, this misrepresentation of the current condition could suggest to readers that managed fire is not the appropriate tool for achieving restoration. We ask that it be clearly identified in this section the areas on the SQF that have benefited ecologically from managed fire.

We are also concerned about how the consequences of fire are portrayed. For example, it is not useful in the assessment to state that "fire is a stressor when it is large, uniform, of high severity, and outside of natural range of variation" without explicitly defining these parameters (p.66). The assessment goes on to state (p.69) that "the extent of high severity fires has increased beyond what is desirable by most." These "normative" statements regarding high severity fire as

a stressor conflict to some extent with the discussion earlier in the assessment around the legitimate science questions surrounding the historic role of high severity fire in these ecosystems (see pages 38-42). First, the assessment needs to provide an informational basis for these statements, and second, it is questionable whether this statement is relevant to the assessment question at hand. We recommend that the Forest Service apply a science review to either the assessment or the planning process to cover specific science questions related to fire and fire effects (see draft directives chapter 40, section 42.2 for a description of an optional science review process). For example, the assessment (p. 42) discusses "uncertainties about how to characterize or interpret different sources of scientific information on historic high severity fire…This creates a need for a scientific basis to determine the level and extent of high severity fire that impacts rare species or habitats or species of concern, such as the California spotted owl. The question becomes how much high severity fire is too much." A science review of this question would "support the quality and credibility of planning" (directives 42.2) around this topic and, from our perspective, meets the criteria for undertaking a science review put forward in the draft directives: controversial, risk to key resources, and lack of scientific consensus/high degree of uncertainty around the science question.

The forest assessment should include an analysis of the efficacy of fuels treatments, including prescribed fire, fires managed for resource benefit and mechanical treatments, completed since the forest plan was last amended, i.e., since 2001 or 2004. The forest assessment (p. 74) states that, "An assessment of current conditions in the wildland urban interface is not possible at this time because there is no single database of fire hazard and community protection treatment projects or conditions." We do not agree with this conclusion since data is available for projects undertaken on the SQF. In the table below, we collected information presented in the "Monitoring Accomplishment Report" completed annually 2004 through 2012.

Table 4. Acres of fuel treatment on the SQF compared to national forests within the scope of the Sierra Nevada Forest Plan Amendment. Data compiled from annual reports dated 2004 to 2012 (http://www.fs.usda.gov/detail/r5/landmanagement/planning/?cid=STELPRDB5349922).

	Sequoia NF			SN Bioregion		
Year	Fuel Treatments	WUI (acres)	Proportion WUI Treated	Fuel Treatments	WUI (acres)	Proportion WUI Treated
2004	ND	ND	ND	169,190	84,595	50%
2005	ND	ND	ND	67,014	32,167	48%
2006	ND	ND	ND	53,468	28,338	53%
2007	ND	10,114	ND	99,942	24,124	24%
2008	6,817	409	6%	119,584	38,267	32%
2009	12,718	2,162	17%	131,203	53,093	40%
2010	14,014	4,835	35%	106,426	35,211	33%
2011	26,605	5,055	19%	98,151	40,183	45%
2012	1,233	1,233	100%	69,274	30,565	44%
2007 to 2012	ND	23,808	ND	624,580	221,443	35%
2008 to 2012	61,387	13,694	22%	524,638	197,319	38%
All Years	ND	ND	ND	914,252	366,543	40%

As can be noted from the information above, some data was not reported for the years 2004 to 2007 for SQF. During the period 2008 to 2012, 61,400 acres were treated and 22 percent were in the wildland urban interface (WUI). The forest plan was amended in 2004 to specifically direct the strategic placement of fuel treatments in order to modify fire behavior and reduce the risk of undesirable effects from wildfire. The forest assessment needs to evaluate fuel treatments to determine if they are achieving this purpose. Such an analysis can only be completed if the data being used incorporates the area that has been treated.

It is not clear to us if the analysis and map illustrating departure from a reference condition class (p. 69-70) take into account how recent treatments (e.g., managed fire or mechanical treatments) have changed the landscape. This may also be the case for the analysis and map depicting resiliency (p. 71-72). We believe that there are several ways that these analyses may underestimate the area treated. First, the text on page 81 reports data 50,000 acres of managed fire (since 2001), 3,600 acres of thinning, and 6,200 acres for prescribed fire, totaling 59,800 acres of treatment on SQF. These values are less than the total of 60,400 acres reported in the forest monitoring report for the period 2008 to 2012 and noted in Table 4, above. The values reported in the forest monitoring reports should be included in the forest assessment and the differences in the area treated should be explained. In addition, Silvas-Bellanca (2011) summarized the FACTs database for the SQF from 2000-2008 for prescribed fire and fires managed for resource benefit. Reported accomplishments on the SQF are 2,396 acres of prescribed fire and 39,815 acres of fires managed for resource benefit for a total of 42,211 acres of treated land on the forest. At this point, we are unable to reconcile the data presented contained in the FACTS database with the forest monitoring reports and the data presented in

this assessment. Please clarify the treatment types and time frame for the data presented. Lastly, we ask that all mechanical treatment with decisions and all fire projects that have been implemented including fires that have been managed for resource benefit be modeled as completed in the analyses presented in the assessment.

We think the analysis of restoration options presented on pages 77-78 generally is a good approach to examining opportunities, but it is not clear how the attributes were defined. For instance, in the Sierra National Forest assessment "potential treatment areas" were defined, in part, by the existence of dense canopy cover. We are uncertain if attributes for this analysis on the SQF were defined the same way. If they were, we believe this would underestimate the areas available for restoration and would appear to be biased towards reporting areas suitable for mechanical treatment. An additional bias towards mechanical treatment could be evident in limiting the potential treatment areas to slopes <40%. Areas with steeper slopes are in need of management (see for example locations of recent wildfire ignitions from the American, Aspen and Rim fires in steep canyons), yet the ability to treat these areas mechanically is limited by the forest type (e.g., hardwood provide no commercial timber value) or the ability to access steep areas with mechanical equipment. It should be made clear that managed fire may be the only feasible treatment option in some areas due to vegetative conditions or geography. Managed fire, e.g., use of fire and prescribed burning to achieve ecological benefits should be considered in such areas.

The statement on p. 66 should be rewritten to acknowledge that fire is a part of the ecosystem, although admittedly it has been limited by fire suppression (revisions provided in bold, underline and strikeout).

> For example, fire ~~used to and can~~ plays an important role by keeping understory plants at lower levels and thinning understory trees. It ~~used to and can~~ creates variation in habitat**,** which is important for biodiversity. In these ways, it is a "driver" of ecosystem condition. Fire is can be a stressor when it is large, uniform, of high severity and outside the natural range of variation.

3) Insects and pathogens

There is no bioregional or SQF specific data presented to support claims in the forest assessment that insects and pathogens are a stressor on this landscape. All of the statements about the current levels of mortality from these agents presume that they are out of range. This presentation fails to acknowledge the work of insects and pathogens to create snags and trees with wildlife features that are ecologically beneficial. For example, the platforms created by mistletoe brooms are important nesting and resting sites for some animals, and patches of snags resulting from density induced mortality provide sites for beetle infestation and provide prey to foraging woodpeckers and other wildlife. Especially in the face of limited fire (managed or wildfire) that could otherwise create snags and density induced mortality; insects and pathogens have become an important driver or process that create snags. Presently, the levels of snags are lower than standards in the forest plan (e.g., compare the guideline of 6 per acre in red fir types with WIKI snapshot of Chapter 1, lines 559 to 564). Density induced mortality and the effects of insects and pathogens are processes that can support the generation of snags. The standard silvicultural paradigm that seeks to limit the loss of fiber to insects and pathogens needs to be

revised to address the benefits that such processes provide to creating and supporting essential habitat elements in forested stands.

Assessment statements (e.g., p. 74) need to be rethought in order to contribute to effective evaluation of the plan and development of plan components. Specifically, the attributes identified in the following statement "past management activities have resulted in overly dense stands, imbalances in diversity of age class, and altered forest structure and composition" are all distinct ecosystem characteristics that need to be described in terms of reference conditions (using NRV or another valid approach) and projected in the future under current plan components. Second, the statement "This alteration from historical conditions has resulted in increased susceptibility to insects, pathogens, and weather induced stress" should be supplemented with a corresponding reference describing the degree of risk and uncertainty inherent in this sort of generalization. Similarly, the discussion of historical vegetation landscape pattern and resilience to insect disturbance needs to be better defined, e.g., what was historical landscape vegetation pattern and density and at what temporal and spatial scales, with citations to the literature, and discussed in the context of the current forest plan.

In the new paradigm of ecological restoration promoted by Region 5, it is now critical to develop estimates of beneficial disease and insect levels and acknowledge the benefit of episodic events to the creation of wildlife food sources and habitat structures. Given the characterization of beneficial levels of these agents, one can evaluate the environmental settings that may produce undesirable levels and develop measures to limit these agents

With this in mind, we ask that you provide data specific to the SQF to support the following claim in the forest assessment (p. 83):

Characteristic	Condition	Trend
Area affected by insects and pathogens beyond natural range	Mostly outside of natural range. Dense forests and climate change increase susceptibility to large outbreaks.	Continued. Restoration far below rates needed to restore. Climate change will make worse

We also ask that you address the following information presented in the forest assessment and elsewhere that is contrary to the findings above:

> Hardwoods (Merriman 2013, draft natural range of variability report): This report indicates that there is no information on which to base an estimate of the natural variation for insects and disease in hardwoods (p. 24). Furthermore, introduced insects and disease (i.e., sudden oak death and gold spotted oak borer) are the only species noted as being outside the NRV since they are introduced species (p. 28).
>
> Yellow pine and mixed-conifer (Safford 2013, draft natural range of variability report): Table 11 (p. 120) indicates that it is unknown whether insects and pathogens are outside the natural range of variability.

Red fir (Meyers 2013, draft natural range of variability report): Table 12 (p. 54) indicated that red fir was "Generally within NRV."

Subalpine zone and white bark pine: Information in Maloney (2011) suggests that white pine blister rust disease is not a prevalent risk in the southern Sierra Nevada to the degree it is in other parts of the Sierra Nevada. Further, Maloney (2011) suggest that only a small amount of mortality from mountain pine beetle has been observed in the Sequoia NF, but not at significant levels

Increasingly, "forest health" and the threat of insects and pathogens are used as reasons to conduct extensive mechanical treatment and to assert, as was done in the forest assessment, that the current pace and scale of restoration treatments is insufficient to manage the "threat." We ask that the forest assessment provide data to support any claims made about the threat of insects and pathogens that are specific to the SQF with a particular attention to the scale and extent of the concern. We also ask that the beneficial actions of density-induced mortality, insects and pathogens be recognized and integrated into any evaluation of "threat."

B. Comments on the Conclusion Section

The conclusion section for drivers and stressors (p. 216) does not adequately address the positive benefits to the ecosystem of managed fire. Please provide additional discussion and integration on fire as a key "driver" and integrate this with conclusions for Chapters 1, 2, 4 and 5.

C. Changes to the Forest Plan to Improve Resource Conditions

The following table highlights several changes we recommend making to the forest plan. The complete set of recommendations on improving forest plan can be reviewed in *National Forests in the Sierra Nevada: A Conservation Strategy* (Britting et al. 2012), Restoring Fire as an Ecological Process
http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/IV_A_Restoring%20Fire%20as%20Ecological%20Process.pdf

Table 5. Drivers or conditions that indicate a need to change the current forest plan, including the practice to be changed and a sample of recommendations on how the forest plan could be changed to affect this practice. The table below contains hyperlinks to the specific sections of Britting et al. (2012) that contain additional recommendations.

Driver or Condition	Change in Practice	Examples of Changes to Forest Plan and Policy to Support Practice
Lack of periodic fire	Increase use of managed fire[8]	Change objectives/strategies to emphasize use of managed fire of all types; set targets for the accomplishment of managed fire Allow use of managed fire in nearly all land allocations (i.e., change suitability of use for this practice) and allow for areas that are in need of mechanical treatments (due to density related issues or human and safety concerns) to be moved into a land use for managing fire upon completion of treatment (see North et al. 2012 for more discussion) Include assessment of land area that is suitable for mechanical treatment, managing fire, or both (<40% slope for machine operability, >40% slope and/or within Wilderness and Roadless areas) Revise limitations in den buffer allocation to provide greater latitude to use managed fire Limit post-fire salvage to that necessary to address public health and safety For additional recommendations see Restoring Fire as an Ecological Process (in Britting et al. 2012)
Stands are homogeneous and uniform	Increase within stand complexity	Use managed fire to enhance understory species and patchiness For additional recommendations see Restoring Fire as an Ecological Process (in Britting et al. 2012)
Lack of complex early seral stages	Managed fire results in a variety of fire effects (e.g., low, moderate and high severity)	Prescriptions in burn plans provide for a diversity of fire effects For additional recommendations see Restoring Fire as an Ecological Process (in Britting et al. 2012)

The following web links are for the sections of *National Forests in the Sierra Nevada: A Conservation Strategy* (Britting et al. 2012) that are cited in the table above.

Restoring Fire as an Ecological Process (http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/IV_A_Restoring%20Fire%20as%20Ecological%20Process.pdf)

[8] We define managed fire as any ignition, i.e., intentional, planned, human-caused, or naturally-caused, that is managed for ecological benefit.

Structural Diversity of Forest and Adjacent Habitats
http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/IV_B_Structural%20Diversity.pdf

V. Chapter 4: Carbon

A. Information that is missing

The word "carbon" does not occur in the 2004 Sierra Nevada Forest Plan Amendment Appeal Decision. It is reassuring that the element that makes up about 50 percent by weight of the organic material in the Sierra Nevada receives an entire chapter in the Draft Forest Assessment, and because of carbon's importance in the matter of climate change.

One form of carbon not considered in adequate detail is charcoal, which is, very generally, made up of about 80 percent pure carbon. Charcoal is important partly because it is one product of fire-adapted ecosystems. With each successive fire, charcoal is laid down on the soil as a result of incomplete burning of woody biomass. Great quantities of charcoal are also present in snags and down wood that remain after fires and even in trees that survive fire but are scarred by it. More than 100 years of fire suppression and management activities (salvage logging following fires and grazing) have greatly reduced the production of charcoal in Sierra Nevada forests and meadows. Charcoal does not oxidize as readily as non-charcoal forms of carbon, but it still reacts with oxygen and other elements to form various compounds and is thus gradually removed in its pure form from the ecosystem. So it behooves us to study the effects of reduced production of charcoal in fire-adapted ecosystems, like the forests and chaparral of the Sierra Nevada.

The Draft Forest Assessment considers carbon as a means of carbon sequestration, but does not consider other potential contributions carbon as charcoal might make to Sierra Nevada ecosystems. As an example, the contributions of charcoal to forest nutrient cycles (Lehmann and Joseph 2012; Pingree et al. 2012) should be considered in this assessment.

VI. Chapter 5: At-Risk Species

A. Information that is missing

As noted in our comments on Chapter 1: Ecological Integrity, we ask that the linkage between ecosystems, and their conditions, evaluated in Chapter 1 be clearly associated with critical habitat components (e.g. ecological conditions) for the at-risk species included in Chapter 5. This information is fundamental to evaluating current plan components, developing future coarse filter plan components, and making legitimate determinations that the ecosystem approach is sufficient to meet the regulatory requirements of at-risk species and to support the design of species-specific plan components, where needed.

This chapter should also provide information on species trends that relate to both the plan area and regional status. In fact, the draft directives state that when evaluating the status of at-risk species: "Conduct the evaluation at the scale of biological populations. If the appropriate scale for the evaluation extends outside the plan area, consider effects of other land ownerships and

actions outside of NFS lands" (FSH 1919.12, 12.55). We are aware that there has been a substantial amount of monitoring for at-risk species at the forest and regional level, but find that those results are not presented in either the forest assessment, the forest WIKI chapter or in the bioregional assessment. As we noted in our comments on the bioregional assessment, this omission of information is particularly troubling since many of the resource conflicts over the past years have been focused on the tension between providing sufficient habitat for species at-risk versus the pursuit of other management objectives (e.g., logging, grazing, and fuels management). It is not possible to resolve resource conflicts if the information is not provided in the assessment.

We are troubled by the following statement in Chapter 5 (p. 89), "The full suite of readily available information relevant to at-risk species will be considered when developing and evaluating plan components throughout plan revision." Assessments must consider all relevant information that is publicly available at the time the assessment is prepared. The forest assessment is the time to complete the evaluation and summarize all the available data. The purpose is to disclose the condition and trend now as the foundation for evaluating the existing forest plan. We ask that the final SQF assessment be revised to provide all the information needed to evaluate the existing plan and revise the future plan, if needed. We have developed species accounts for a number of the potential species. We recommend that information from those accounts be included in the forest assessment: Appendix A: Species Assessments and Conservation Measures (Britting et al. 2012) (http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/Appendix%20A%20Species%20Revised.pdf).

Lastly, as we noted earlier in these comments, there is no information provided to evaluate how the existing forest plan has influenced the current conditions and future conditions for at-risk species, including changes to species populations. Critically, the assessment fails to provide clear projections of future viability and other conservation standards (i.e. for listed or candidate species) for at-risk species under the current plan components. The assessment should include a clear discussion of future population viability under the current plan for species of conservation concern, or where relevant for listed species, future species recovery status, based on designated recovery actions that may be found within the existing forest plan. This analytical step is clearly required in the draft directives 12.55, and the failure to project regulatory parameters for at-risk species under the current plan is a major flaw in this assessment. As currently drafted, the assessment will not provide information useful to developing plan components that will meet the legal requirements of the planning rule. For the reasons mentioned above, this information is critical to the evaluation of the need to change the forest plan. We also found that there was little mention of monitoring results completed on species affected by the forest plans. We are aware that a significant investment has been made in monitoring species and expect those results should be relevant to this assessment.

We also offer the following specific comments on the species accounts and characterizations:

Fisher

p. 94: Naney et al. (2012) identified high severity wildfire as a threat to fisher. However, it remains to be addressed how the fisher population on the Kern Plateau has managed to sustain its population in areas that were affected by the McNally Fire – consisting of 38% moderate and 28% high severity fire effects. A closer examination of fisher in this area is warranted and may well provide insights on how fishers use burned landscapes (severely or otherwise). A recent study by Hanson (2013) in the Kern Plateau suggests that dense forests that have been severely burned are utilized by fisher.

p. 94: Small populations, as noted by Naney et al. (2012) should be added as a risk factor. This factor was considered the most important in that review and explains to a large degree why evaluations of cost-benefit of treatment to reduce fire risk must be carefully consider, i.e., the risk of a fire occurring has a low probability, but the likelihood of reducing habitat quality with fuels treatment is fairly certain. This trade-off can become an acute problem with a small population. Such a cost-benefit analysis was the basis of the work undertaken by Spencer et al. (2008).

p. 94: Add increased predation (Bobcats and other species) as a significant threat to fishers (Thompson-KRP Fisher Research, SNAMP Fisher Research, Fisher Working Group).

Northern Goshawk

p. 99: Salvage logging (fire, insect or other types) should be included as a risk factor.

Great Gray Owl

P. 100: Complex forest-meadow edges should be included as a key ecological factor, and identification of habitat loss due to timber harvest as a key risk to species.

Mount Pinos Sooty Grouse

P. 101: Logging (green tree and salvage) should be included as a risk factor.

B. Comments on the Conclusion Section

This section mentions the association of some at-risk species with "a few key ecosystems such as: mature forests; aquatic, riparian and meadow systems; and gabbro or serpentine soils" and notes that "some key ecosystem components such as: snags, down logs, riparian vegetation, and shrub fields are important for several at-risk species." This is the type of information that needs to be developed more fully in Chapter 5 and linked to the evaluation of the trends and conditions of these habitat types and elements in Chapter 1, 2 and 3. In fact, the draft directives clearly state that ecological integrity assessments consider the geographic range, habitats and necessary

ecological conditions for at-risk species when determining target ecosystems and key ecosystem characteristics (FSH 1909.12, 12.12, 12.13, 12.14).

C. Changes to the Forest Plan to Improve Resource Conditions

We evaluated the status of a variety of species, including the risks posed by the existing forest plan. This information is contained in *National Forest in the Sierra Nevada: A Conservation Strategy, Appendix A: Species Assessments and Conservation Measures* (Britting et al. 2012) (http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/Appendix%20A%20Species%20Revised.pdf). We found that for a number of at-risk species on the SQF, the existing forest plan did not adequately provide for species needs. The complete recommendations on aspects of the forest plan that we believe should be changed is noted in Appendix A; however, in the table below, we provide examples for some of the species that occur on the SQF.

Table 6. At-risk species for which changes to the current forest plan should be made. This table includes examples of recommended changes to the forest plan to improve conservation outcomes for these species. These examples and additional recommendations are located in Appendix A: Species Assessments and Conservation Measures (Britting et al. 2012) (http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/Appendix%20A%20Species%20Revised.pdf).

Condition	Objective	Examples of Changes to Forest Plan and Policy to Support Practice
California spotted owl: declining population	Reduce likelihood of nest abandonment	Provide guidelines to protect owl habitat with high canopy and large diameter trees (CWHR 5D) Limit amount of vegetation management within Protected Activity Centers. Establish as a priority the conservation of owl habitat outside of areas close to communities.
Fisher: small population	Limit habitat degradation	Define objectives for the use of fire in constrained travel corridors to achieve low severity fire effects and to avoid stand replacing effects. Reestablish and enhance patches of lush layered ground vegetation, snags, and fallen logs to provide conditions for abundant prey. Adopt marking guidelines to achieve retention of structures important for resting, denning, and hiding cover from predators.
Marten: low population numbers	Retain and recruit large structures for denning and resting	Retain all available den and rest structures, including large snags, downed logs in decay classes 1 and 2, large standing boles, cavities in large trees, within the elevational range for marten and outside the Community Zone (0.25 mile buffer around communities and infrastructure). Adopt marking prescriptions that clearly retain important habitat structure for marten per corresponding objective above. Avoid post-disturbance logging in marten habitat.

Condition	Objective	Examples of Changes to Forest Plan and Policy to Support Practice
Willow flycatcher: declining population	Reduce predation pressure	Keep new developments that attract cowbirds and other nest predators, such as pack stations and campgrounds, away from riparian areas to minimize the impacts of the cowbirds on willow flycatchers. Maintain standing water in meadow systems to limit ability of predators to access nests established in willow thickets.
Black-backed woodpecker: Small populations with episodic increases	Provide for episodic elements at the right pace and scale	Protect important black-backed woodpecker habitat from post-fire logging by retaining patches of dense, burned conifer trees (9" dbh or greater) occurring in contiguous patches of 5 acres or greater. Also retain the highest densities of the largest trees to support foraging, except where human life and property are at risk. Use prescribed fire, especially with mixed-severity effects, to create black-backed woodpecker habitat that is well-distributed across the landscape, especially in areas that have not experienced wildfire recently. Retain snags and dense patches of conifers in green forests during forest thinning to allow tree mortality and support black-backed woodpecker population persistence between wildfire events.
Great gray owl: low population numbers	Limit habitat degradation	Exclude meadows associated with great gray owl PACs from grazing allotments and fence if necessary to exclude cattle. If grazing must occur, maintain stubble heights at a minimum of 12," measured at the end of the grazing season, and avoid grazing in the meadow prior to September. Maintain 70-100 percent canopy closure in the forested areas of the nest sites.

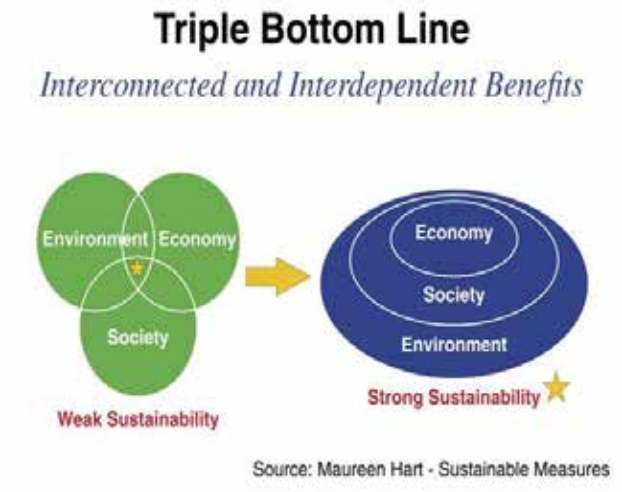
VII. Chapter 6: Assessing Social, Cultural and Economic Conditions

A. Information that is missing

The assessment of economic conditions related to timber harvesting, mining, and grazing should include the integration of sustainability criteria to better inform the assessment and its audience about the context of economic trends.

During the past century and a half, logging of old growth, fire resilient trees and halting of the key ecological process, i.e., fire, that drives resilience in Sierran forests has led to significant ecological damage and social confusion as to the nature of the forest system and its ability to provide for human demands that have tended to outstrip the system's ability to remain intact and resilient. Economic trends built upon simplistic over-expectations about the ecosystem's ability to produce goods and services for people, has been all too common (Kauffman et al. 1994). The lack of integration of economic potential with ecosystem potential continues to fuel debate as to

the capacity of the system to maintain biodiversity (evolutionary potential) and long term resilience while providing for human needs (Callicott and Mumford 1997). The long list of wildlife species at-risk is the constant reminder of the lasting impacts of past forest management.



In the National Report on Sustainable Forests - 2010 (USDA Forest Service 2011), the Forest Service revisits the question of forest sustainability and presents a profound re-thinking of the older, outdated position of "weak sustainability" that has evolved into a more integrated and holistic vision of "strong sustainability" where human society and economic activity is grounded within a healthy, sustainable environment.

It is therefore critical that the Sequoia NF Assessment and the Bioregional Assessment frame economic trends in a sustainability context. It is simplistic and inconsistent with current sustainability policy to cite recent economic trends (for timber as an example) without raising sustainability benchmarks for judging if a particular extractive use within a particular timeframe supports or contributes to sustainability or degrades it.

Sustainability is the key criteria for determining the need for change in the current forest plan. Wildlife population trends, habitat trends, meadow conditions, fire severity trends, the absence of fire in the system, a timber industry's capacity to support restoration while not further degrading environmental conditions, recreation use and a road system that adds to the forest experience while not degrading water quality or meadows are all possible sustainability criteria that help explain the need for change.

Forest Service management decisions can have an impact on county revenues and as noted in the assessment (p. 118):

> Local governments rely on revenue generated from activities on forest lands. Management decisions that affect these activities have the potential to impact these revenues. Key sources of these revenues are: (1) the sales taxes generated from timber sales and tourism and (2) direct revenue received from the Payments In-Lieu of Taxes (PILT) and Secure Rural Schools and Community Self-Determination Act (SRS) programs.

The changes in Forest Service receipts and any downward trend in revenue may be related to variable housing markets and other factors outside Forest Service control. Changing cultural perceptions and scientific research can also suggest changes in management practices or can alter our understanding of sustainable management.

PILT and SRS funds provide a tiny fraction (0.5%) of county revenue in the CCD areas. The Sequoia Assessment should explain how these funding streams have been, in the case of SRS, delinked from historic timber volume revenue and how country dependence on a fixed level of resource extraction has the potential to damage long-term sustainability on national forest lands. The Assessment should also discuss, in an "all lands" context, how an unsustainable timber demand can move the location of impacts from public to private land and still impact the bio-region via fragmentation and loss of landscape connectivity.

The assessment provides the following statistics for timber sector employment:

> Total employment in the timber sector has decreased from around 0.8 percent of all private sector employment in 1998 to the 0.6 percent level of today (Headwaters Economics 2012a). (p. 116)
>
> Forest Service spending for the Sequoia National Forest has increased from around $10.5 million in 2006 to around $20 million in 2012 mostly as a result of increases in the budgets for wildland fire management – spending for fuel reduction and fire preparedness (USFS 2012b). (p. 118)

We find these statements confusing. Please explain why total employment has decreased 0.2 percent since 1998 whereas spending (most for fuels reduction) on the Sequoia NF has nearly doubled from $10.5 million in 2006 to $20 million in 2012. Fuels reduction is largely logging projects focused on trees that are ladder fuels or trees in the over-story thought to contribute to crown continuity and potential negative fire outcomes. What accounts for this discrepancy between decreasing employment in the timber sector and doubling of spending for fuels reduction and fire preparedness on the Sequoia NF?

The assessment (p. 120) primarily links the opportunity to increase the pace and scale of restoration to supporting infrastructure related to logging:

> Not only is restoration a potential benefit to these rural communities, but economically healthy local communities are also a benefit to the success of Forest Service restoration goals. Given the desire to increase the pace and scale of restoration, maintaining a robust local workforce and local infrastructure is necessary to support the logistics and economics of restoration (Charnley and Long 2013, Charnley et al., in press). This is because the revenue that can be generated through stable local markets for timber and non-timber biomass from restoration activities can help offset the costs of Forest Service restoration goals. In addition, the further the haul distance from the harvest site to the processing facility, the higher the transportation costs and less economical the timber sale. Therefore, maintaining local wood processing infrastructure in the bio-region is an

important strategy for maintaining favorable economics for accomplishing ecological restoration goals while sustaining jobs in the local wood products industry (Charnley and Long 2013, Charnley et al., in press).

We see this as a leap of faith that maintaining the local wood processing infrastructure is an important strategy for reaching restoration goals. We believe that there are other important strategies that are necessary to achieve restoration goals. See for example, North et al. (2012, p. 398) where the authors argue that absent a significantly ramped up ecological burning program and given the current rate of mechanical treatment and need for re-treatment, "the current pattern and scale of fuels reduction is unlikely to ever significantly advance restoration efforts . . ." The goal of achieving restored forest conditions is much more complex than maintaining wood processing infrastructure alone. The Sequoia Assessment should address the current cultural challenges ahead for meeting restoration goals including the need for increased ecological burning and landscape level fire restoration (Ryan et al. 2013; Sneeujagt et al. 2013).

B. Conclusions from Chapter 6 (p. 217)

There is no mention of the Forest Service's Ecological Restoration Goals and Ecological Restoration Initiative being the primary driving vision for forest management in the Sierra Nevada. This is a major new cultural agenda for the agency. It is an engaging, "all lands" approach that is much broader in scope than past Forest Service re-vision efforts (e.g., Ecosystem Management, New Forestry, New Perspectives) and it is forging new collaborative partnerships in support of moving restoration objectives to completion. Given the declining trends in treated acres and the challenges to increased managed fire use, the assessment needs to identify these efforts and challenges. It should address the need for changes in Forest Service culture and challenge the public to join in the search for effective solutions such as increased managed fire to increase the pace and scale of restoration.

VIII. Chapter 7: Benefits to People (Timber)

The assessment states "There are over 20,000 acres of plantations on the Sequoia National Forest in need of treatment that would allow the stands to develop old forest conditions." It is questionable that the 20,000 acres of plantations will ever return to "old forest conditions". Even with treatment such narrowly-spaced, homogenous and even-aged structures are subject to increased fire threats and large scale insect attach. If the plantations survive to old age, it a speculative project at best to suggest that old forests with the appropriate ecological function could develop from these plantations. The tragic loss occurred at upon creation of these plantations when the old forest structures we now seek to restore were removed. Please provide a reference to support the idea that, ecologically diverse old forest conditions has ever evolved from plantation forestry in the fire adapted, mixed conifer of the Sierra Nevada.

To the best of our knowledge, there are no, or very limited, opportunities to utilize the biomass from plantations that the assessment indicates need thinning. (See assessment, p. 131: "The treatments are needed to reduce fuel loading, reduce inter-tree competition, and improve the species mix within the stands. While these plantations contain some saw log size material, the majority of the trees are only suited for biomass. There are few projects that provide adequate

volume to potential markets to make the projects commercially viable.") Please address this in the context of a trend. With declining budgets and lack of biomass infrastructure, are these 20,000 acres of plantations trending toward or away from resilience? What are the management options for the plantations and for local biomass in the future?

The assessment (p. 131) states "The ability of the timber industry to respond to probable increased timber volume opportunity and production varies depending on milling infrastructure, logging infrastructure, and product transportation. The milling infrastructure available is currently underutilized and may be subject to failure under current government timber production plans. If it survives in the short term, available mills have the capacity to double and possibly triple output if the supply is made available." With respect to this, the Forest Service should document the various factors that intersect with making "the supply" available. It is more than a simple matter of supply and demand. Forest Service staffing and budgets including specialists to do the NEPA work, standards and guidelines to protect resources, access to lands <35% slope, current timber prices and the markets for low-end plantation wood, treatment costs of approximately $600/ac and many other factors can limit or advance availability. To simply state that there are 20,000 acres of plantations and milling capacity to "double and possibly triple" outputs leaves a significant number of variables out of the conversation. All the factors need to be displayed to better understand if there is a need to change the current plan and what those possible changes might be.

IX. Chapter 8: Multiple Uses – Range

A. Information that's missing

As stated earlier in this letter, we are deeply concerned by the lack of assessment of the ecological conditions and trends for meadows. In many cases, the assessment presumes that current patterns of grazing are acceptable and only historic grazing caused resource damage. We are especially disturbed by the "apologist" stance that is taken in the assessment (p. 141) regarding adverse impacts to vegetation:

> Grazing is not necessarily a primary driver of vegetation change and even when grazing has been the cause of vegetation change, current levels of grazing may be inconsequential. Even completely removing grazing will not always result in a return to historical conditions (Westoby et al. 1989). Some, perhaps many, altered plant communities can no longer achieve what may have once been a historic condition because of lack of a current seed source, the presence of highly competitive and sometimes exotic introduced plant species and changes in soil characteristics limiting species adaptation to the site . These situations are considered state changes in vegetation (Bestelmeyer et al. 2004, 2009, Briske et al. 2008). If current vegetation is a result of climate and disturbance to date, it may be unrealistic to expect vegetation to return to historical conditions, especially in the face of global climate change.

Our interpretation of the above statement is that if Forest Service practices resulted in a "state change in vegetation" then there may be little obligation to restore the ecosystem. Given that historic and current grazing practices have resulted in introduced invasive species, lowering

water tables, water quality violations, loss of native species (e.g., willow flycatcher), the assessment appears to suggest that it is unrealistic to change management to reverse these conditions and we should simply accept the degraded conditions. We ask that you revise this section of the assessment to reflect actual conditions within the SQF. If extrinsic factors are operating on the SQF to prevent the attainment of the ecological integrity of meadow ecosystems, then this should be evaluated site-specifically and such conclusions supported by the best available science.

B. Comment on the conclusion section

We are concerned that meadow trends and conditions are not adequately summarized in this section and that there is a lack of integration with the effects of grazing on meadows from Chapters 1 and 2.

C. Changes to the Forest Plan to Improve Resource Conditions

The following table highlights several changes we recommend making to the forest plan. The complete set of recommendations on improving forest plan can be reviewed in *National Forests in the Sierra Nevada: A Conservation Strategy* (Britting et al. 2012), Restoring Fire as an Ecological Process http://www.sierraforestlegacy.org/Resources/Conservation/Biodiversity/ConservationStrategy/IV_A_Restoring%20Fire%20as%20Ecological%20Process.pdf.

Table 7. Meadow conditions for which changes to the current forest plan should be made. This table includes examples of recommended changes to the forest plan to improve meadow conservation. These examples and additional recommendations are located in Appendix A: Species Assessments and Conservation Measures (Britting et al. 2012).

Condition	Change in Practice	Examples of Changes to Forest Plan and Policy to Support Practice
Overgrazing in meadows	Reduction in impacts of grazing on meadows	Suspend grazing in RCAs that contain perennial saturated meadows with non-cohesive soils that only contain shrubs, grasses, and forbs. Prevent grazing in seeps, springs, fens, and other unique wetted areas Permit grazing only where livestock can be prevented through fencing or other means, from entering riparian and wet meadow areas that are off limits to grazing Development of ecological objectives for allotment management and landscape analysis, until such standards limit grazing and packstock. We suggest the following: · 40% utilization for upland areas in good condition · 20% utilization for upland areas in poor condition · 5” stubble height for meadows and riparian in good condition · 7” stubble height for meadows and riparian in poor condition · 5% max annual utilization on new growth · 15% max annual utilization on new growth for highly palatable upland browse species · 5% limit on alteration of streambank Establishment of six water quality monitoring stations for *E. Coli* and

		other pathogens Restrict grazing in monitored areas where *E. Coli* or other pathogens persist 2 years of mitigation failure and where risk to public is present. For additional recommendations see Restore and Maintain Aquatic Ecosystems (in Britting et al. 2012)

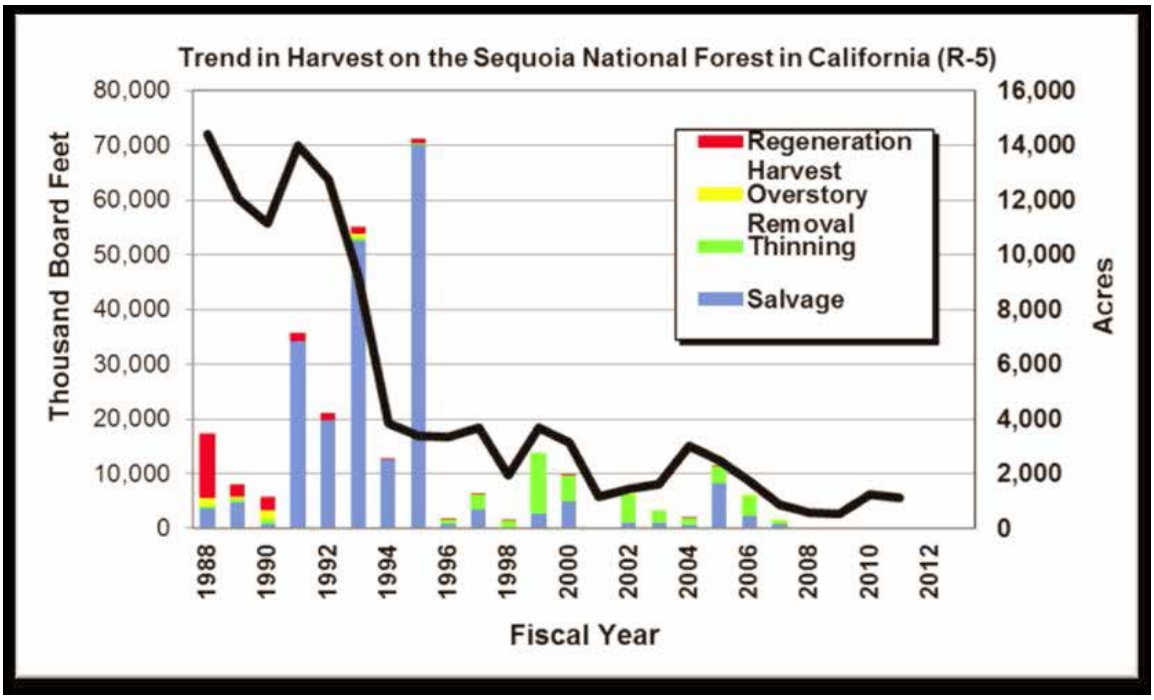
X. Chapter 8: Multiple Use – Timber

A. Information that is missing.

The assessment (p. 149) focuses on stand density and full site occupancy in the following:

> The Sequoia National Forest essentially abandoned even-aged reforestation management 20 years ago, in favor of stand maintenance thinning harvests intended to control density and growth of stands, generally for habitat maintenance. Thinning reduces the number of trees on a site, allowing remaining trees to increase crown and photosynthetic production, and increases growth rates on those remaining trees. Remaining trees grow larger and faster than untreated stands. This cannot continue forever naturally. Once maximum densities are achieved (usually planned for about 15 years), some of those larger trees must die or be removed to accommodate population growth. As with most living things, tree species have distinct maximum life spans, and there tends to develop a maximum average stand age."
>
> In general, the forest composition is being converted to full tree occupancy. While large individual trees are more resistant to the effects of fire, maintaining full site occupancy in such trees puts the forest at risk from other mortality agents like insect damage."

These statements in the assessment fail to recognize several key factors. First, new tree marking and design measures based on ecological principles are incorporating openings, important clumping and retention patterns and research from reference site conditions that are not promoting "full tree occupancy"; these news practices should be considered in the assessment. Second, while the Sequoia NF is growing more wood volume than what is being removed (i.e., harvested) much of that volume is retained because fire as a disturbance process that would remove wood is mostly suppressed and increased growth is (or should be) "placed" on increasingly large trees in order to restore old growth trees to historic levels. With increased burning and increases in large, fire resilient trees the ecosystem will not be trending toward "full tree occupancy" but will move toward a state of increased ecological integrity and resilience.



The graph (above) and displayed in the assessment (p. 150) reflects the shift in timber outputs on the Sequoia NF from the 1988 to 2012. The assessment suggests the shift is from management for resource production to a shift toward ecological function. The primary changes that occurred during this timeframe were the limits placed on unsustainable practices such as large scale clear cutting (i.e., the 20,000 acres of plantations) and the removal of individual, large old growth trees. Also, there was recognition within the Forest Service that wildlife associated with mature and old growth forests were (and remain) increasingly at-risk from habitat loss and fragmentation. The Forest Service initiated this change absent appeals and litigation based upon the recognition of the scientific research at the time (1992) and the close coordination with the scientists with the Pacific Southwest Research Station examining the long term consequences of unsustainable timber removal on wildlife associated with old forests A more complete shift toward ecological function would show significant increases in prescribed and managed fire. While the staff on the Sequoia NF has accomplished several important large burns at higher elevation, a shift toward ecological function would include an order of magnitude increase in burning at all elevations.

The assessment (p. 153) mentions the following stocking guidelines:

> The yield tables commonly used to determine desired stocking levels were generally developed in the late 1920s and early 1930s (Meyer, Dunning and Reineke, Schumacher) when vegetation had been growing under cooler and wetter conditions than are currently being experienced. Use of these stocking guides should be adjusted for warmer, drier conditions possibly leading to decreased site productivity (reduced stocking and growth potential).

The stocking tables should be used with caution since most of the plots in Dunning and Reineke (1933) growth and yield tables where from younger stands (verses old forest plots) and were produced in an era focused on intense timber production and not the maintenance of ecological function or ecological processes. The photo (below) is an example of an important ecological clump of mature and old growth trees. The historic stocking tables do not explain well the presence of this unique and under-represented ecological condition. While we are not debating the fact that trees compete for resources, heavy reliance on stocking control methods can skew thinking towards even-spaced, homogenized tree-spacing guides when recent advances in ecological marking guides based on topographic position and recognition and retention of important ecological patterns and processes is a key concern in project and landscape restoration treatments in the Sierra Nevada (see for example, North et al. 2009; North 2012; Franklin et al. 2013).

The Sequoia NF Assessment should fully discuss the new methods of marking for ecological outcomes, which are moving away from average basal area retention and moving toward recognizing, retaining and creating ecological patterns that resemble pattern in an active fire regime forest. The individual tree, clump, and opening (ICO) marking patterns help preserve and enhance heterogeneous stand and landscape structure and composition and allow for ecological processes to enter the system to build resilience and diversity.

XI. Chapter 9: Recreation Settings, Opportunities and Access, and Scenic Character

A. Developed Recreation

In the assessment, the Forest Service refers to the Recreation Facilities Analysis, but does not provide much information on the findings in the Recreation Facilities Analysis, or, more generally, on the condition and sustainability of the developed facilities. We recommend you add this information into the final assessment.

B. Dispersed Recreation

The description of dispersed recreation would be enhanced with a description of the management problems associated with dispersed recreation that needs to be addressed. For instance, the assessment states that the ROS allocations are outdated. What other issues related to dispersed recreation need to be addressed?

C. Recreation Use and Trends

We recommend that you add information on recreation trends (e.g., uses and preferences that are growing and declining in popularity; demographic shifts in outdoor recreation participation in the Sierra Nevada). Information is available including multiple National Visitor Use Monitoring reports, and the annual National Survey of Recreation and the Environment conducted by Forest Service researcher Dr. Ken Cordell. Synthesized long-term trend information is available in *Outdoor Recreation for 21st Century America: A Report to the Nation: The National Survey on Recreation and the Environment* by Cordell et al, 2004.

D. Spatial Distribution of Recreational Settings and Opportunities

It is common in descriptions of recreation systems to find lots of information related to the number of facilities and opportunities, but rare to find information related to spatial distribution of the facilities, opportunities and settings. It is also rare to find information related to capacity of recreational opportunities and settings and how it compares to needs and preferences – for instance, are the hiking trails in particular regions overcrowded, are the motorized trails under-utilized, etc.? We recommend that you provide this information, if available, as it will help define a need for change.

E. Special Uses

It would be helpful if the Forest Service could add additional information to this section. Specifically, are there management problems with the Special Use Permitting system that need to be addressed? Is the need for special use permits, or particular types of special use permits, greater than supply? Or the other way around? Can the Forest Service meet the administrative burden, including monitoring permit conditions, adequately?

F. Opportunities for cross-boundary recreational connections

Somewhere in this section it would be helpful to include a discussion of cross-boundary recreational opportunities. For instance, are there proximal trail systems or regional trail corridors on nearby state or municipal public lands? Are there opportunities and does it make sense to enhance these types of opportunities to enable people in nearby communities to recreation in a more seamless way?

G. Recreational Access

The section starting on page 166 on Recreational Access discusses the growing gap between available funds for trail and road maintenance, and the consequences related to route closures and deterioration. We recommend that you invoke the Travel Analysis Process (TAP) currently happening on the forest, and explain that a purpose of the TAP is to identify a sustainable road system so that funds can be better focused on maintaining safe and reliable access to important recreational destinations and not spent on unneeded roads identified for retirement. List the relevant findings in the TAP as they should serve to inform plan components.

H. Public Transit

The draft assessment acknowledges on Page 167 that there are no public transit opportunities on the forest, but does not say whether there is need and opportunity for such. Establishing public transit opportunities has multiple benefits including maintaining scenic character and recreational settings, creating quality recreational experiences, facilitating connections between communities and the forest, enhancing visitor management, and potentially lowering long-term road maintenance costs. Is there an opportunity to create or enhance public transit to reduce car traffic and improve recreational settings and resource conditions? Is there a way to integrate municipal transit with Forest Service recreational services (e.g., have buses stop at trailheads)? The assessment should explore whether this option makes sense for the Sequoia National Forest over the duration of the revised forest plan, and what would be required to set the ball in motion.

I. Sustainability

The section beginning on page 169 entitled "The Extent to Which the Plan Area meets Recreational Demand and Sustainability of Recreation" is missing a few key elements. First, the document should spell out the degree to which there are recreation funding shortfalls each year.

Second, on page 170, the draft assessment discusses the growing need to rely on private concessionaires and private businesses, but does not offer information related to the social acceptance of increasing private operations within national forests. A more robust discussion would help frame a need for change and plan components.

Third, the draft assessment does not discuss at all the ecological sustainability of the recreation system, although in the first paragraph of the section acknowledges that ecological sustainability is one of the three sustainability pillars. The literature is full of studies showing that recreation can lead to ecological harm, especially when poorly sited or inadequately managed (for instance, because of declining budgets). Hence, it is important that a discussion on the ecological sustainability of the recreation system be added to this section in order to inform the need for change analysis and the development of the plan components.

XI. Chapter 11: Infrastructure

A. Introduction

The transportation/access system is a major determinant of where people go and the condition of forest resources. The transportation system viewed in the cumulative is one of the most significant stressors to the forest. It also provides significant benefit by providing access to recreational, commercial, and management activities. For all these reasons, it deserves a robust discussion in the assessment designed to inform the development of plan components that will meet regulatory requirements set forth in the planning rule. These include ensuring a sustainable access system (36 CFR 219.10(b)(1)(i)), and restoring or maintaining ecological integrity of terrestrial and aquatic ecosystems and watersheds, water quality, air quality, and water resources (36 CFR 219.8(a)(1)).

B. Missing Information

The Draft Forest Assessment lacks important information related to ecological impacts of roads. It is well accepted that roads can adversely affect aquatic resources, wildlife, and wildlife habitat, especially if the roads are not well sited or maintained (Gucinski et al. 2000). Given the regulatory requirements for sustainable access and ecological integrity, we do not think that the draft assessment provides enough information to identify a need for change or inform plan components adequately.

Specific to aquatic impacts from roads, the literature is replete with studies showing that roads pose numerous risks to aquatic resources and watersheds (Gucinski et al, 2000). The draft forest assessment, however, provides basically no information save a paragraph on page 60 where the Forest Service explains that road density is a major cause of watershed impairment.

> "Properly functioning watershed conditions create and sustain functional terrestrial, riparian, aquatic, and wetland habitats capable of supporting diverse populations of species. On the Sequoia National Forest, 43 percent of watersheds were properly functioning, 52 percent were functioning at risk, and 5 percent had impaired function. Habitat fragmentation, flow alteration, exotic species, road density, and road proximity to water were the most common stressors affecting watersheds that were not properly functioning."

The Sequoia National Forest should have considerable information available and synthesized on the risks and benefits of roads and motorized trails given that it recently published a draft Travel Analysis. In that Travel Analysis, the Sequoia National Forest conducted a detailed analysis of risks and benefits to aquatic resources and watersheds following the direction in the Region 5 Travel Analysis Process Guidebook, Appendix E, available on the Sequoia National Forest's website at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5435025.pdf.

Appendix E summarizes the risks of roads to watersheds and aquatic resources (page 13-14).

"The impacts of roads upon watersheds, aquatic organisms, and their habitat include sediment delivery, channel and floodplain alteration, and reduced habitat connectivity. Other road-related impacts include reduced large woody debris delivery, increased water temperature, and impaired water quality. Roads also influence the routing of water from uplands to the stream channel. In addition, when placed near streams, roads often simplify channels and riparian and in-stream habitat, alter hydrologic processes, and prevent natural channel adjustments (Spence et al. 1996). At culverts, excessive flow velocities, insufficient water, excessive culvert heights, and the absence of pools all can impede migration of aquatic biota (Evans and Johnson 1980).

Furniss et al. (1991) concluded that forest roads contribute more sediment than all other forest activities combined on a per unit area basis. Summarizing results from nine different studies, they reported that mass wasting associated with roads produced 26 to 346 times the volume of sediment as undisturbed forests. Mass failures were attributed to poor road location, construction, and maintenance, as well as inadequate culverts. Surface erosion from roads also constitutes a significant source of chronic sediment inputs (Beschta et al. 1995, Best et al. 1995). The combined effects of mass wasting and surface erosion can lead to elevated sediment levels in streams even when only a small percentage of a watershed is roaded. For example, Cederholm et al. (1981) reported increased sediments in salmonid spawning gravels when roads exceeded 3% of the total basin area.

For the TAP, the analysis of roads and road impacts to watersheds and aquatic resources should occur in two stages: first, a consideration of the cumulative effect of roads in a watershed and second, the consideration of each individual road. (The term "watershed" is used in the following section in its generic sense of a land area draining to a point, rather than in reference to a specific scale.) The watershed analysis could occur at multiple scales, generally HUC6 and finer.) For the watershed analysis, one should identify watersheds that are of particular concern because of their high resource value or high risk of cumulative road impacts. Second, individual roads should be analyzed for their specific impacts and risks."

The guidebook goes on to suggest metrics to consider in an integrated way to assess risk to watersheds, including riparian areas, from roads (page 14-15). Examples of these include:

Possible Metrics for Watershed Risk:

- Subwatersheds that are identified as proposed reintroduction areas in Recovery Plans for ESA-listed aquatic species
- Subwatersheds that contain designated or proposed critical habitat for ESA-listed aquatic species
- Subwatersheds that support one or more populations of Forest Service sensitive aquatic species
- Designated priority watersheds (WCF)
- High open road density (WCF)
- Environmental Protection Agency's (EPA) 303d listing
- High road maintenance risk (WCF)

- High road density in proximity to water (WCF)
- High stream crossing density (WCF)
- High density of roads with mass wasting risk (WCF)

Possible Metrics for Riparian Area Risk:

- Stream crossings with aquatic organism passage problems
- Stream crossings in general
- Road-stream crossings with diversion potential
- Meadow crossings
- Road segments in riparian zones (riparian reserves, RCAs, SMZs, RHCAs)
- Hydrologically-connected road segments or inboard ditches that discharge to streams
- Road segments in areas of high mass wasting potential
- Fill volumes at risk of erosion
- Steep road gradients
- Native surface road in areas with soils that are highly erosive and/or that have high rutting potential
- Length or percent of road with ruts
- Length or percent of road with inadequate drainage features

The guidebook also directs that the forest utilize accepted thresholds indicating when road densities are high enough to result in resource damage. The guidebook offers three thresholds for consideration:

Published Indicators, Thresholds, and References

Indicator	Threshold	Reference
Total road density	3% of total watershed area	Cederholm et al. (1981)
Total road density	0.84 km/km2	Dose and Roper (1994)
Total road density	0.7 mi/mi2	FEMAT (1993)

We recognize that it may be too detailed to provide a synthesis of all the indicators listed above in a forest assessment. However, given that the information is available, we certainly think it is appropriate and necessary to provide an overview of road risks to aquatic and watershed resources on the Sequoia National Forest. For instance, the assessment should include an analysis of road density across the forest and within areas of high resource value and concern (e.g., subwatersheds that are identified as proposed reintroduction areas in Recovery Plans for ESA-listed aquatic species; subwatersheds that contain designated or proposed critical habitat for ESA-listed aquatic species; subwatersheds that support one or more populations of Forest Service sensitive aquatic species). The road density analysis should assess where accepted thresholds are exceeded, and what resources are consequently affected.

Similarly, related to riparian areas, the forest assessment should provide an overview picture of the impacts and risks posed to riparian areas from roads as measured by the road-riparian indicators listed above.

Lastly, the Draft Forest Assessment lacks an estimate of the number of miles of illegal roads and trails, which, when added to the total mileage of authorized roads and trails, will give better estimate of actual road densities and the true nature of sediment loading and wildlife habitat fragmentation from roads generally.

C. Travel Analysis

We are heartened that the draft assessment mentions the Travel Analysis Process (TAP) in the draft forest assessment (page 177). However, given the importance of the TAP process, we think it deserves a more robust discussion on exactly what it is, how it will be used, and the recommendations of the recently completed draft TAP (or preferably the final TAP if the timing works). The Sequoia National Forest webpage (http://www.fs.usda.gov/detail/sequoia/landmanagement/planning/?cid=stelprdb5435007) provides useful descriptions of the TAP process that could be imported into the assessment. For instance, the PowerPoint presentation provided on the web page describes the goal of Travel Analysis as "Management and sustainability of a road system that minimizes adverse environmental impacts by assuring roads are in locations only where they are necessary to meet access needs, and can be maintained within budget constraints." Also, the web page summarizes the TAP in the following way:

> "The purpose of the Travel Analysis Process for the Sequoia National Forest is to identify opportunities for the road system to meet current or future management objectives, based on ecological, social, cultural, and economic concerns. This process is an important part of effectively managing the National Forest Transportation System, and includes an examination of resource management, public access, and Forest Service administrative requirements associated with the road system.
>
> Travel Analysis is expected to identify opportunities to decommission roads, close roads, or convert roads to other uses, such as trails. This analysis will be documented in a Travel Analysis Report for the Sequoia National Forest that identifies the minimum road system and any roads that have been identified as unneeded. Though this is not a decision-making process, implementation of any future opportunities will require a site-specific NEPA decision-making process."

In addition to more thoroughly explaining the TAP process, the forest assessment should summarize the results of the recently completed TAP, including impacts/risks of the road system to aquatic and watershed resources, wildlife resources, and quality recreation; benefits of the road system; fiscal sustainability of the road system; and recommendations for the minimum road system and roads for decommissioning. This will provide necessary information for identifying a need for change and developing plan components to achieve the rule's substantive requirement for ensuring a sustainable access system, and restoring or maintaining ecological integrity of terrestrial and aquatic ecosystems and watersheds, water quality, air quality, and water resources.

D. Air Quality and Roads

Include information on air quality related to dust emissions from roads. The Draft Forest Assessment explains that the Sequoia National Forest "has lands federally designated as in non-attainment for PM2.5 and ozone. California standards are stricter than federal standards, resulting in non-attainment for ozone, PM2.5, and PM10." (Page 58)

It is important that the assessment discuss the fact that fugitive dust from dirt roads contributes to particulate matter pollution, reflect the current requirements for particulate matter in areas within and affected by the Sequoia National Forest, and identify whether and to what degree dust emissions from the road system are contributing to air quality problems and non-compliance.

E. Trends Related to Roads

If the information is available, it would be useful to provide the following trend information:

- Distribution of maintenance levels over time. Are a higher proportion of roads in maintenance level 1 and 2 categories than in previous years? If so, why?
- Road-related aquatic impacts over time. Are more or less stream segments impaired for road-related sediment than 5, 10, or 20 years ago?
- Storm related road failures over time. Is the Sequoia National Forest experiencing relatively more or less road failures in recent years? What is the cost of addressing these failures over time? Is road failure and accelerated erosion anticipated to become more prevalent in the future, because of climate change, inadequate maintenance or some other reason?
- Road use over time. Is the volume of traffic changing over time? Is the type of use (recreational, commercial) changing over time? How does the volume and type of use break down by maintenance class?

F. Climate change and Roads

Lastly, the assessment does not discuss the impacts (current and projected) of climate change on Forest Service infrastructure. We know that climate change is changing hydrographs characterized by more extreme flow events. Is the infrastructure capable of adjusting to shifting hydrographs? Or will it need a major overhaul? If the infrastructure is not upgraded to meet peak flows under climate change conditions, will the road system be ecologically and/or fiscally sustainable?

XII. Chapter 15: Designated Areas

A. Roadless Areas

Over the decades the Sequoia NF has been laced with roads to support mining, logging, early settlement, modern urbanization, energy development, and even recreation. Despite this, a great deal of wild country remains.

It is critically important that the assessment include information about all of the wilderness-quality lands in the Sequoia NF (and include their locations on a map), both IRAs and other areas, because according to the USFS' planning regulations at §219.7(c)(2)(v), the agency is required to "Identify and evaluate lands that may be suitable for inclusion in the National Wilderness Preservation System and determine whether to recommend any such lands for wilderness designation." The Forest Service Manual (FSM) 1923.03 and Forest Service Handbook (FSH) 1909.12, chapter 70, offer more detail regarding the areas that must be evaluated:

> 3(a). Newly identified roadless, undeveloped areas and areas (1) previously identified in the *Forest Service Roadless Area Conservation Final Environmental Impact Statement* (Volume 2, November 2000), (2) in a unit plan, or (3) in a land management plan, which remain roadless and undeveloped and have not yet been designated as wilderness or for non-wilderness uses by law.
> b. Areas contiguous to existing wilderness, primitive areas, or administratively proposed wildernesses, regardless of agency jurisdiction for the wilderness or proposed wilderness.
> c. Areas that are contiguous to roadless and undeveloped areas in other Federal ownership that have identified wilderness potential.
> d. Areas designated by Congress for wilderness study, administrative proposals pending before Congress, and other legislative proposals pending which have been endorsed by the President.

For each area subject to evaluation under paragraph 3 of FSM 1923, the determination of the significant resource issues shall be developed with public participation and, at a minimum, consider:

> 1. The values of the area as wilderness.
> 2. The values foregone and effects on management of adjacent lands as a consequence of wilderness designation.
> 3. Feasibility of management (FSH 1909.12, sec. 72.1) as wilderness, in respect to size, nonconforming use, land ownership patterns, and existing contractual agreements or statutory rights.
> 4. Proximity to other designated wilderness and relative contribution to the National Wilderness Preservation System.
> 5. The anticipated long-term changes in plant and animal species diversity, including the diversity of natural plant and animal communities of the plan area and the effects of such changes on the values for which wilderness areas were created.

Furthermore, as is stated at FSH 1909.12 Chapter 72, the USFS must consider the capability, availability and suitability of each area considered for wilderness designation.

Under the USFS' planning regulations, local forest managers have the discretion to evaluate *all* roadless areas, not just IRAs. We request that the SQF use this discretion as part of the LRMP revision process for three reasons:

- The USFS' roadless area survey from 1979 is badly outdated;

- Roadless areas provide critical social and ecological benefits; and
- The Sequoia NF includes newly identified undeveloped areas as per the FSM 1923.03 and FSH 1909.12, chapter 70

We will now discuss each of these issues in detail.

RARE is outdated and inaccurate

The Roadless Area Review and Evaluation (RARE) survey from 1979 that produced the current system of IRAs is now badly out of date for a variety of reasons, including:

- The many miles of road decommissioning that has occurred since that time;
- Vehicle route designation efforts, especially the ongoing Motorized Travel Management process;
- The acquisition of land that was private during the RARE surveys; and
- The fact that there have been more recent surveys of wilderness-eligible areas (WEA) conducted by non-governmental organizations such as the California Wilderness Coalition (CWC).

Regarding the last point, from 1998-2001 the CWC conducted a "Citizens Wilderness Inventory" (CWI) to arrive at a more accurate reckoning of roadless land in the Golden State. The CWI identified 7.4 million acres of land in over 300 separate areas that still qualify for wilderness designation on federal lands in California. This total included 5,254,228 acres of National Forest System land, which is 16 percent more than the 4,417,000 acres of RARE IRAs that existed at the time of the 2001 *Forest Service Roadless Area Conservation Final Environmental Impact Statement* (RAC FEIS). The Sequoia NF was resurveyed by the CWC from 2010-2012 and 271,527 IRA acres and 18,470 WEA acres were identified. These areas will be listed later.

Roadless areas provide critical ecological and social benefits

It is critically important that the Sequoia NF accurately map *all* roadless areas during the LRMP development process because of the many important social and ecological benefits these areas provide. Chapter 3, pages 3-7 of the RAC FEIS offers an excellent summary of these values:

- Clean water for domestic, agricultural, and industrial uses, that helps to maintain abundant and healthy fish and wildlife populations, and that provides the basis for many forms of outdoor recreation;
- Undisturbed or less disturbed habitat that conserves native biodiversity by providing areas where nonnative invasive species are rare, uncommon, or absent;
- Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land;
- Opportunities for people to enjoy high-quality non-motorized recreation activities, including hiking, camping, mountain biking, picnicking, wildlife viewing, hunting, fishing, cross-country skiing, swimming and whitewater boating;

- "Reference landscapes" that can provide comparison areas for scientists seeking to evaluate and monitor the differences between natural settings and more intensely managed areas;
- High quality scenery that contributes directly to local tourism and to real estate values in neighboring communities; and
- Many important Native American cultural sites and valuable historical resources.

In addition, even a cursory glance at maps of national forests in California reveals that the remaining roadless areas tend to be much lower in elevation than many of the areas that are currently designated as wilderness. This is important because the diversity of flora and fauna generally increases as elevations decrease (see summary by Reed F. Noss and A.Y. Cooperrider, *Saving Nature's Legacy: Protecting and Restoring Biodiversity*, Washington, DC: Island Press, 1994).

Areas are eligible for wilderness designation if, as is stated in the Wilderness Act of 1964, they:

- "...*generally* [appear] to have been affected *primarily* by the forces of nature, with the imprint of man's work *substantially* unnoticeable" (emphasis added—as these three qualifiers clearly illustrate, Congress did not intend for only pristine areas to be designated as wilderness);
- "...[have] outstanding opportunities for solitude *or* a primitive and unconfined type of recreation" (emphasis added—all too often federal agencies mistake the "or" for an "and," also, please note that in the context of the Wilderness Act "unconfined" simply means outdoor);
- "...[have] at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition"; and
- "...may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."

<u>The Sequoia NF includes newly identified undeveloped areas as per the FSM 1923.03 and FSH 1909.12, chapter 70</u>

As a result of both the CWC's 1998-2001 and 2010-2012 surveys in the Sequoia NF, we believe that the following roadless areas meet the definition of "wilderness" as established by Congress.

Table 8. Areas eligible for wilderness evaluation.

ROADLESS AREA NAME	IRA ACRES IDENTIFIED BY THE USFS IN 1979	WEA ACRES IDENTIFIED BY THE CWC	TOTAL WILDERNESS-ELIGIBLE ACRES
Cannell IRA & adjacent WEA	45,361	3,506	48,867
Chico IRA & adjacent WEA	39,836	2,761	42,597
Domeland Additions IRA & adjacent WEA	2,962	2,951	51,431

ROADLESS AREA NAME	IRA ACRES IDENTIFIED BY THE USFS IN 1979	WEA ACRES IDENTIFIED BY THE CWC	TOTAL WILDERNESS-ELIGIBLE ACRES
Greenhorn Creek IRA	28,137	0	28,137
Mill Creek IRA	27,538	0	27,538
Oat Mountain IRA	12,223	0	12,223
Rincon IRA & adjacent WEA	54,591	3,471	58,062
South Sierra IRA	7,820	0	7,820
Woodpecker IRA & adjacent WEA	11,616	2,029	13,645
Woolstaff IRA & adjacent WEA	41,443	3,752	45,195
TOTALS	**271,527**	**18,470**	**335,515**

The CWC's survey methods included the preliminary identification of potential roadless areas using USFS maps (both hardcopy and GIS) and high-resolution aerial photographs. These potential boundaries were verified in the field by a contractor who drove or walked all of the boundaries to the maximum extent possible. In its aerial photograph analysis and other research and field surveys, CWC sought to exclude the following from the WEAs shown on the maps below:

- All legally-open roads and motorized trails
- Areas that were excessively marred by illegal vehicle use
- Heavily-logged areas
- Obvious plantations
- Heavily-developed private land
- Campgrounds
- Reservoirs (not including a few small stock ponds)
- Areas covered by extensive type-conversions
- Maintained fuelbreaks sometimes described as "shaded fuelbreaks" or defensible fuel profile zones (this does not include mere bulldozer lines constructed during fires)
- Helispots
- Drafting sources
- Communication sites
- Heavily mined areas
- Utility corridors

Despite this, please note that some of the wilderness-eligible areas we surveyed include:

- A small amount of forest that may have been logged. Our intention was to exclude all heavily-logged areas and obvious plantations but it is quite possible that a few areas were overlooked. In our experience, USFS records of the locations, extent and condition of plantations is often incomplete at best. Regardless, please note that the NWPS includes many areas that were either partially or completely logged, so the Wilderness Act does not require that an area be unlogged for it to be designated as wilderness.

- Minor historic mining disturbances. Major disturbances were excluded. Please note that old mines and other signs of mineral development exist throughout the NWPS, so we left some minor disturbances inside of our wilderness-eligible areas.
- Roads and motorized trails that are no longer legally open to the public. For the most part these routes are recovering because they are rarely or never used. However, some of them continue to experience a certain degree of unauthorized use.
- Developments associated with grazing allotments. These features exist throughout the NWPS, so they were not excluded.
- Bulldozer lines constructed during fires. Since bulldozers are allowed in designated wilderness during fires and because there are ridges scarred by these machines throughout the NWPS, we did not exclude all of these lines.

We request that the existence of the WEAs listed above be acknowledged in the Sequoia NFA.

The direction for roadless areas in the current Sequoia NF LRMP must change because:

- It is based on a roadless inventory that is 34 years old;
- It does not consider all of the Sequoia NF's roadless lands;
- It is inconsistent with the RACR when it comes to the management of IRAs; and
- New scientific information about the ecological and social importance of roadless areas has been uncovered since the LRMP was approved (this information has been described in the RACR).

To meet the intent of 36 CFR 219, section 219.17 and to fully address the management of roadless areas, the planning team on the Sequoia National Forest should complete the following four objectives:

- Conduct an inventory of all wilderness-eligible land during the LRMP development process, including roadless areas that are not IRAs;
- Provide a full description of every roadless area's wilderness qualities and social and ecological values;
- Provide full and fair evaluations of every roadless area's wilderness qualities and, if found deserving, recommend them for wilderness designation in the LRMPs. Include an explanation as to why the USFS will or will not recommend to higher authorities that the areas be designated as wilderness in whole or in part; and
- Thoroughly examine the impacts of placing all or portions of an IRA or other roadless area under a non-wilderness prescription.

We will now explain these objectives in more detail.

Objective 1: Conduct an inventory of all wilderness-eligible land during the LRMP development process, including roadless areas that are not IRAs.

It would be impossible to fully understand the ecological and social benefits of roadless areas and the impacts of allocating them to non-wilderness zones without a comprehensive survey of what is and is not roadless.

It is therefore essential that planners on each forest accurately map all roadless areas, including those that are brought to their attention by the public, during the LRMP development process. Planners should look for new roadless areas or extensions of known roadless areas that have been created as a result of:

- Road decommissioning;
- The recent Motorized Travel Management process and other route designation efforts;
- Land acquisitions; and
- Wilderness designations.

An area should be identified as roadless if it is free of "classified roads" as defined in the RACR at 36 CFR Part 294.11(1), or identified for closure or decommissioning as part of the Travel Analysis Process.

Objective 2: Provide a full description of every roadless area's wilderness qualities and social and ecological values.

Sequoia National Forest planners should fully describe the wilderness qualities and social and ecological values possessed by every roadless area. The list of at least some of these qualities and values are listed at 36 CFR 219, section 219.17, in the RACR FEIS and in the April 14, 2009 letter from 127 scientists to President Barack Obama in support of the RACR. In addition, forest planners should include wilderness qualities and social and ecological values brought to their attention by members of the public.

Objective 3: Assess all roadless areas for their wilderness potential and, if found deserving, recommend them for wilderness designation.

A roadless area should be found eligible for wilderness designation and forest planners should consider recommending it as wilderness if, as is stated in the Wilderness Act of 1964, it:

- "...generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable" (emphasis added—as these qualifiers clearly illustrate, Congress did not intend for only pristine areas to be designated as wilderness);
- "...[has] outstanding opportunities for solitude or a primitive and unconfined type of recreation" (emphasis added—some have mistaken the "or" for an "and." Also, note that in the context of the Wilderness Act "unconfined" simply means outdoor);
- "...[has] at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition"; and
- "...may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."

Forest planners should provide a full and fair evaluation of every roadless area's wilderness qualities, followed by an explanation of why the USFS will or will not recommend that the areas be designated as wilderness in whole or in part.

We emphasize the word "fair" because it has been rather common for forest planners to use external "sights and sounds" criteria, rather than an area's undeveloped character, to decide whether or not roadless areas should be recommended for wilderness designation. In so doing, the USFS acts contrarily to long-standing direction from Congress to avoid using sights, sounds and other external influences to judge an area's wilderness quality.

For example, during subcommittee hearings for the 1978 Endangered American Wilderness Act Congress found that:

> . . . many areas, including the Lone Peak [outside Salt Lake City] …, received lower wilderness quality ratings because the Forest Service implemented a "sights and sounds" doctrine which subtracted points in areas where the sights and sounds of nearby cities (often many miles away) could be perceived from anywhere within the area. This eliminated many areas near population centers and has denied a potential nearby high quality wilderness experience to many metropolitan residents, and is inconsistent with Congress' goal of creating parks and locating wilderness areas in close proximity to population centers. The committee is therefore in emphatic support of the Administration's decision to immediately discontinue this "sights and sounds" doctrine. House Report 95-540, 95th Congress, July 27, 1977, page 5.

During Senate hearings on the Endangered American Wilderness Act, Dr. M. Rupert Cutler, the Assistant Secretary of Agriculture, assured Senator Pete Domenici (R-NM) that "…there is no reference in the Wilderness Act to criteria for wilderness that includes such things as the sights, sounds, and smells of civilization which is a set of criteria which has been misapplied to wilderness areas" (Subcommittee on Parks and Recreation of the Committee on Energy and Natural Resources, United States Senate on S. 1180, September 19 & 20, 1977, Publication No. 95-88, Committee on Energy and Natural Resources, page 41).

Despite this, even as recently as 2005 forest planners developing LRMPs for the Angeles, Cleveland, Los Padres and San Bernardino National Forests failed to recommend roadless areas for wilderness designation at least in part because of audible highway noises, the passage of aircraft overhead, and the fact that powerlines, communities or other developments outside of a roadless area can be seen or heard inside of them.

It is important to note that Congress has ignored such factors innumerable times when designating wilderness. Indeed, many of the jewels of the National Wilderness Preservation System provide views of settled areas and the sounds of roads, aircraft, etc.

Areas that are recommended for wilderness designation should be managed in a manner that is consistent with the Wilderness Act until such time as Congress decides whether or not to act on the recommendation.

Objective 4: Thoroughly examine the impacts of placing all or portions of an IRA or other roadless area under a non-wilderness management prescription.

For those roadless areas or portions of roadless areas that are not recommended as wilderness, forest planners should include a thorough examination of the impacts of placing all or part of a roadless area under a non-wilderness management prescription.

The RACR FEIS offers a detailed description of some of the issues that should be studied, described and discussed for each alternative in an LRMP (see page 3-21 to 3-242). These issues include:

- The projected amount and impact of road construction in roadless areas;
- The costs associated with maintaining new roads in roadless areas;
- The risks of reducing water quality in roadless areas;
- Impacts to air resources from roadless areas;
- Economic impacts;
- Consequences of and for fire and fuels management in roadless areas;
- Impacts of insects and disease in roadless areas;
- Impacts to the size of roadless areas (as the RAC FEIS states at 3-136, "There is a positive relationship between size of an area protected from human disturbance and maintenance of biodiversity");
- Impacts to roadless areas on development at various elevation distributions;
- Impacts to terrestrial animal habitat, including fragmentation and connectivity, edge effects, habitat suitability and effectiveness, early successional habitat, game species and late-successional habitat;
- Impacts to aquatic animal habitat and species in roadless areas, including fragmentation and connectivity, water hydrology and stream channel morphology, habitat complexity, water quality, pools, riparian vegetation, introduction of nonnative species and diseases and over-harvest and illegal introduction;
- Impacts to terrestrial and aquatic plant species in roadless areas, including non-native invasive species, habitat fragmentation and effects of temporary roads;
- Impacts to threatened, endangered, proposed and sensitive species in roadless areas;
- Impacts to research, monitoring and reference landscapes in roadless areas;
- Consequences for non-mechanized, mechanized and motorized recreation in roadless areas;
- Impacts to scenic quality;
- Consequences to heritage resources; and
- Impacts from roadless area development on existing wilderness and the possibility of future wilderness designation.

Lastly, if all or part of a roadless area is allocated to a non-wilderness prescription, LRMPs should discuss what mitigation, if any, the USFS proposes for the loss of wilderness characteristics and the effects on plant and animal communities.

B. Research Natural Areas (RNAs)

Please describe the process by which RNAs are selected and established, including the **specific metrics** used to determine whether a habitat/vegetation type/special feature/process/genetic array is adequately represented. For example, how does the agency assess whether there is **adequate representation, adequate acreage, and adequate distribution** to accomplish each of the objectives established in FSM 4063.02:

- to maintain a wide spectrum of high-quality areas that represent the major forms of ecological diversity on USFS-administered lands for research and education, and for the maintenance of biological diversity;
- to preserve and maintain genetic diversity (including in relation to threatened, endangered, and sensitive species);
- to protect against human-caused environmental disruptions;
- to serve as reference areas for the study of natural ecological processes (including in relation to disturbance);
- to provide on-site and extension educational activities;
- to serve as baseline areas for measuring long-term ecological changes;
- to serve as control areas for comparing results related to manipulative research; and
- to monitor the impacts of resource management techniques and practices.

After describing the specific methods used to determine adequacy of size and representation, consider **conducting an assessment that describes the conditions and trends on the Sequoia NF with respect to the adequacy of representation, distribution, and size of RNAs to accomplish each of these objectives**.

Please explain how or whether RNAs fit into a larger network of protected lands or corridors.

Please assess the need for and adequacy of connectivity among all RNAs and among RNAs of the same vegetation type.

Please assess the distribution and size of RNAs with respect to features such as latitude, altitude, and soil type—especially important in light of the risk of vegetation type changing with a changing climate.

C. Wild and Scenic Rivers

1) Forest Planning Rule, Forest Service Handbook, and the Draft Assessment

The 2012 Forest Planning Rule (Sec. 219.6[b][15]) requires an assessment in preparation of a Forest Plan Revision to identify and evaluate existing information for existing designated areas, including wilderness and wild and scenic rivers and the potential need and opportunity for additional designated areas. The Rule (219.7[2][vi]) also directs the responsible official in the

plan revision to identify the eligibility of rivers for inclusion in the National Wild and Scenic Rivers System, unless a systematic inventory has been previously completed and documented and there are no changed circumstances that warrant additional review.

This specific direction in the Rule is further defined in the Forest Service Handbook (FSH), which requires the land management process to include "a comprehensive evaluation of the (wild and scenic) potential for rivers in the plan area…" The FSH further directs the land management planning team to "develop and conduct a process to determine which rivers meet the eligibility criteria" unless "a systematic inventory of eligible rivers has been completed…" (FSH 1909.12, Chapter 80, Version—02/14/2013, sec. 82.22 and 83.1)

2) Systematic Inventory of Potential Wild & Scenic Rivers

The Sequoia National Forest Draft Assessment recognizes the direction provided by the Forest Planning Rule and the FSH by stating "Before the Sequoia National Forest invites comments on the proposed plan, an inventory of the eligibility of rivers for inclusion in the Wild and Scenic System is required." The Draft Assessment then refers to an "initial screening of streams and rivers" that "discovered six more stream or river segments eligible for Wild and Scenic status." (Draft Assessment pg. 202)

We assume the latter statement refers to the limited screening of potential Wild & Scenic Rivers conducted by the Forest Service in the early 1990s in response to the Sequoia Forest Plan appeal settlement agreements with Friends of the River and American Rivers in 1990. We have copies from Forest Service files of eligibility assessments for eleven streams, plus eligibility findings for three additional rivers from separate documents (see table below). However, we have found no record of the systematic inventory/comprehensive evaluation of potential Wild & Scenic Rivers on the Sequoia Forest as required by the Forest Planning Rule and Forest Service Handbook.

Table 9. Streams Assessed For Wild & Scenic Eligibility On The Sequoia National Forest.

River/Stream	Status	Source
White River	Ineligible	USFS files
Rattlesnake Creek	Ineligible	USFS files
Salmon Creek	Ineligible	USFS files
Trout Creek	Ineligible	USFS files
Middle Fork Tule River	Ineligible	USFS files
South Fork Middle Fork Tule River	Ineligible	USFS files
South Fork Tule River	Ineligible	USFS files
North Fork Tule River	Eligible	USFS files
North Fork Middle Fork Tule River	Eligible	USFS files
Little Kern River	Eligible	USFS files
Lower Kern River segments 1 & 3	Eligible	USFS files
Lower Kern River segment 2	Eligible	Sequoia Forest Plan 1988
South Fork Kern River segment 1	Recommended	South Fork Kern Wild & Scenic River Study Report

River/Stream	Status	Source
		EIS 1991
Kings River segments 3-5	Eligible	Kings River Special Management Area Draft Implementation Plan 1990

If a systematic inventory/comprehensive evaluation of all streams on the Forest has been completed, than the Forest Service should make available to the public the full list of streams that have been evaluated. Planning guidelines requires the agency to "Document the finding of ineligibility or eligibility and the river's potential classification, in the land management plan EIS." (FSH 1909.12, Chap. 80, pg. 25, sec. 83.1)

If indeed the streams listed in the table above simply represent the full extent of the eligibility screening to date on the Sequoia Forest, this should be noted in the Draft Assessment and the Forest Service should commit to completing a systematic inventory/comprehensive evaluation of all potential Wild & Scenic Rivers in the Forest Plan Revision. The systematic inventory/comprehensive evaluation should be conducted using public input, up to date resource information, and the expertise of the Forest's resource professionals.

3) Suitable Rivers

Determining the suitability of an eligible river should be fully analyzed in an Environmental Impact Statement (EIS) because the decision by a federal agency to recommend or not recommend protection for an eligible river is considered a major federal decision under NEPA. This was done for the short lower segment of the South Fork Kern River that was not included in either the 1987 legislation or the 1988 Forest Plan. Instead, this eligible segment was determined to be suitable in a separate 1990 EIS.

Because of the NEPA requirement, we are surprised but pleased to see eligible segments of the Little Kern River, North Fork Tule River, and North Fork Middle Fork Tule River to be listed as "suitable for designation." (Draft Assessment pgs. 205-206) However, as much as we believe that these outstanding streams are indeed suitable and deserve Wild & Scenic protection, we believe the best way to protect them is to proceed with suitability evaluations of all eligible stream segments in the Forest Plan Revision EIS. This is encouraged by the FSH, which states, "The appropriate timing of a suitability evaluation may vary. The preferred approach is to proceed with determining suitability in the land management planning process." (FSH 1909.12, Chapter 80, Version—02/14/2013, pg. 25) The concurrent revisions of the Sequoia, Sierra, and Inyo Forest Plans under a single EIS provides an appropriate and economical vehicle to complete the suitability recommendations since all three Forests have eligible streams requiring completion of suitability studies. Determining suitability of eligible streams in a separate and presumably later EIS would be both costly and time-consuming, and it would stretch out a 25-year Wild & Scenic River study process that began with the 1988 Forest Plan.

The Draft Assessment should state that the suitability of eligible streams, including those that have been identified and that may be identified once a systematic inventory/comprehensive evaluation has been completed, shall be determined in the Forest Plan Revision.

4) Updated Wild and Scenic River Eligibility Inventory

The Draft Assessment lists six rivers and streams that "warrant serious consideration for their eligibility." (Draft Assessment pg. 206) The list appears to include segments of the Kings and Kern Rivers that have already been determined to be eligible or even designated by Congress. This section of the Draft Assessment alludes to the "spectacular and remote paddling adventures" offered by the potentially eligible streams, but it does not appear to consider other potentially outstandingly remarkable values, such as endangered wildlife values, that may have become apparent since the limited eligibility inventory was first conducted. This simply reinforces the need to conduct a systematic inventory/comprehensive evaluation with the full involvement of all agency resource experts and the general public. We would expect that input from these sources will likely lead to eligibility determinations of most of the listed streams and others identified in a systematic inventory/comprehensive evaluation.

5) Comprehensive River Management Plans

The Draft Assessment lists existing Wild & Scenic Rivers and their outstandingly remarkable values on the Sequoia Forest on pages 203-204. However, the Draft Assessment fails to mention that the management of these protected rivers is guided by a Wild & Scenic River management plan completed in 1991. Nothing more is said about how the Forest Plan Revision may address these designated rivers.

The Forest Plan Revision provides an important and necessary opportunity to update Wild and Scenic River plans, now known as Comprehensive River Management Plans or CRMPs. The updated plans should include new and relevant resource information, including changes in visitor use, listings of threatened and endangered species, changes in water quality, new resource information, revised management standards, etc. Considering whether new resource information merits the recognition of new additional outstandingly remarkable values is a particularly important component of the updated plans. The plans should also comply with interagency guidance on the development of CRMPs and recent legal decisions requiring consideration of visitor carrying capacity of designated rivers.

Indeed, the Draft Assessment discusses how increased visitor use on the North Fork Kern Wild & Scenic River has caused effects on vegetation, sanitation issues, and loss of habitat. It notes that the Upper Kern River Action Plan was developed in 2010 to address these issues. This underscores the need to update the North Fork Kern CRMP to ensure that the river's free flowing character and outstandingly remarkable values are protected and enhanced.

The Draft Assessment should address whether the CRMP updates should be included in the Forest Plan Revision or alternatively, whether the Revision should simply establish a schedule for CRMP updates at a later date. Updating the CRMPs in the Forest Plan Revision using the joint EIS for all three Forest Plan revisions would of course save the agency the expense of updating the plans later in a separate NEPA processes.

6) Specific River Comments – Kings River

The Draft Assessment's short narrative on page 205 about the eligible segments of the Kings River fails to mention that this river forms the boundary between the Sequoia and Sierra National Forests. The concurrent revision of both the Sierra and Sequoia Plans using a single EIS provides the appropriate opportunity to complete the suitability study for this segment of the Kings and to make a recommendation to Congress for its protection.

7) Specific River Comments – Lower Kern River

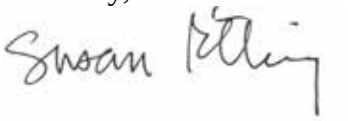
The Draft Assessment's short narrative on page 205 about the eligible segments of the lower Kern River fails to mention that the Bureau of Land Management (BLM) manages approximately three miles of the lower Kern River downstream of Isabella Dam and more importantly, that the BLM recommended this segment for Recreational River designation in the Bakersfield Proposed Resource Management Plan & Final Environmental Impact Statement (August 2012). The Forest Service should consult with the BLM when it conducts its suitability study of the lower Kern to ensure that both agencies are in agreement on the specific outstandingly remarkable values and joint future management of the river.

XIII. Conclusion

We are encouraged by the transparency and willingness of the Forest Service to collaborate in the creation of a robust and science-based forest plan that adequately addresses the deficiencies in the current forest plans. We also believe that your decision to undertake one environmental impact statement for the three early adopter forests will be useful in integrating information across the region and coordinating conservation actions among the national forests.

Please contact Susan Britting (britting@earthlink.net; 530-295-8210) if you have specific questions about these comments. Thank you for the opportunity to comment.

Sincerely,



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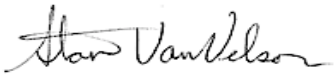

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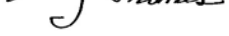

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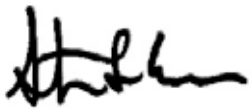

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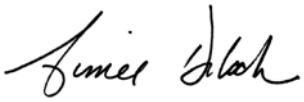

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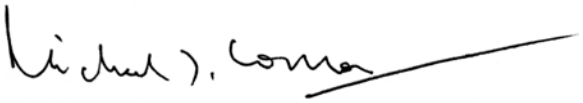
Native Trout Initiative
California Trout



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