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August 25, 2016

cc: Ara Marderosian
Stephen Montgomery

Inyo National Forest Supervisor Edward Armenta,
Sequoia National Forest Supervisor Kevin Elliott, and
Sierra National Forest Supervisor Dean Gould.
U.S. Forest Service

Submitted by Email to: r5planrevision@fs.fed.us

Subject: Concerns about revised Forest Plans and 2016 DEIS for the Sequoia, Sierra, and Inyo National Forests

Please accept the following National Forest Plan Revision Comments on behalf of the Kern-Kaweah Chapter of the Sierra Club and Sequoia ForestKeeper.

The Kern-Kaweah Chapter of the Sierra Club, Sequoia ForestKeeper, its Board of Directors, staff, and members are deeply disappointed in with the DEIS and draft Forest Plans that have been created for the Inyo, Sequoia and Sierra National Forests. These plans need to be revised to outlaw clear-cutting, group selection, and post-fire logging; techniques that have already devastated the Sierra Nevada where they are allowed on private lands. The strategic use of limited mechanical thinning near communities to protect people from fire may be necessary, but destructive logging techniques proposed miles from communities have no place on our public lands.

The draft plans also need many more, and stronger, standards and guidelines to ensure that logging does not destroy the large, contiguous home ranges that wildlife need to survive, especially rare species like the California spotted owl, Pacific fisher and black-backed woodpecker.

A. Add New Wilderness to Sequoia and Sierra National Forests

The plans should include recommendations to add hundreds of thousands of new acres of wilderness to the Sierra and Sequoia forests -- not zero.

Sequoia National Forest, in particular, should at the very least recommend for Wilderness designation the Slate Mountain and Southern Sierra West (aka, the Woodpecker Roadless) areas in every alternative. If the Forest Service states that these roadless areas qualify in one of their Alternatives, then they qualify in all Alternatives.

We previously provided sufficient information in our November 20, 2015 (Exhibit A) and February 1, 2016 (Exhibit B) comment letters on recommendations for Wilderness and Wild and Scenic Rivers, which are attached and included into these comments in their entirety by reference. We include them again because none of the recommendations for wilderness in the

Giant Sequoia National Monument of Sequoia National Forest were included in Alternatives B or D. The Forest Service should rectify this oversight in the DEIS by including many or all of the recommended areas in each of the alternatives based on the descriptions and justifications discussed in detail in our February 1, 2016 letter. The named areas in the following list have been modified to match those from the DEIS:

1. **<u>Cannell Peak</u>** – east of the Kern River
2. **<u>Dennison Mountain</u>** – The Forest Service should recommend those portions of Polygon 190 that are in the Dennison Mountain/Peak IRA, which clearly qualifies as Wilderness.
3. **<u>Domeland Wilderness Additions</u>** – including the Fish Creek area, the Woodpecker Roadless and adjoining areas, and the south addition.
4. **<u>Golden Trout Additions</u>** (Southwest and 1, 2, and 3) – also, the Rattlesnake Creek watershed area, east of the Kern River, which includes most of Polygon 1387.
5. **<u>Jennie Lakes Wilderness Additions</u>** – The Forest Service should recommend those portions of Polygon 1385 that are the Jennie Lakes IRA, which clearly qualify as Wilderness.
6. **<u>Long Canyon (Black Mountain)</u>** – The Forest Service should recommend those portions of Polygon 162 that is the Black Mountain IRA, which clearly qualifies as Wilderness.
7. **<u>Monarch Wilderness Additions (including Sierra NF additions)</u>** – The FS should recommend the northern portion of polygon 1377, i.e., the Agnew IRA; it should also recommend the larger addition that straddles the Kings River in both Sequoia and Sierra NFs.
8. **<u>Slate Mountain</u>** – The Forest Service should recommend those portions of Polygon 160 that is the Slate Mountain IRA, which clearly qualifies as Wilderness.
9. **<u>South Sierra Wilderness Addition</u>** – the area adjacent to the Golden Trout Wilderness
10. **<u>South Sierra Wilderness Additions (West)</u>** – as proposed by the FS' initial recommendations
11. **<u>Stormy Canyon (aka Chico or Split Mtn.)</u>** – west of the Kern River

<u>Additional Areas that Should be Included:</u>

12. **<u>Bright Star Wilderness Additions (Piute Mountains)</u>** – aka, the eastern portion of Polygon 1426.
13. **<u>Oat Mountain</u>** – in western-most part of Hume Lake RD, outside the Monument or Polygon 227.

We also believe there should be additional alternatives, which better balance protection of Wilderness-eligible lands versus management that would be inconsistent with Wilderness values.

B. <u>Recommend Additional Wilderness and Wild and Scenic Rivers</u>

Also attached and included herein in its entirety by reference, for the Forest Service to consider recommending Wilderness Designation, is the comment letter by Tule River Conservancy, dated

January 28, 2016 (Exhibit C), regarding consideration of the Tule River and its tributaries for Inclusion in the National Wild and Scenic Rivers System.

C. The Plans Should Include Recommendations to Add Research Natural Areas

Research Natural Areas (RNAs) are National Forest System (NFS) and other public lands permanently protected to maintain biological diversity and provide ecological baseline data, education and research. Only non-manipulative research is allowed within the RNAs. RNAs have been selected based on vegetation target elements.

Three RNAs have been established on the Sequoia National Forest and one other is a candidate for establishment (Cheng 2004).

The 1,465 acre established **Church Dome RNA** is located in the Domeland Wilderness. It represents eastside Jeffrey pine, desert pinyon woodland and rock outcrop vegetation types. This RNA has granite and extrusive igneous (basalt) lithology. According to Cheng (2004, p. 60): This area receives little recreation impact. The trail through the western portion of the RNA has light use. There is evidence of past grazing use but no current grazing occurs and there appears to be no habitat alternation as a result of past usage. Forest litter is minimal and the need for controlled burning is low.

The 2,131 acre **Long Canyon RNA** is in the northern Piute Mountains. This RNA has metamorphic schist and marble lithology and preserves Piute cypress and desert chaparral vegetation communities. According to Cheng (2004, p.181): Despite proximity to human development the candidate RNA has experienced little impact. One dirt road enters the site to the north of the region. A few campsites and a cluster of old bee boxes are associated with the road. The westernmost branch of the road ends at a mining excavation in metamorphic rock, but appears not to be in use. Dirt bikes and other off-highway vehicles appear to have used the road and the main trail. Cattle grazing is limited to the annual grassland with little or no impact on the shrubs of the adjacent foothill pine woodland or the vegetation along the streambed. The few cattle seen were near the northern boundary where a fence delineates the site. However the current condition of the fence allows the cattle to cross easily.

The 960 acre **Moses Mountain RNA** is within the Golden Trout Wilderness. It contains montane meadows and parts of the Upper and Middle Tule Giant Sequoia Groves. This RNA is underlain by soils derived from the meta-sedimentary Wishon/Tule roof pendent. According to Cheng (2004, p.202): Despite heavy use of a trail through the area and several regularly used campsites, human impact on most of the area is light. Areas around campsites are regularly lightly grazed by pack animals, but heavy trampling is restricted to immediate areas of trails and campsites.

The 1,603 acre **South Mountaineer Creek RNA** is a candidate area in the Golden Trout Wilderness. This high elevation RNA represents red fir and subalpine forest, and montane meadows. According to Cheng (2004, p.269): A few campsites are located near the South Mountaineer Creek. Aside from these sites, little recreation impact was noted in the site. The wet meadows are largely undisturbed and show no noticeable signs of grazing. Clear-cut clocks (cut over the past 15–20 years) border the southeast side of the site but do not affect the South Mountaineer Creek drainage.

D. Clarify Sequoia Plan Revision Regarding the Mediated Settlement Agreement (1990)

Will you please confirm that nothing in the revised plan affects management in the Monument, including sequoia groves - EXCEPT the Wilderness and wild and scenic river issues? If so, the revision must specifically state that.

The Mediated Settlement Agreement discussed the closure of the Sirretta Peak Trail (34E12). This trail remains open to motorcycles without restriction and leads into the wheeled vehicle restricted Domeland Wilderness. On page 17, line 153, References and Remarks column of the MSA Comprehensive Review_ 05_02_2009.xls[1] "Will be addressed in site specific analysis and forest plan revision if needed. (The Siretta (sic) Trail project is site specific—where forest plan comes in is if change is needed to SPNM.) Due to the biologically remarkable "Twisselmann Botanical Area" only accessible via this trail and due to the increased fire danger that motor vehicle access presents to this unique grove of conifers, we ask that this area be immediately added and included in the Forest Plan Revision as an addition to Domeland Wilderness and the trail be designated as a foot trail only. Twenty-six years of promises have yielded no action. The time to fulfill these promises is now.

E. The Plan should Consider the Fact that Science Does Not Support Removing Insect-Infected Trees

The plan fails to provide a scientific basis for the number of snags to leave in the forest nor is the snag removal enabled by the plan based on the ecological functions of snags. There are many types of snags and each performs a different function in an ecosystem. Snags can't be counted as if they were coke cans on a shelf. As biologists will know, snags can be standing, down, large, small, of various species, and in various stages of decomposition. They should not be uniformly spaced around the forest like candles on a cake nor should they be all in one corner of a survey plot and then averaged in with the other plots, so it appears there are snags throughout the surveyed area. Additionally, after a serious drought/insect infestation event, the forest responds in positive ways – insectivorous species thrive. Standing dead trees may be the tallest structure the forest will have for many decades. Within a year, likely sooner than the highly flammable slash a project will create can be burned, the dead needles and smaller branches of the dead trees will shed and the dead trees will become less flammable. Science indicates that most dead trees outside of the 200 feet surrounding structures should be left standing.

There is no evidence that removing a tree infected with beetles after it has died will decrease the infection rate to other trees. Additionally, logging dead and diseased trees can spread the problem. Some beetles, such as Ips, can incubate in piles of slash and spread more rapidly than had the tree been left standing. Forest Service botanists have recommended methods to avoid spreading bark beetle. These include not cutting diseased trees unless it is mid-summer, pulling

[1] http://www.fs.fed.us/r5/sequoia/gsnm/msa_comprehensive_spreadsheet.pdf

slash away from any living tree, and covering slash piles with black tarps to increase the heat in the pile.

A recent compilation of data by leading scientist in the Pacific Northwest has found that "[b]y dampening subsequent burn severity, native insects could buffer rather than exacerbate fire regime changes expected due to land use and climate change. In light of these findings, we recommend a precautionary approach when designing and implementing forest management policies intended to reduce wildfire hazard and increase resilience to global [climate] change." Miegs et al. (2016). "In addition, by dampening subsequent burn severity, insect outbreaks could buffer rather than exacerbate some fire regime changes expected due to global change (e.g., climate warming, drought, invasive species (Littell et al. 2010, Ayres et al. 2014)) and forest response to land use (e.g., fire exclusion, timber harvest, livestock grazing (Hessburg et al. 2000))." *Id.*

All trees that must be removed should be surveyed for any active nesting or dens the same season as the cutting will occur – preferably just prior to the planned cutting. No cutting or treatment should be allowed near meadows during fawning or nesting season.

F. Forest Plan WUI Size is Not Supported by Science and Science Supports Treating the Home Ignition Zone and the 200 feet immediately Surrounding Homes to Protect Communities

Forest Service Fire Science indicates that treating the home and the 200 feet immediately surrounding the structure (the home ignition zone) can protect the structure from wildfire. (See below and Reducing the wildland fire threat to homes: Where and how much? Author: Cohen, Jack D. 1999 http://www.treesearch.fs.fed.us/pubs/5603). Treating farther from the structure than 200 to 300 feet causes unnecessary resource damage and can actually increase fire danger.

These Forest Plans fail to follow the best U.S. Forest Service fire science. But instead the Sierra, Sequoia and Inyo national forest plans propose to thin the forest in their Wildland Urban Interface (WUI) that extends for more than a mile from structures, which would damage the forest habitat and the species in the forest that the Forest Service is charged with protecting. These forest plans fail to provide any science that proves that WUI treatments beyond 300 feet from the structures could be effective. These forest plans ignore the science that shows that treatments beyond 300 feet from homes are not effective in protecting structures.

Some of the responsibility for protection of privately owned structures must be borne by the private property owner. Just as those who build homes on shorelines accept the risks of high seas eroding or undercutting their structures because they love living by the ocean, so must those who chose to live surrounded in Sierra Nevada forests accept the risk that accompanies living in an ecosystem that not only burns recurrently, but must burn if it is to survive as a forest.

Science support treatments limited to the Home Ignition Zone (HIZ). The Forest Service's own Jack Cohen (Jack D. Cohen, Research Physical Scientist, Fire Sciences Laboratory, PO Box 8089, Missoula, MT 59807 406-329-4821 (fax) 406-329-4825 jcohen@fs.fed.us), has shown that the Home Ignition Zone – the 200 to 300 feet immediately surrounding homes, is where mechanical fuel treatments should be implemented to protect homes. The Home Ignition Zone treatments can be the mechanically-treated safezone that anchors prescribed fire treatments that would then be implemented beyond the HIZ and into the WUI to protect homes.

However, the Forest Service, State, and Counties should investigate measures that would assist private property owners to not only be aware of things they can do to make their homes less likely to ignite in a fire, but also actively seek sources of funding such as grants for property owners that would give financial assistance to replace flammable roofing and siding with flame resistant materials. Many studies show that homes with these and other fire-wise building methods often survive fire. The cost of providing financial assistance to private property owners would be more than offset by the costs of replacing homes and in providing assistance to families after their homes and possessions have been destroyed. *See*, also *Safe At Home*, NRDC's study, conducted with a former California State Fire Marshall, of preparing Sierran communities for wildfire, attached.

In summary, the plan should be scaled back to treat the 200 feet immediately adjacent to private structures and important access routes.

If the Forest Service really wants to protect homes and the fire-adapted forests they are charged with protecting, the Forest Service should find ways for much of the billions of taxpayer dollars spent each year suppressing fires to be used for fire-proof or fire-resistant roofing and siding for homes built in and adjacent to these fire-adapted forests.

G. Forest Plans Fail to Provide Science to show Fire Suppression Reduces Fire Danger

The Forest Plans continue business-as-usual fire suppression even though science indicates that these fire-adapted forests require fire to sustain all of the native species that inhabit the forests.

These Forest Plans say:

> "Wildfires are actively suppressed on national forests when needed to protect key resources and to prevent intrusion of dangerous fires into communities."
>
> "Wildfire is suppressed under most conditions due to the very significant risk, potential economic loss and public safety concerns posed by a wildfire occurring within this zone."
>
> "Standards (MA-WMZ-STD) 01 Following current wildland fire policy, manage wildfires to meet resource objectives and restore and maintain fire as an ecological process. The responsible line officer must use the current decision support system for wildfire management to document cases when naturally caused wildfires are promptly suppressed."
>
> "Riparian Conservation Areas Use screening devices for water drafting pumps. (Fire suppression activities are exempt during initial attack.) Use pumps with low entry velocity to minimize removal of aquatic species from aquatic habitats, including juvenile fish, amphibian egg masses and tadpoles."

> "Forestwide (FIRE-FW-STD) 01 Fire management actions and any subsequent suppression within research natural areas must be planned and carried out in consultation with the forest research natural area coordinator and the fire resource advisor."

> "Coordinate access for initial attack and suppression activities with responsible jurisdictions to reduce response times and address public and firefighter safety."

The Forest Service would not have to waste billions of dollars annually and endanger the lives of firefighters by suppress fires in these fire-adapted forests that are ignited miles from structures in order to protect structures in communities, if these plans would follow their own science and instead treat the Home Ignition Zone.

H. Forest Plan Fails to Provide Science to Prove that Thinning/Logging Reduce Fire Danger and Timber Production Conflicts with Need to Sequester Carbon in the Ground and to Combat Climate Change by Reducing the Burning of Fuels that cause Climate Change

The Forest Plans propose fuel reduction treatments throughout the forest for timber production for various reasons:

> "Forest management consists of restoration and fuels reduction treatments … on suitable timber lands."

> "On lands not suited for timber production, timber harvest may occur to protect multiple use values other than timber production, and for salvage, sanitation, or public health."

The Forest Plans make a number of scientifically unsupported claims about the value of logging and thinning:

> "Predictable and sustainable forest product yields **are sufficient to meet the needs of ecological restoration**."

> "Production of timber **contributes to ecological sustainability**."

> "A sustainable mix of forest products is offered … **in response to restoration needs**."

> "**Salvage of dead and dying trees** captures as much of the economic value and carbon storage capacity of the wood as possible while retaining key features in quantities that **provide for wildlife habitat, soil productivity and ecosystem functions**.

Each alternative in the Draft Environmental Impact Statement Revision of the Inyo, Sequoia, and Sierra National Forests Revised Land Management Plans acknowledges short-term decreases in carbon storage upon logging, but claims a long-term increase through increased carbon stability. They fail to clearly or adequately explain how more logging could mean greater carbon stability – i.e. greater carbon sequestration.

1. **“Consequences Specific to Alternative A**

   Fire Regimes and Fire as an Ecological Process

   Carbon Stocks, Sequestration, and Stability
   Low levels of vegetation restoration would continue in alternative A, while the likelihood of large, high-intensity fires would increase (see “Fire Trends” section, Westerling et al. 2015). This would result in increased emissions of carbon to the atmosphere and decreases in carbon stocks and sequestration. Most of the carbon stocks and fires both occur in the montane and upper montane zones. Therefore, an individual very large fire can have large impacts on carbon stocks and emissions. There would be a negative impact of alternative A on carbon stability, carbon stocks, and sequestration rates.”

Draft Environmental Impact Statement Revision of the Inyo, Sequoia, and Sierra National Forests Land Management Plans – Vol. 1 Page 227.

2. **“Consequences Specific to Alternative B**

   Fire Regimes and Fire as an Ecosystem Process

   Carbon Stocks, Sequestration, and Stability
   Under alternative B, there would be restoration treatments across substantial landscape areas (up to 30 percent or more). These treatments would move vegetation toward the desired conditions, increasing heterogeneity and reducing forest density. This would increase fire resilience and as a result carbon stability (TERR-FW-DC-02, -05). There may be short-term decreases in carbon storage where trees are removed by thinning, but a long-term increase through increased carbon stability. There would be short-term increases in carbon emissions where there are prescribed fires or wildfires managed to meet resource objectives but these would be offset by reductions in potential high-intensity wildfire emissions (see “Air Quality” section). The impact of restoration on carbon sequestration is more uncertain. There may be increases because vegetation in the thinned areas may have more optimal growing conditions. There may be decreases because trees are removed.

Draft Environmental Impact Statement Revision of the Inyo, Sequoia, and Sierra National Forests Land Management Plans – Vol. 1 page 232.

3. **“Consequences Specific to Alternative C**

   Fire Regimes and Fire as an Ecosystem Process

   Carbon Stocks, Sequestration, and Stability
   Impacts of alternative C on carbon would be similar to alternative A, except that there may be more prescribed fire and wildfire managed to meet resource objectives. There is a high level of uncertainty on how much more fire may occur, because with fewer thinning projects, prescribed fires and wildfires managed to meet resource objectives may be more difficult to implement and could be less likely to occur. Therefore there is a high level of

uncertainty on the impacts of alternative C on carbon. If more beneficial prescribed and managed fires occurred, then there would be short-term increases in carbon emissions but a long-term increase in carbon stability. Burned areas would have lower surface fuels, lower vegetation densities, and higher fire resilience, making the likelihood of large, high-intensity fires lower.

Draft Environmental Impact Statement Revision of the Inyo, Sequoia, and Sierra National Forests Land Management Plans – Vol. 1 page 238.

4. **"Consequences Specific to Alternative D**

Fire Regimes and Fire as an Ecosystem Process

Carbon Stocks, Sequestration, and Stability
The impacts of alternative D on carbon would be similar to alternative B but with beneficial impacts over a larger area. Under alternative D, the area proposed for thinning is the greatest. There would also be the greatest amount of prescribed fire and wildfire managed to meet resource objectives. The combined effect of these restoration treatments would be between 30 and 60 percent of the low and mid-elevation areas with lower forest and vegetation densities and fuel loadings. This would substantially decrease the likelihood of large, high-intensity fires. This means that carbon stability would be substantially higher and large carbon emissions the lowest (see the "Air Quality" section).

Draft Environmental Impact Statement Revision of the Inyo, Sequoia, and Sierra National Forests Land Management Plans – Vol. 1 page 241.

5. **"Analytical Conclusions**

Fire Regimes and Fire as an Ecological Process

Carbon Stocks, Sequestration, and Stability
Alternative D followed by B would have the greatest positive impact on carbon stability, and as a result, on carbon storage and sequestration. They have the greatest proportions of vegetation restoration that would decrease the likelihood of large, high-intensity fires and increase the resilience of vegetation to fires. This would result in less tree mortality maintenance of carbon storage. Carbon sequestration would be more stable and would likely increase because of less competition between trees for water, light, and openings that would improve understory shrub and plant vigor. Alternative D would have the greatest positive impact, because there is enough of the low and mid-elevation areas restored that could reduce the amount of large, high-intensity fires (see the "Fire Trends" section).

Alternatives A and C would likely result in a continued condition of high instability of carbon. There would be a continued increase in the likelihood of large, high-intensity fires and low climate adaptive capacity. There would continue to be large areas of the landscape with low ecological fire resilience and resilience to insects and pathogens (see

> “Insects and Pathogens” section). This means that there would likely be large areas burned as crown fires in large, high-intensity fires or areas with widespread tree mortality due to moisture stress and insect and pathogen activity. While dead trees can store much of their carbon in the stems and branches, this is short term carbon storage, because decay and other ecological processes (like fire) release carbon to the atmosphere (North and Hurteau 2011). Carbon sequestration could increase because of more young vegetation actively growing after large fires. This increase in sequestration would likely be short term in both alternatives. In alternative C, there would be little to no reforestation and therefore, lower levels of sequestration in post-fire landscapes characterized by large high-severity fire patches with increased tree regeneration failure (Ritchie and Knapp 2014, Collins and Roller 2013). In alternative A, while there might be more reforestation, if it is extensive and densely planted, there is a moderate to high likelihood that the plantations would not survive additional large, high-intensity fires and climate change. There is often, but not always, a pattern of repeated fires in the same vicinity, that burn intensely through plantations. The most notable examples are on the Stanislaus National Forest, near and in the Rim Fire area, which were often established following earlier uncharacteristically severe wildfire events (like the 1987 Stanislaus Complex).

Draft Environmental Impact Statement Revision of the Inyo, Sequoia, and Sierra National Forests Land Management Plans – Vol. 1 page 247.

<u>Comments</u>
Thinning and logging are not restoration. The Forest Plans fail to provide scientific research or data to show that thinning and logging could be considered restoration and fail to consider the scientific research that shows that thinning and logging are harmful to the ecosystem.

The Forest Service wrongly assert that it has “protected” forests by logging the largest trees and removing canopy cover, which makes forests hotter and dryer, more susceptible to surface winds, and causes more flammable bushes to grow where the trees once stood, all of which increase fire danger. (See Fire Weather: A Guide for Application of Meteorological Information to Forest Fire Control Operations Mark J. Schroeder Charles C. Buck USDA Agriculture http://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1013&context=barkbeetles)

Since the Forest Service is also mandated to do commercial logging on public lands, it actively promotes increased logging of both live and dead trees. The Forest Plans wrongly assert that more logging is needed to reduce the fire risk. But, if that were true, after a century of logging, the forests should be fireproof.

While the Forest Plans advocate for widespread logging of snag forest habitat, and generally described snag forest habitat mainly as “fuel” and commodities, the position of the Forest Service is opposed by the overwhelming and growing consensus of scientists who oppose snag forest logging as one of the most ecologically destructive of all forest management practices. The vast majority of scientific evidence has found that this rare and unique forest type as highly important wildlife habitat, not “fuel”. *See* Exhibit D (Forest and Fire Science Synthesis, also available at http://johnmuirproject.org/wp-content/uploads/2014/12/ForestAndFireScienceSynthesisApr2015.pdf). Moreover, in September of 2015, over 260 scientists sent a letter to President Obama and Congress opposing proposals to conduct more snag forest logging on federal public lands, noting that "'complex early seral forest,' or 'snag forest,' is quite simply some of the best wildlife habitat in forests". *See* Exhibit E (also available at http://johnmuirproject.org/2015/09/over-260-scientists-urge-senate-dont-pass-post-fire-logging-bills/). Many native wildlife species that depend on patches of snags (standing dead trees)—both small and large—from either drought/native-beetles or fire, and many of these species are now at risk due to habitat loss and destruction from fire suppression and the logging of this "snag forest habitat". The attached 9 August 2016 letter from Dr. Chad Hanson to Governor Jerry Brown on the science regarding Snag Forests and Fire Severity and Fire Spread, is incorporated herein, in its entirety, by reference. *See* Exhibit F.

Forest Service staff have recently suggested that logging of snags on national forests should be expedited, ostensibly due to potential for increased fire severity/spread posed by the recent snag recruitment. Lest the Forest Service think that this view gives the agency a justification to sidestep NEPA, we note that the existing science does not support the Forest Service's assertions regarding snags and fire.

"What we are doing to the forests of the world is but a mirror reflection of what we are doing to ourselves and to one another." **—** Chris Maser, Forest Primeval: The Natural History of an Ancient Forest (2001). Chris Maser traces the growth of an ancient forest in Oregon's Cascade Mountains from its fiery birth in the year 987 to the present. A unique biography of an ecosystem.

I. Forest Plans Fail to Provide Science to Show that Past Thinning and Logging Have Made Forests More Resilient to Drought to Justify More Thinning

The Draft Forest Plan proposes more thinning and logging to make forest landscapes resilient to drought and climate change:

> "Restore ecosystems to a more fire resilient condition and lessen the threat of wildfire to communities."
>
> "All Montane Vegetation Types (TERR-MONT-DC) 01 At the landscape scale, montane vegetation occurs in a complex mosaic of different forest densities, sizes, and species mix across large landscapes (Figure 3 and Table 1), that vary with topography, soils and precipitation. **The composition, structure, and function of vegetation make them resilient to fire, drought, insects, pathogens and climate change**."
>
> "TERR-ALPN-DC-03 Subalpine woodlands and alpine ecosystems are resilient to insects, diseases, fire, wind and climate change. **High-elevation white pines (e.g., whitebark pine and foxtail pine) are healthy and vigorous, with a low incidence of white pine blister rust, and resilient to moisture stress and drought**."

Comments

We believe that previous thinning could not have done anything to prevent the drought-related mortality. The drought-related mortality as similar to extreme fire weather in that there is really nothing human intervention can do to mitigate its effects.

While the Draft Forest Plan proposes more thinning and logging to make forest landscapes resilient to drought and climate change, the Draft Forest Plan provides no evidence in the form of research to show that past logged and thinned areas have become more resilient to California's extended drought. California's drought and climate change created the massive die-off of trees in the southern Sierra Nevada. Before the public can be convinced that continuing to implement thinning and logging promoted by these Forest Plans could make these National Forests more resilient to drought and climate change, irrefutable scientific proof of the survivability of past thinned and logged forests to drought and climate change must be provided. The Forest Service must provide detailed maps and the GIS shapefile/feature class data and metadata of past logging, thinning, and subsequent plantation units overlaid with NASA's one-meter resolution satellite images of the tree die-off to show how effective past thinning and logging has been in the die-off areas.

J. Protect Old Forest Trees to Sequester More Carbon and Counteract Climate Change

Mature forests in colder climes may continue to store more carbon than they emit, thereby helping to deflect global warming. Whether logging or clearing land for agriculture, the bulk of the world's forests have fallen to crops, cattle, or younger trees. According to some estimates, less than 10 percent of forests worldwide can be considered old growth, or undisturbed for more than a century. And that is not just a tragedy for the plants and animals that require mature forests—it is also a tragedy for the world's climate, according to a study published in Nature: **Rate of tree carbon accumulation increases continuously with tree size** (click link for article).

> Forests are major components of the global carbon cycle, providing substantial feedback to atmospheric greenhouse gas concentrations[1]. Our ability to understand and predict changes in the forest carbon cycle—particularly net primary productivity and carbon storage—increasingly relies on models that represent biological processes across several scales of biological organization, from tree leaves to forest stands[2, 3]. Yet, despite advances in our understanding of productivity at the scales of leaves and stands, no consensus exists about the nature of productivity at the scale of the individual tree[4, 5, 6, 7], in part because we lack a broad empirical assessment of whether rates of absolute tree mass growth (and thus carbon accumulation) decrease, remain constant, or increase as trees increase in size and age. Here we present a global analysis of 403 tropical and temperate tree species, showing that for most species mass growth rate increases continuously with tree size. Thus, large, old trees do not act simply as senescent carbon reservoirs but actively fix large amounts of carbon compared to smaller trees; at the extreme, a single big tree can add the same amount of carbon to the forest within a year as is contained in an entire mid-sized tree. The apparent paradoxes of individual tree growth increasing with tree size despite declining leaf-level[8, 9, 10] and stand-level[10] productivity can be explained, respectively, by increases in a tree's total leaf area that outpace declines in productivity per unit of leaf area and, among other factors, age-related reductions in population density. Our results resolve conflicting assumptions about the nature of tree growth, inform efforts to understand and model forest carbon dynamics, and have additional implications for theories of resource allocation[11] and plant senescence[12].

(N. L. Stephenson, *et al.* **Nature 507, 90–93 (06 March 2014) doi:10.1038/nature12914 -** 15 January 2014)

Average Stand Age from Forest Inventory and Analysis (FIA) Plots Do Not Describe Historical Fire Regimes in Ponderosa Pine and Mixed-Conifer Forests of Western North America **(**PLoS ONE · May 2016)
https://www.researchgate.net/publication/303374032

1) The FIA stand age variable does not reflect the large range of individual tree ages in the FIA plots: older trees comprised more than 10% of pre-stand age basal area in 58% of plots analyzed and more than 30% of pre-stand age basal area in 32% of plots.
2) Recruitment events are not necessarily related to high-severity fire occurrence. Because the FIA stand age variable is estimated from a sample of tree ages within the tree size class containing a plurality of canopy trees in the plot, it does not necessarily include the oldest trees, especially in uneven-aged stands.

Thus, the FIA stand age variable does not indicate whether the trees in the predominant size class established in response to severe fire, or established during the absence of fire. FIA stand age was not designed to measure the time since a stand-replacing disturbance. Quantification of historical "mixed-severity" fire regimes must be explicit about the spatial scale of high-severity fire effects, which is not possible using FIA stand age data.

Increasing wood production as trees age is a mechanism underlying the maintenance of biomass accumulation during forest development and the carbon-sink capacity of old-growth forests. (Increasing wood production through old age in tall trees, (Stephen C. Sillett, et.al. (2009) http://www.sciencedirect.com/science/article/pii/S037811270900872X)

Allowing entire old-growth forests to thrive, by maintaining a closed canopy, moist forest without interference by management treatments that would interrupt their continued accumulation of carbon, is the best, science-based way to manage forests to maintain old growth forest characteristics and carbon sequestration and combat climate change.

K. Cumulative Impacts of the System of Fuel Breaks on Ridges, Roads, and Trails throughout the Sequoia, Sierra, and Inyo National Forests must be Considered in a New DEIS or a Supplemental DEIS, because no specific Project EIS that Implements the Plan will analyze the Cumulative Impacts of Implementing all Projects in Three National Forests

These plans must analyze the cumulative impacts to the environment from the system of restoration treatment fuel breaks along ridgelines, roads, and trails that would be enabled and implemented throughout these Sierra Nevada National Forests by these plans. At many locations throughout the Sequoia, Sierra, and Inyo draft revised plans there are specific requirements to locate restoration treatments along ridge lines, roads, and trails, examples of which are cited below.

Chapter 3 Strategic Fire Management Zones

> "Locate restoration treatments along ridges, roads, or other natural or man-made features and in areas that pose the greatest fire threat to communities so that there are more tactical opportunities to manage wildfires and reduce the spread rate and intensity of wildfires. Treatments should conform to the terrestrial ecosystem desired conditions." DEIS page 50

> "Guidelines (MA- GWPZ-GDL) 01 Restoration treatments to reduce the spread rate and intensity of wildfires are located in more tactical opportunity areas like along ridges, roads, other natural or man-made features and in areas that pose the greatest fire threat to communities. Treatments should conform to the terrestrial ecosystem desired conditions." DEIS page 50

> "Guidelines (MA- GWPZ-GDL) 01 Restoration treatments to reduce the spread rate and intensity of wildfires are located in more tactical opportunity areas like along ridges, roads, other natural or man-made features and in areas that pose the greatest fire threat to communities. Treatments should conform to the terrestrial ecosystem desired conditions." DEIS page 51

> "Standards (MA-WRZ-STD) 01 Use natural barriers and features like creeks, old fire scars, ridges and human-made features (e.g., roads and trails) when managing wildfires to meet resource objectives or managing unwanted wildfires that have surpassed the initial attack phase, unless unsafe or impractical. Variation from this standard will be the exception and will be documented by the responsible line officer in the current fire decision support system." DEIS page 52

> "Use natural barriers and features, such as creeks, old fire scars, ridges, and human-made features (e.g., roads and trails) when managing wildfires to meet resource objectives or for the Sequoia National Forest unwanted wildfires that have surpassed the initial attack phase, unless unsafe or impractical. Variation from this standard will be the exception and will be documented by the responsible line officer using the current fire decision support system." DEIS page 52+53

> "FIRE - During ecological restoration treatments, reduce fuels along ridges, roads, or other natural or man-made features to aid in the use of large prescribed fires and in managing wildfire, including wildfires managed primarily for resource objectives." DEIS page 87

> "VEGETATION MANAGEMENT PRACTICES - Forest management in wildfire protection zones and strategic ridge tops will be prioritized for treatment." Appendix E page 156

<u>Comments</u>
Given the large number of miles of ridges, roads, trails, and other natural and manmade features, the cumulative effects of applying hazard tree removal, thinning, hand treatments, prescribed fire, and other restoration treatments extending out 150 to 225 feet from all sides from all of

these features of each forest (Sequoia, Sierra, and Inyo) could potentially cause extensive canopy cover reductions, in addition to the canopy cover reduction throughout the WUI that the Plans are enabling, throughout the habitat of Pacific fishers, California Spotted owls, Northern goshawks, and other species in addition to increasing the temperature and decreasing the moisture of the forest floor as well as causing surface winds to increase throughout the forest. Therefore, the FEIS or Supplemental DEIS must consider and analyze the cumulative impacts to climate change, the drought, and the temperature of the forest as well as the fire danger in the forest of this system of treatments along ridges, roads, or other natural or man-made features enabled by the Sequoia, Sierra, and Inyo draft plans.

L. Biomass Extraction Should NOT be Specified in the Plan due to Impacts to the Ecosystem, Air, and Climate

Continuing to extract biomass from forests cannot sustain soil because removing biomass removes soil nutrients for growing future forests, removes the smaller materials and therefore causes subsequent fires to burn larger materials, thus causing more intense fires, and prevents the greatest levels of carbon sequestration from taking place in the forests. Biomass removal should not be enabled by the forest plan revision because the cumulative impact of removing biomass over the life of the plan has not been adequately considered.

Opening the forest canopy causes the sun to shine on the forest floor, causes the forest to become hot and dry, causes brush to grow where the trees once stood, and causes surface winds to increase, which all increase, not decrease, fire risk, removes some sequestered carbon from the forest, and jeopardize the trees that are already struggling. Opening the forest canopy would also jeopardize the old-growth species that are already on the brink of extinction, including the Pacific fisher, California Spotted owl, Northern goshawk, and a host of frog and salamanders, as well as other reptiles.

North et al. (2009) is an unpublished and non-peer-reviewed report often cited and relied upon by the Forest Service for most fuel reduction, ecosystem restoration, and forest health actions, including biomass removal from forested areas. But the North et al. (2009) report did not mean to use the word “remove” to suggest commercial logging of mature trees up to, or over, 20 inches in diameter—as opposed to simply “removing” a given mature live tree from competition with other larger trees by turning it into a large snag or downed log.

Indeed, the authors of North et al. (2009), on page 24 of that report, specifically discuss the potential removal of trees over 10-16 inches in diameter “for socioeconomic purposes” such as “generating revenue” or “providing merchantable wood for local sawmills.” Nowhere do the authors of North et al. (2009) specifically recommend “removal” of mature trees (as opposed to snag creation or downed log creation) for strictly ecological purposes, or offer a single citation to any ecological study concluding that some mature trees must be removed from the forest ecosystem, as opposed to being left as live trees, converted into large snags, or converted into large downed logs.

M. <u>The Environmental Analysis for all Forest Treatments, including, but not limited to Biomass Removal, Fuels Treatment, and Burning, Must Disclose the Effects On and Contribution to Climate Change</u>

The plan must discuss and analyze how proposed treatments will potentially emit CO2, Methane, and other Greenhouse Gas emissions (GHG's), that may contribute to climate change, including the carbon emitted from the vehicles and equipment used for fuel reduction treatments, as well as felling, stacking, slash treatments, and biomass collection, hauling from the forest, and burning outside the forest in a power or heat generating facility or prescribed burning. The environmental analysis must disclose what efforts will be taken to mitigate these emissions.

A recent article by Mitchell et al. (2009) describes tradeoffs for managing for carbon storage (a valid goal in any forest management action) versus fuels reduction. That study suggests that, with the exception of some xeric ecosystems (not present in the Sierra), "fuel reduction treatments should be forgone if forest ecosystems are to provide maximal amelioration of atmospheric CO2 over the next 100 years." *Id.* at 653. For that reason, each alternative should discuss and analyze carbon emissions from implementation, and the no-action alternative should also provide information about the potential for carbon storage from foregoing project implementation.

Depro et al., 2007, found that eliminating logging would result in massive increases in Carbon sequestration. "Our analysis found that a "no timber harvest" scenario eliminating harvests on public lands would result in an annual increase of 17–29 million metric tonnes of carbon (MMTC) per year between 2010 and 2050—as much as a 43% increase over current sequestration levels on public timberlands and would offset up to 1.5% of total U.S. GHG emissions." (Depro et al., 2007 abstract)

Moreover, Mitchell et al. (2009) found the amount of net carbon released into the atmosphere, on an acreage basis with small diameter thinning for fuel reduction (if used for biomass), puts more carbon into the atmosphere than an average fire, on an acreage basis:

> Our simulations indicate that fuel reduction treatments in these ecosystems consistently reduced fire severity. However, reducing the fraction by which C is lost in a wildfire requires the removal of a much greater amount of C, since most of the C stored in forest biomass (stem wood, branches, coarse woody debris) remains unconsumed even by high-severity wildfires. For this reason, all of the fuel reduction treatments simulated for the west Cascades and Coast Range ecosystems as well as most of the treatments simulated for the east Cascades resulted in a reduced mean stand C storage. One suggested method of compensating for such losses in C storage is to utilize C harvested in fuel reduction treatments as biofuels. Our analysis indicates that this will not be an effective strategy in the west Cascades and Coast Range over the next 100 years.

Mitchell et al., 2009 abstract.

In any case, the environmental analysis must disclose the emissions from fuel reduction treatments, associated slash treatments, and biomass collection, hauling, and burning/incineration or prescribed burning for each action alternative. For this, the Washington Office of the Forest

Service has generated specific direction on how to discuss climate change effects in a National Environmental Policy Act (NEPA) analysis. See *Climate Change Considerations in Project Level NEPA Analysis* (Jan. 13, 2009) (available at http://www.fs.fed.us/emc/nepa/climate_change/includes/cc_nepa_guidance.pdf). That document specifically mentions fuel reduction projects in the types of projects that should disclose direct effects on climate change:

- The effect of a proposed project on climate change (GHG emissions and carbon cycling). Examples include: short-term GHG emissions and alteration to the carbon cycle caused by hazardous fuels reduction projects, GHG emissions from oil and gas field development, and avoiding large GHG emissions pulses and effects to the carbon cycle by thinning overstocked stands to increase forest resilience and decrease the potential for large scale wildfire.

Id. at 2. To assist in disclosing these effects, the Forest Service provides tools that can help managers determine the direct contributions of GHG emissions from project burning or treatments. *Id.* at 5 (*FOFEM 5.5, Consume 3.0,* and the *Forest Vegetation Simulator*). Because the Forest Service has tools or models to effectively calculate emissions, it must disclose these emissions for each of the action alternatives in order to reduce GHG emissions in California that are globally cumulative. In addition, the guidance document suggests that the NEPA document include a qualitative effects analysis. *Id.* Such an analysis should include the cumulative effects, quantified in an "individual, regional, national, global" context. *Id.* at 6.

Finally, the guidance suggests that NEPA provides direction on how managers should respond to comments raised during project analysis regarding climate change:

1. Modify alternatives including the proposed action.
2. Develop and evaluate alternatives not previously given serious consideration by the Agency.
3. Supplement, improve, or modify the analysis.
4. Make factual corrections.
5. Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the Agency's position and, if appropriate, indicate those circumstances that would trigger agency reappraisal or further response.

Id. at 8. At the very least, because any project that proposes biomass removal includes fuel reduction treatments and burning that will contribute GHG emissions, the EIS must include an acknowledgment of carbon emissions and must provide a response to this issue.

Moreover, the analysis should account for and quantify (as part of the cumulative effects analysis) not only the emission from prescribed burning on-site and the emissions from any biomass that is removed from the project area and later burned or incinerated off-site, but also the contribution of emissions from transporting this material for off-site burning, and the contribution of emissions from the off-site burning, planning, and implementing the project by the agency, a contractor, and/or other agent that implements such projects.

This holistic approach to account for GHG emission is necessary to provide managers and the public with the kind of information under NEPA to make informed choices between alternatives and to mitigate for climate change, and to consider and assess the larger picture of GHG contributions from all projects on the national forests that may contribute GHG emissions.

N. Disclose and Consider the Impact from Mechanical Equipment Use and Biomass Extraction on Forest Soils, Mycorrhizal Fungi networks, Streams, and Watersheds

Mechanized fuel treatments and biomass removal treatments incur ecological costs by damaging soils, vegetation, and hydrologic processes, as proponents of fuel reduction treatments have acknowledged (e.g., Allen et al., 2002; Graham et al., 1999; 2004; Agee and Skinner, 2005). Mechanical fuel reduction treatments typically involve the same suite of activities as logging, with the same set of impacts to soils, runoff, erosion, sedimentation, water quality, and stream structure and function. These effects, their mechanisms, and their aquatic impacts have been extensively and repeatedly documented across the West (e.g., Geppert et al., 1984; Meehan, 1991; USFS et al., 1993; Rhodes et al., 1994; CWWR, 1996, USFS and USBLM, 1997a; c; Beschta et al., 2004). Watershed damage ultimately translates into aquatic damage.

The collateral impacts of fuel treatments and biomass removal actions are of considerable concern due to the existing aquatic context. Across the West, aquatic systems are significantly and pervasively degraded (Rieman et al., 2003; Beschta et al., 2004). As a result, many populations of aquatic species, including most native trout and salmonids, have undergone severe contractions in their range and number and remaining populations are now imperiled and highly fragmented (Frissell, 1993; USFS and USBLM, 1997a; Kessler et al., 2001; Behnke, 2002; Bradford, 2005). Additional damage to watersheds and aquatic systems reduces the prospects for the protection and restoration of imperiled aquatic species (USFS and USBLM, 1997c; USFWS, 1998; Karr et al., 2004).

In addition, snags and logs provide enriched soil microsites for seedling establishment, in part because they are centers of biological activity for mycorrhizal fungi and nitrogen-fixing bacteria (Maser & Trappe 1984), reduce erosion by acting as physical barriers to soil movement (Franklin et al. 1985), provide cover for small mammals that disseminate mycorrhizal spores into disturbed areas (Maser et al. 1978, Tallmon & Mills 1994), and exhibit higher water-holding capacity that aids seedling survival during drought (Harvey et al. 1989, Amaranthus et al. 1989a).

Shrubs and hardwoods directly facilitate the re-establishment of conifer seedlings by providing access to mycorrhizal fungi, nitrogen-fixing bacteria and bacteria that stimulate root-tip production (summarized in Perry 1994). Research in the Siskiyous has shown that survival and growth of tree seedlings established in disturbed areas depends on their ability to quickly establish links with their below-ground microbial symbionts, especially on infertile soils or in climatically stressed environments (Amaranthus et al. 1987, Perry et al. 1987). Nutrients also cycle faster in soils near hardwoods than in the open, a reflection of greater biological activity. Both controlled and field studies have shown that Douglas-fir survive and grow better in proximity to shrubs and hardwoods than in the open (Horton et al. 1999, Amaranthus & Perry 1989a,b; Amaranthus et al. 1990; Borchers & Perry 1990, Wilson 1982). Perry (1994) also reports that the relative inflammability of Pacific madrone and several other hardwoods may actually protect small conifers from fire.

The research report *Impacts of forest harvesting on biological processes in northern forest soils*, Marshall, VG - Forest Ecology and Management [For. Ecol. Manage.]. Vol. 133, no. 1-2, pp. 43-60. 1 Aug 2000, found at: http://www.sciencedirect.com/science/article/pii/S0378112799002972, indicates that, "Harvesting directly affects these processes through the reduction and redistribution of organic matter, compaction, changes in plant cover, and modification of microclimate, all of which affect the distribution, composition and activity of the soil biological communities. Changes over the longer-term are less obvious because of gradual recovery of most biological components with canopy closure. Although the relationships among floral composition, faunal diversity and sustained soil fertility are not always clear, there are indications that a simplified soil biological system will adversely affect nutrient cycling, tree growth, and forest health. Destruction of mycorrhizae, essential for the establishment of coniferous seedlings, can lead to serious reforestation problems. It is therefore prudent to discourage any qualitative or quantitative changes in the soil biota."

"Although preliminary, our studies suggest that the degree to which mycorrhizal networks facilitate regeneration establishment increases with disturbance or drought stress, in keeping with the stress-gradient hypothesis of facilitation." (*The foundational role of mycorrhizal networks in self organization of interior Douglas fir forests* by Suzanne W. Simard (2009) http://www.sciencedirect.com/science/article/pii/S0378112709003351)

"Mycorrhizal networks, defined as a common mycorrhizal mycelium linking the roots of at least two plants, occur in all major terrestrial ecosystems. This review discusses the recent progress and challenges in our understanding of the characteristics, functions, ecology and models of mycorrhizal networks, with the goal of encouraging future research to improve our understanding of their ecology, adaptability and evolution. We focus on four themes in the recent literature: (1) the physical, physiological and molecular evidence for the existence of mycorrhizal networks, as well as the genetic characteristics and topology of networks in natural ecosystems; (2) the types, amounts and mechanisms of interplant material transfer (including carbon, nutrients, water, defence signals and allelochemicals) in autotrophic, mycoheterotrophic or partial mycoheterotrophic plants, with particular focus on carbon transfer; (3) the influence of mycorrhizal networks on plant establishment, survival and growth, and the implications for community diversity or stability in response to environmental stress; and (4) insights into emerging methods for modelling the spatial configuration and temporal dynamics of mycorrhizal networks, including the inclusion of mycorrhizal networks in conceptual models of complex adaptive systems. We suggest that mycorrhizal networks are fundamental agents of complex adaptive systems (ecosystems) because they provide avenues for feedbacks and cross-scale interactions that lead to self-organization and emergent properties in ecosystems." (*Mycorrhizal networks: Mechanisms, ecology and modelling* by Suzanne W. Simard, et al, http://www.sciencedirect.com/science/article/pii/S1749461312000048)

Dr. Simard was interviewed on the July 30, 2016 Radiolab Podcast Articles http://www.radiolab.org/blogs/radiolab-blog/, titled *From Tree to Shining Tree*. Dr. Simard discussed the results of some of the research on Mycorrhizal networks in the forest:

> Mycorrhizal networks of fungi and tree roots are a hidden world beneath your feet as busy and complicated as a city at rush hour.
>
> Massive mat of intertwining roots was found with different colors and shapes of roots. Following clearcuts, Dr. Simard noticed that there was a healthier community of trees before one species was removed. Birch was removed and Douglas fir died. Radioactive gas was injected and absorbed into separate trees. A Giger counter found the radioactive tags. Dr. Simard discovered that trees were sharing their food underground. One tree connected to 47 other trees in the network. The biggest trees in the network were the hub of the food communication network.
>
> The tree has sugar that the fungus needs and the fungus has minerals that the tree needs. Carbon is the sugar that builds the tree, but this fungus has the minerals that the tree needs. The fungus removes water and mineral nutrients that the tree needs. The tree gets most of its minerals and moisture from the fungus. The tree and fungus exchange mineral nutrients and sugar. 20 to 80% of the sugars produced by the tree are sent to the fungus.
>
> Warning signals are sent by the trees using chemicals to warn other trees of the invasion of insect beetles. Trees also being injured by climate change or drought transfer their carbon and nutrients to other trees. Sick trees give up their food, which goes to the needs of the forest, to neighboring members of the forest through the Mycorrhizal network. There is an intelligence in these plants and fungus network.

Comments

The trees still living after California's worst drought in 1,200 years may produce offspring genetically adapted to surviving drought. Imagine destroying the chance to have offspring that can regenerate forests despite climate change. We can't log our way out of this problem, and we certainly can't do it by logging live trees.

A borax-based fungicide is conventionally proposed as an application to 'cut trees' to prevent the spread of annosus root disease. The EIS must consider the impacts to mycorrhizal networks from the application of fungicides in forest ecosystems.

These impacts to soils, Mycorrhizal Fungi networks, streams, and watersheds from these biomass removal project must be acknowledged and added to the existing damage and foreseeable future damage from past and future treatments in the forest to provide an accurate assessment of the adverse effects of biomass removal projects.

O. Treatments that Allow Any Additional Erosion are Unacceptable

Treatments that use either commercial or non-commercial activities to thin ladder fuels, restore species composition to those present before fire suppression and logging, and increase the resiliency of stands of trees to drought, insects, and fire may release sediments downstream because heavy equipment on slopes up to 35% and greater have a risk of soil erosion, and loss of soil to erosion, which is unacceptable.

No additional erosion or sediment flow into down-stream watersheds would be considered acceptable. All sediment flows into streams is cumulative and eventually contributes to causing reservoirs like Isabella Reservoir to fill with sediment, as it has. The U.S. Army Corps of Engineers is now spending hundreds of millions of taxpayer dollars to restore the Isabella Reservoir because the Forest Service implements biomass removal projects, in the mountains above the reservoir, which cause soil erosion and sedimentation that cumulatively impact the Kern River watershed, and which the agency considers to be "acceptable."

P. <u>Because much of the Sierra Nevada Forests are Habitat for Pacific Fisher, Pacific Fisher Tolerance to the Rate of Treatments must be Considered in the EIS</u>

While the Sequoia DRAFT Forest Plan makes many appropriate statements and cites to the Southern Sierra Fisher Conservation Strategy, the plan must also quote from, cite to, and consider the new science, the Zielinski et al. (2013b) Fisher Tolerance Study (Exhibit G), which concludes that managers must factor in the extent and rate of logging, thinning, and restorative treatments, including prescribed fire, to determine whether fishers can tolerate the planned activities, also ensuring that habitat connectivity is maintained.

According to the Zielinski et al. (2013b) Fisher Tolerance Study, fisher occupation of larger habitat areas begins dropping quickly when restorative treatments, which include fuel reduction thinning, prescribed fire, or pre-commercial (hand) thinning, exceed a rate of about 13% in 5 years, or an average of about 2.6% per year. Fisher use was lowest in areas where the rate of treatments was only slightly higher, that is, when 3.5% of the area has been disturbed each year. In other words, as the rate of treatment increases from 2.6% of a larger area per year, the fisher's use of the area declines, with data showing the lowest use when an area was treated at 3.5% per year. The Zielinski et al. (2013b) Fisher Tolerance Study concludes that treatment rates which exceed the 2.6% per year "may put fisher habitat and fisher use of these areas at risk."

Zielinski et al. (2013b) noted that although fishers showed no aversion to including treated areas within their home ranges, Garner (2013) (Exhibit H) found that "fishers avoided using treated areas when resting and foraging." *Id.*

Projects must be reconsidered where there is a constricted corridor in the Fisher's Core Habitat, and the proposed treatments in this corridor may cut off fisher movement through the corridor. As discussed above in Zielinski et al. (2013b), Garner (2013) found that "fishers avoided using treated areas when resting and foraging." When an entire corridor is proposed for treatment, meaning there is a likelihood that fishers will completely avoid use of this corridor after treatment, which will completely sever the movement of fishers through the corridor for an extended period of time, which would have a devastating effect on foraging, reproductive behavior, and genetic diversity of the fishers, the management agency must reconsider or rethink implementations of such a project. In essence, if movement through a corridor is severed, it would cut-off and genetically isolate the fisher population in the fisher's already limited range.

The Forest Service has neither analyzed the extent or rate of forest-plan-enabled treatments that could be implemented based on the management plan, which include fuel reduction thinning, prescribed fire, or pre-commercial (hand) thinning, nor the connectivity of habitat for fishers. Failure to consider this significant new information in light of the MMBF range of treatments and prescribed fire acres and acres of other treatments violates NEPA.

Q. Deficiencies in the Forest Species of Conservation Concern and Failure to Consider Evidence of Rarity and Habitat Alteration

We find many deficiencies and an almost cavalier attitude toward protecting old-growth dependent species instead of utilizing the latest science to be proactive in protecting habitat for many Sierra Nevada species. Why was **the American Pika** (*Ochotona princeps*) denied as species of conservation concern when recent studies showing absence from 15% of their historic sites due to climate change? [2] **The mountain beaver** (*Aplodontia rufa*) has suffered range contraction and is no longer found on the Los Padres National Forest but has been observed on the Sequoia National Forest. This rare rodent along with the **North American Porcupine** are important prey species for Pacific fisher but they girdle commercial conifers and have been deliberately extirpated from their range in the Sierra Nevada. These species should be protected and returned to the forests of the Southern Sierra Nevada. **The Sierra flying squirrel** (*Glaucomys sabrinus lascivus*) is assumed to be the squirrel in the southern Sierra although until Sequoia ForestKeeper accessioned two specimens with the Museum of Vertebrate Zoology in 2016, no specimens had previously been recorded south of Quaking Aspen. The assumption on subspecies is troubling as only two northern flying squirrels have had their DNA analyzed and those are both from the Great Lakes region. Assumption without knowledge is not science. The Northern Inyo and Sierra National Forests both should protect habitat for endangered **Wolverine** (*Gulo gulo*) as the range of this elusive predator may expand to reoccupy its historic habitat. **All communally roosting bat species** must be protected from habitat disturbance and white-nosed bat syndrome. Additionally the **white-tailed jackrabbit** (*Lepus townsendii townsendii*) and **the Sierra Nevada snowshoe hare** (*Lepus americanus tahoensis*) are rare and little studied in the Sierra Nevada. Species that are rare but have been insufficiently studied should not be precluded from consideration just because there is not enough information. This is exactly why species should be considered, to add to the body of knowledge and to prevent extirpations and potential extinctions at the species or subspecies level. Many more species of wildlife should be considered.

R. The Massive Die-off of Trees throughout the Sierra Nevada Must be Considered by the EIS when Proposing Removal of Live Trees – Trees that could be genetically adapted to surviving drought

Despite the use of 2015 quantitative analysis of fire-climate trends and research from 2016 on predicting high fire severity at the landscape scale, the DEIS bases its projections for forest

[2] Stewart J.A.E., Perrine J.D., Nichols L.B., James H., Millar C.I., Goehring K.E., Massing C.P., & Wright D.H. (2015), Revisiting the past to foretell the future : summer temperature and habitat area predict pika extirpations in California. Journal of Biogeography, 42:880–890.

vegetation conditions and subsequent treatments on 2012 models for vegetation that predate California's severe drought and massive die-off of trees.

> "Recent Past and Current Trends
> Mean annual temperatures in the planning area have increased in the last several decades, mostly with increased nighttime temperatures (Meyer et al. 2012, Mallek et al. 2012). Unlike much of the rest of the Sierra Nevada, overall precipitation has remained steady at higher elevations but there have been some decreases at lower elevations. There has been a decrease in the amount of snow at low to mid-elevations and an increase in year-to-year variability (wetter wet years and drier dry years). At higher elevations, overall snowfall and spring snow water equivalent (amount of water in snowpack) have remained steady in most southern Sierra Nevada areas, but snowmelt occurs earlier in the year. Changes in temperatures and amounts and timing of precipitation have led to earlier peak stream flow rates in most Sierra Nevada streams, with higher spring flows and lower summer flows. Warming temperatures are leading to glacial recession across the southern Sierra Nevada.
>
> Projected Future Trends in Climate and Hydrology
> Although climate change models vary in their projections for the latter half of the 21st century, all predict significant warming in the Sierra Nevada. Most expect precipitation to remain similar or slightly reduced compared to today (Safford et al. 2012). Most models also agree that summers will be drier (causing higher evapotranspiration rates) on average. Although snowpack in the higher elevations (higher than 7,500 feet) of the southern Sierra Nevada has generally remained steady (or risen) over the past half-century (Meyer et al. 2012, Mallek et al. 2012), continued warming is likely to decrease snowpack in much of the high southern Sierra Nevada.
>
> Most models project a continuously increasing rain-to-snow ratio and earlier runoff dates for the next century, especially at higher elevations. Under most climate scenarios, models project higher winter-to-early spring runoff and lower spring-to-summer runoff, as higher temperatures hasten the onset of snowmelt. This could increase downstream flood potential due to earlier peak flow rates and the increased proportion of precipitation falling as rain. If overall precipitation increases over time, streamflow volumes during peak runoff will increase even more, leading to notably higher flood risk in downstream areas." (Draft Environmental Impact Statement Revision of the Inyo, Sequoia, and Sierra National Forests Land Management Plans – Vol. 1 page 58)
>
> "Analysis and Methods
> This section is based primarily on a quantitative analysis of fire-climate trends conducted by the University of California (UC) in Merced as part of a cooperative agreement with the Forest Service (Westerling et al. 2015). Other scientific literature used is found in the Fire-climate supplemental report.
>
> Climate scientists at UC Merced conducted a study to predict trends in wildfire with climate change under a broad range of different levels of vegetation restoration. The predictions are based on data from recent and past wildfires, associated vegetation condition, and climate data. The methodology was established in previously published

research by Westerling and others (Preisler et al. 2008, Holmes et al. 2008, Bryant and Westerling 2014, Preisler et al. 2015). This research applies a statistical approach to predicting wildfire, in contrast to mechanistic models, such as FARSITE. They are well suited for broad analysis that takes into account trends in wildfire with climate change. Scientists made projections of climate using several different climate models, since common trends in different models would indicate a more certain trend. The results presented here are primarily for the Geophysical Fluid Dynamics Laboratory A2 climate scenario, as well as some results from the Centre National de Recherches Météorologiques (CNRM) and Community Climate System Model (CCSM) A2 climate scenario (Westerling et al. 2015). The differences between wildfire predictions for the selected climate scenarios were small compared to the effects of the restoration treatments scenarios. The Geophysical Fluid Dynamics Laboratory climate model was emphasized because it yielded mid-century increases in wildfire activity between the CNRM and CCSM models.

Vegetation conditions were based on LANDFIRE vegetation condition class data (LANDFIRE 2012). The conditions are derived from remote sensing data on existing vegetation density and species composition and derived differences with historic conditions based on fire history research and biophysical models of vegetation type and historic fire regime groups.(http://www.landfire.gov/NationalProductDescriptions12.php) Where there is a large departure in historic fire regime (that is, fire patterns and intensities are very different from what they used to be) and vegetation conditions are different than what they would have been under a historic fire regime, then the condition class is considered "highly departed."

Draft Environmental Impact Statement Revision of the Inyo, Sequoia, and Sierra National Forests Land Management Plans – Vol. 1 Page 59.

"The amount and patch size of high-severity fire is most important for evaluating the consequences to ecosystems, particularly in vegetation types that historically had low- and mixed-severity fire regimes. High-severity fire is difficult to predict because it depends on the interaction of vegetation composition (size and species) and structure, and fire intensity and duration. Available research on predicting high fire severity at the landscape scale focuses on statistical analysis of fire size with fire severity (Westerling and Keyser 2016). An analysis of fires and large areas and patches of high fire severity in the Sierra Nevada and southern Oregon, (Farris 2015, personal communication) found that there is a correlation between very large fires (such as the Rim Fire) and both the amount of and size of large patches of high severity. This may partly be because larger fires can have larger patches of high severity whereas smaller fires physical can't. However, short but intense fire runs can burn a lot of area, particularly under extreme weather conditions, such as on the Rim and King Fires. Statistical modeling shows that high fire severity areas show similar trends with climate to the trends in burned area (Westerling et al. 2015, Westerling and Keyser 2016). The model predicted that fire severity was more sensitive to changes in restoration scenarios than burned area alone. In other words, with restoration, fire severity declines more sharply than burned area."

Draft Environmental Impact Statement Revision of the Inyo, Sequoia, and Sierra National Forests Land Management Plans – Vol. 1 Page 66.

> "Environmental Consequences of Fire Management
> *Strategic Fire Management Zones*
> The wildfire risk assessment covers a 4,323,416-acre area encompassing the Inyo, Sequoia, and Sierra National Forests characterized by vegetation conditions ranging from valley-bottom grasslands in the Central Valley to alpine forests and rock at the highest elevations, and to arid sagebrush shrubland on the east side of the Sierra crest.
> The zones used in alternative A consist of the two zones within the wildland-urban intermix: the defense zone and the threat zone; and the general forest, which consists of the area outside the urban-wildland intermix. These are derived from the current forest plans. The wildfire risk assessment was the basis for the creation of strategic fire management zones in alternatives B and D and, in part, the zones in alternative C. The zones identified from the modeling outputs are described below for comparison. The consequences are described separately by alternative in the analysis that follows."

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> "**Analysis Methods and Data Sources**
> **We used a combination of scientific summaries, scientific research, and existing and available vegetation information for the analysis. This included Forest Inventory and Analysis plot data and remote sensing, satellite data. Most of the information included in the "Affected Environment" section was based upon the bio-regional and forest assessments (USDA FS 2013a, 2013b, 2013c, 2013d). These included information from the "Living Assessment" (USDA FS 2013e, 2013f, 2013g, 2013h), published scientific literature, the "Scientific Synthesis" (Long et al. 2014), and the "Natural Range of Variability Assessments" (Safford 2013; Estes 2013a, 2013b; Merriam 2013; Meyer 2013a, 2013b; Sawyer 2013; Slaton and Stone 2013a, 2013b. This information was used to evaluate the conditions of the indicators relative to desired conditions and analysis thresholds.**
>
> For each indicator and vegetation type or ecological zone, we evaluated potential effects on composition, structure, and resilience at the programmatic level for each alternative. This entails identifying plan direction relevant to the vegetation type for each alternative and making projections about the potential effects of future implementation of that plan direction. The specific timing and location of potential restoration projects is not known but the types of effects associated with implementation can be discussed. The evaluation of potential effects to composition, structure, and resilience associated with plan implementation is based on scientific literature (and professional experience) that has examined the effects of treatments similar to those that would be implemented under alternatives B, C, and D using fire-climate modeling (see "Fire Trends" section, Westerling et al. 2015), and ecological fire resilience modeling (USDA FS 2013a, 2013b, 2013c, 2013d).

> Most of the literature on restoration of montane forests has focused on fuels treatments. More recently, there has been an increase in ecological restoration for vegetation composition, structure, and ecological function. Much of the associated research on ecological restoration for westside and yellow pine (ponderosa and Jeffrey pine) forests has been summarized in two recent technical reports, GTR 220 and 237 (North et al. 2009a, North 2012), and the recent "Science Synthesis for the Sierra Nevada Bioregion" (Long et al. 2014). Red fir restoration is also addressed in the Science Synthesis to some degree. Restoration management strategies and treatments proposed and described in those documents are the basis for management direction contained in alternative B, C, and D.
>
> For sagebrush and pinyon-juniper ecosystems, we examined several recent comprehensive scientific literature reviews and management strategies directed at restoration of greater sage-grouse habitat (Chambers et al. 2007, Wisdom and Chambers 2009, Arkle et al. 2014, Chambers et al. 2013, Chambers et al. 2014). This includes reducing conifer density in sagebrush areas, prevention and restoration of areas with non-native, invasive annual grasses, and restoration of perennial grasses.
>
> For some vegetation types there are multiple applicable research papers, and for readability only key ones were cited here. Additional scientific research on the effects of different restoration management activities specific to different vegetation types are summarized in the Vegetation Ecology supplemental report.
>
> The analysis is displayed in two ways. First, there is a narrative for each indicator by major vegetation type that explains the potential consequences of implementing the different type, amount, and location of restoration activities. Second, there is an overall rating of whether the indicator has a low, moderate, or high similarity to desired conditions. This rating is based upon the degree of departure (and especially the proportion of the landscape with departure of current or expected future conditions) from the desired conditions and natural range of variation. The criteria and thresholds for the ratings were identified for each major vegetation type and indicator and are displayed in the Vegetation Ecology supplemental report. The tables for westside montane mixed conifer (Table 32) and eastside sagebrush and pinyon-juniper (Table 33) are included below because these are the primary vegetation types that would be managed."

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<u>Comments</u>
During the 3 August 2016 Forest Service Plan Revision meeting in Bakersfield, CA at the Double Tree Inn, Forest Service employee, Phil Bowen, who created the models for the Strategic Fire Management Zones, confirmed that "the die-off changed conditions since the Plan process began."

Over the last few years, as a result of the drought in California, many thousands of trees in the Sierra Nevada in fisher habitat areas. The Forest Service has surveyed and NASA has confirmed that more than 66 million trees in the Southern Sierra Nevada have died. NASA also predicts that this massive die-off will continue for at least two more years.

Forest conditions in Inyo, Sierra, and Sequoia National Forests have dramatically changed, bringing the business as usual timber extraction practices of the past into question for the future. The Forest Service models used forest condition from 2012, which indicates that the DEIS has not analyzed the impact of recent drought-related, four-year tree mortality on the Pacific fisher or the cumulative effects of that tree mortality and the range of enabled treatments proposed by the management plan and DEIS on the remaining trees in the forest, the Pacific fisher, the California Spotted owl, or Northern Goshawk.

This massive die-off of trees has negatively affected habitat for Pacific fishers and other old-forest dependent species. Because the cumulative effects from the various treatments enabled by the Draft forest plan and DEIS combined with the massive tree die-off will have significant adverse effects on the forest ecosystem, the Pacific fisher, California Spotted owl, Northern Goshawk, and other old-forest species. The Forest Service must consider restarting the entire DEIS process, so these combined impacts are considered in all of the alternatives of the DEIS before proceeding with implementation of a final EIS and management plan revisions for Sequoia, Inyo, and Sierra National Forest.

Also, the Forest Service must seriously consider that trees still living after California's worst drought in 1,200 years may produce offspring that are genetically adapted to surviving drought. Destroying the chance to have offspring that can regenerate forests despite climate change would be a tragedy that the Forest Service must avoid. We can't log our way out of this problem, and we certainly can't do it by logging live trees.

S. Consider All Existing Water Resources and Water Uses, including Wells, Diversions, Withdrawals, and Development Projects, that could be Depriving the Forest Ecosystem and Causing Tree Mortality

Is the massive die-off of trees in the Sierra Nevada being caused only by the drought and climate change, or is the die-off being exacerbated by the limited water supply in the Sierra because of the granitic structure of the mountains where water is found in isolated fracture pockets where tree roots must penetrate to reach the needed water supply when surface water flows are intermittent? Fractured rock aquifers drain when connected water resources below the impoundment are removed. Water wells in the Sierra Nevada are located and placed using fracture drilling techniques. Forest managers must consider the anthropogenic uses of water in the forests, including, but not limited to, water wells, water diversions, water withdrawals, and water developments that serve people who have established in forested areas of California. How are these anthropogenic uses of water impacting the available water for growing forests and maintaining the forest species? These human uses of forest water must be identified, their flows determined and totaled, and the cumulative extracted water volume considered along with drought and climate change. Should these extractions be permitted to continue at the expense of the needs of the forest which is California's major location for sequestering carbon?

Global climate change will likely lead to water resource shortfalls. According to the CEC document http://www.energy.ca.gov/2009publications/CEC-500-2009-014/CEC-500-2009-014-

F.PDF, "there is a disquieting preponderance of simulations that become significantly drier during the twenty-first century." Also, "The incidence of years with very low spring snowpack and associated low soil moisture in late spring and early summer occur much more frequently."

According to the CEC document *Using Future Climate Projections to Support Water Resources Decision Making in California* at http://www.energy.ca.gov/2009publications/CEC-500-2009-052/CEC-500-2009-052-F.PDF, "The 30-year trend indicates that the fraction of annual runoff occurring from April through July decreases from about 35% for the historical base scenario (historical conditions with no increase in air temperature) to about 15% for the +4°C scenario."

After thinning stands of mature trees, to increase heterogeneity and resilience, and after hand thinning stands of smaller trees, the temperature of forest fuels and forest air will increase, the moisture level of forest fuels decreases, and the relative humidity in the understory decreases, it stands to reason that surface and groundwater resources could also be impacted by the removal of these materials. It therefore stands to reason that the Forest Service should provide a comprehensive inventory of surface and groundwater resources of water in the watersheds of any project area where trees are proposed for removal as a way to establish a baseline for assessing the impacts of the project on forest resources. These inventories and an analysis of water resources must be considered in the environmental analysis, especially now that we are in a prolonged drought period in California. This water balance must be specified in order to be able to determine if sufficient water is available to cope with the increased forest temperatures that would result following tree removal.

The EIS must therefore consider how unlogged forests retain water before allowing forest management in California to approve tree removal. The EIS must consider whether commercial logging is an appropriate treatment since commercial logging would cause the forest to become hot and dry and allow surface winds to increase, all of which would exacerbate wildfire.

If a proposed project is to restore and maintain the forest ecosystem so it is resilient to the effects of wildfire, drought, disease, and other disturbances, the EIS must include an assessment of and documentation to show all water wells, water diversions, water withdrawals, and water developments that utilize water in the watersheds involved in the Plan area in order to establish a baseline of available water for making a decision as to what can be done to protect the forest ecosystem from drought, and whether commercial thinning would be effective, since there is a drought and there is a die-off of millions of trees in the Plan area, and since thinning would cause the forest understory to become hotter and dryer, and would allow moisture-robbing surface winds to increase.

Managing forest ecosystems and clearing fire prone vegetation runs counter to common sense by exposing soils and understory vegetation to desiccating conditions. Removing forest biomass to supposedly reduce fire danger runs counter to making the forest resilient to climate change because opening the forest canopy to winds or the drying heat of the sun results in drying out the layers of moisture-holding duff, small trees, and down woody material, especially in the Sequoia National Forest, which receives relatively little moisture due to its geographic location in the Southern Sierra, essentially surrounded on three sides by desert, and the prevailing weather patterns.

Water vapor in the air comes almost entirely from three sources: Evaporation from any moist surface or body of water, evaporation from soil, and transpiration from plants. Plants have large surfaces for transpiration; occasionally they have as much as 40 square yards for each square yard of ground area. Transpiration from an area of dense vegetation can contribute up to eight times as much moisture to the atmosphere as can an equal area of bare ground.

Relative humidity is most important as a fire-weather factor in the layer near the ground, where it influences both fuels and fire behavior. The relative humidity that affects fuels on the forest floor is often quite different from that in the instrument shelter, particularly in unshaded areas where soil and surface fuels exposed to the sun are heated intensely, and warm the air surrounding them. This very warm air may have a dew point nearly the same or slightly higher than the air in the instrument shelter, but because it is much warmer, it has a much lower relative humidity. Vegetation moderates surface temperatures and contributes to air moisture through transpiration and evaporation – both factors that affect local relative humidity. A continuous forest canopy has the added effect of decreasing surface wind speeds and the mixing that takes place with air movement. The differences in humidity between forest stands and open areas generally vary with the density of the crown canopy. Under a closed canopy, humidity is normally higher than outside (the closed canopy) during the day, and lower at night. The higher humilities are even more pronounced when there is a green understory. While temperature and moisture distribution in the layer of air near the ground are important in fire weather because of their influence on fuel moisture, the distribution of temperature and moisture aloft can critically influence the behavior of wildland fires.

Cumulative impacts that remove trees up to 30 inch diameter and larger that results in opening the canopy and causes the sun to shine where the trees once stood heats and dries forest materials and soil and causes flammable brush to grow where the less flammable tree trunks once stood. Sequoia ForestKeeper's teams of environmental graduate summer interns have repeatedly observed and documented in Sequoia the inverse relationship between canopy cover and ground cover. When forest canopy increases, groundcover decreases: when forest canopy decreases, groundcover increases. (See Fire Weather and other research that indicates the same.)

Much of this is known and is discussed in the US Forest Service's Publication FIRE WEATHER . . . A Guide For Application Of Meteorological Information To Forest Fire Control Operations, by Mark J. Schroeder, Weather Bureau, Environmental Sciences Administration, U.S. Commerce Department and Charles C. Buck, Forest Service, U.S. Department of Agriculture U.S. Government Printing Office: 0-244:923, first published in May 1970. Reviewed and approved for reprinting August 1977, Stock No. 001-000-0193-0 / Catalog No. A 1.76:360 (available at http://gacc.nifc.gov/nwcc/content/products/intelligence/Fire_Weather_Agriculture_Handbook_360.pdf).

Congress recognized that managing natural resources in National Forests was "highly complex" and enacted the Forest and Rangeland Renewable Resources Planning Act. The Act requires that the Forest Service develop an inventory of "present and potential renewable resources, and an evaluation of opportunities for improving their yield of tangible and intangible goods and services." In addition the Act requires that all forest management activities to be preceded by a "comprehensive assessment" of environmental and economic impacts in order to create a management plan that is consistent with MUSYA and NEPA. Congress emphasized the "fundamental need" for the management plans to "protect and, where appropriate, improve the quality of soil, air, and water resources." Developing an inventory of surface and groundwater resources and an assessment of the environmental impacts on surface and groundwater including potential impacts of groundwater use on surface water resources, is an integral step in ensuring that a management plan protects the water quality in Sequoia National Forest.

T. Ecological Restoration Principles – Restoration with Fire and Without Tree Removal – Should be Considered and Analyzed as An Alternative that Enables Nature to Recover from the effects of Continued Drought and Climate Change

The Forest Service should not place too much reliance on mechanical methods for ecological restoration and maintenance. Instead, fire should be used as the primary tool for restoration, as suggested in both the California Spotted Owl and Fisher Conservation Strategies. Moreover, the EIS should not overstate the need for ecological restoration to create resiliency from drought, and native insects and diseases, which are natural processes that should be preserved rather than eliminated.

Thinning of medium and large diameter trees (12-30" dbh) should not be permitted for the purpose of ecological restoration to prevent natural stresses from competition. Tree competition, caused primarily by increases in stand density, is a natural process which induces other natural process that deal with this density, such as native insect- and disease-caused tree mortality. These processes, in turn, produce structural forest elements that are vital for wildlife—snags. While the removal of trees to reduce this natural competition may prevent the death of a small number of large trees, it would also prevent the creation of some of the most important elements in the forest ecosystem—snags—for the perpetuation of certain wildlife species, including California spotted owls, various woodpeckers, and countless other species. It is well-documented that these species need abundant large snags at a certain densities in order to thrive. Even the artificial method of increasing the number of snags by girdling trees will not create as diverse a variety of snags for these species as will natural snag recruitment. And while the cutting or removal of trees to prevent competition-induced stresses may be good for the remaining trees, it prevents natural snag recruitment that helps perpetuate a number of key wildlife species.

For a Plan that promote resilience as a goal, it is important to understand that resilience is not a process. Instead, it is a characteristic, which results from the continued perpetuation of natural processes, including competition. The perpetuation of the forest ecosystem is not the same as the perpetuation of the lives of all of the larger trees in that ecosystem. This means that we need some of these large trees to die at a rate that can sustain certain wildlife species. This also means that we need an assortment of tree species in differing growth stages to replace the larger trees when they die. Competition mortality will result in large snag recruitment beyond what silviculturalists may want in a forest that is 'managed' to produce maximum growth.

Even if the Plan allows tree cutting a few of the larger trees for ecological restoration or to reduce safety hazards along roads, these tree boles should be retained in the forest as large down woody material. Ecological restoration provides an opportunity to restore forest areas with large down woody material for soil nutrients, wildlife (especially for Pacific fishers and herpetofauna), and to maintain ecological functions.

Leaving a large number of downed logs will not increase fire risk. The Forest Service's own science clearly concludes that large logs (defined by the 2001 Sierra Nevada Forest Plan Amendment as being over 12 inches in diameter) are essentially irrelevant to fire behavior. And tree boles over 12 inches in diameter that the agency says it needs to fell for ecological restoration would not create any significant fire hazard if left standing. Operability for prescribed fire management should not be an issue when leaving these large tree boles as down logs. In fact, the 2004 Framework standards takes large down logs into consideration, stating that managers should design prescribed burn prescriptions and techniques to minimize the loss of large down material.

The EIS should use the reintroduction of fire as the primary tool for ecological restoration and should prohibit the thinning of larger trees to reduce fire risk, just as the National Park Service has done with the use of natural process of prescribed and fire use fires for the past 40 years managing the Sequoia and Kings Canyon National Parks. The EIS should limit manual and mechanical methods that prepare the forest for the reintroduction of fire to the cutting of only some trees 8-10 inches dbh and smaller. As the adjacent Sequoia and Kings Canyon National Parks ("SEKI") has found, "cutting trees up to and including 8" in diameter has proven effective in fuels reduction in SEKI." SEKI demonstrated the effectiveness of their prescribed fire treatments that showed dramatically different and beneficial burn result from the Rough Fire compared to the devastating result of the fire in Sequoia National Forest where thinning is the primary management treatment. After fire is reintroduced into stands where only some trees up to 8" in diameter were removed, natural processes can perpetuate, making future thinning applications for ecological maintenance unnecessary.

U. The DEIS must Consider the Impacts of continuing to Allow in Forests Heat sources like Campfires, Cigarette smoking, and Vehicles without Spark Arrestors or shielded Mufflers off paved roads, since Human-caused Fires are Now the Norm and Lightning-caused Natural Wildfires are infrequent

Thousands of acres of forests and chaparral habitats were burned, hundreds of people were displaced, several people were killed, thousands of homes were incinerated with millions of dollars spent in suppression costs, and countless environmental losses occurred as a result of human-caused fires in 2015 and 2016. Heat sources, whether from flames from a campfire, or embers from a tossed cigarette, or sparks from an engine of a nonfunctional spark arrestor, or sparks from a bullet that bounces off a rock, or sparks from the rotating blade of a road clearance weed cutter that strikes a rock – they are all examples of human-caused fires that must be addressed.

Lightning-caused natural fires in forested habitats generally ignite near the top of a tree and slowly burn down the tree because heat rises, so the fire is not easily spread down to the ground where most lightning fires could eventually be extinguished due to the cool environment below the trees where small fuels are less abundant. Human-caused fires generally start at ground level and burn quickly up because heat rises and rising heat creates wind conditions that carry and accelerate the fire's spread.

Due to the changing climate, the drought, and the frequency of expensive human-caused fires, the Forest Service should place Public Service Announcements (PSA's) in multiple languages and in every media outlet and through every organization that operates in California to get the word out about ways to reduce GHG's, climate change, and forest fires. Preventing human-caused forest fires would benefit every American. At a minimum, the Forest Service should consider prohibiting with these Plans all camp fires and smoking in camping areas and impose severe financial penalty for smoking and fires in forested areas.

The Plan must consider an analyze the Cumulative Impacts to the forest ecosystem and its forest species, to air quality, and to climate change from human-caused fires in the forest,

V. <u>The Cumulative Impacts of Grazing Allotments Must be Considered given the Significant and Historic Impacts to Riparian and Meadow Resources</u>

The Forest Plan DEIS contains data from 2012 and earlier on the impacts for grazing, but there is a conspicuous-absence of data after the – pre-drought 2012 data. Examples of the references to grazing data found in the DEIS are pasted below. While the DEIS acknowledged impacts to meadows from past grazing and acknowledged the need to restore perhaps 90 percent of the meadows, grazing appears to be allowed to continue with abandon by the DEIS.

> "Changes in climate, and fire and grazing regimes in the late 19th and 20th centuries have been particularly important factors influencing the composition, structure and distribution of the different vegetation types within the planning area (Slaton and Stone 2013a, 2013b). These changes include an expansion of trees into open shrublands, and changes in vegetation successional patterns associated with modern livestock grazing and fire exclusion, although these patterns depend on several additional factors (such as vegetation type or climate). Invasive plants like cheatgrass and red brome have also significantly expanded their range in many arid shrublands and woodlands in recent years on the eastside of the planning area (Slaton and Stone 2013a, 2013b). In some cases this has led to type conversion from native shrub or woodland vegetation to non-native grasslands. This rate of invasion is expected to continue or increase in the future, although projected changes in climate will alter the geographic distribution of these invasions in the later 21st century (Bradley 2009, Finch 2012)."

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> "Mechanical treatments are most effective in promoting native herbaceous plant and sagebrush cover and inhibiting cheatgrass cover with the application of post-treatment management approaches, such as delayed grazing coupled with post-treatment monitoring (Chambers et al. 2014, Miller et al. 2014a). Cheatgrass abundance may actually increase following mechanical treatments in the absence of these post-treatment measures (Chambers et al. 2007, Miller et al. 2014b)."

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> "However, proper pre-fire fuel mitigation such as mechanical treatments and post-fire management (like grazing management) may help reduce some of the impacts of prescribed fire to biological soil crusts (Miller et al. 2014a)."

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> "Alt A
> Blue oak woodlands will continue to be managed primarily for grazing."

> "Alt B
> Current livestock grazing management through allotment management plans would continue to improve conditions in blue oak woodlands (RANG-FW-DC-02). There is also specific management direction to increase and emphasize ecological restoration for vegetation types or in areas of tribal interest, including specific restoration objectives on the Sequoia National Forest (TERR-FW-OBJ-04), and goals (TRIB-FW-GOAL-01) on both the Sequoia and Sierra National Forests."

> "Consequences Coming to All Alternatives
> However, proper pre-fire fuel mitigation such as mechanical treatments and post-fire management (like grazing management) may help reduce some of the impacts of prescribed fire to biological soil crusts (Miller et al. 2014a)."

> "Affected Environment
> Any activity or management action that removes or reduces flowering can have impacts including intensive grazing, recreation use, mowing, or herbicides."

> "Cumulative Effects
> Conservation Service programs to restore watershed health and function or improve grazing lands. These actions would increase the positive benefits of climate adaptation actions on the national forests. Conversely, a lack of restoration actions on these adjacent lands could increase the vulnerability of terrestrial, riparian and aquatic ecosystems on national forest lands because the likelihood of large, high-intensity fires and limited resilience of widespread vegetation types would persist. Coordinated efforts across all ownerships would provide the greatest cumulative positive impact on climate adaptation."

> "Where meadow conditions are degraded, restoration may be necessary to restore hydrologic functions for dependent vegetation such as willows to recover in highly degraded meadows (Frissell et al. 2012).

> In 1999, the Forest Service Pacific Southwest Region Range Program initiated a regionwide, long-term meadow condition and trend monitoring program. The primary purpose of the program was to (1) document baseline meadow conditions as these new riparian standards and guidelines were coming into use; and (2) examine long-term trends in meadow condition following implementation of these riparian standard and guidelines.

The program currently includes 618 permanent meadow vegetation monitoring sites established in key meadows across the region including the three national forests covered in this analysis. Vegetation composition is measured at the time a plot is established and then every 5 years following. There are 496 plots within the 10 national forests covered under the Sierra Nevada Forest Amendment. As of summer 2012, a total of 246 plots have been reevaluated over the past 10 years, across 127 grazing allotments.

In 2012, the Forest Service Pacific Southwest Region and the University of California, Davis Rangeland Watershed Laboratory established a partnership to conduct the first comprehensive analysis of this unique dataset examining (1) meadow conditions and trends; and (2) relationships between meadow conditions and trends, livestock management, weather, and environmental drivers. In this analysis (Roche 2013) the number of plots available with at least 8 years between their earliest measurement (1997 to 2002) and the latest measurement (2007 to 2012) was 42, 23, and 25 on the Inyo, Sierra, and Sequoia National Forests, respectively. The meadow plant community condition metrics analyzed included relative frequency data, Ratliff Vegetation Score and Condition Classification, and species richness and diversity. The comprehensive analysis found a significant increase in mean species richness and species diversity on all three national forests. There was no significant change in Ratliff condition class between the readings.

On the Sierra National Forest, 4 percent of plots were in excellent to good vegetation condition with an upward trend, 43 percent were in excellent to good vegetation condition with stable trend, no plots were in good vegetation condition with downward or fair upward trend, 30 percent were in fair vegetation condition with stable trend, 22 percent were in fair vegetation condition with a downward trend, and no plots were in poor vegetation condition.

On the Sequoia National Forest 16 percent of plots were in excellent to good vegetation condition with an upward trend, 64 percent were in excellent to good vegetation condition with stable trend, 8 percent were in a good vegetation condition with downward trend, no plots were in a fair vegetation condition with upward trend, 4 percent were in fair vegetation condition with a stable trend, 8 percent were in a fair vegetation condition with a downward trend, and no plots were in a poor vegetation condition (USDA FS 2013c).

On the Inyo, 5 percent of plots showed excellent to good vegetation condition with an upward trend, 74 percent were in excellent to good vegetation condition with a stable trend, 14 percent were in good vegetation condition with a downward trend, no plots were in a fair vegetation condition with an upward trend, 2 percent were in fair vegetation condition with a stable trend, 5 percent were in fair vegetation condition with a downward trend, and no plots were in poor vegetation condition (USDA FS 2013a). Because no systematic assessment of meadows exist on the three national forests, the forest assessments provide information about a subset of meadows overall. Other meadow and stream assessments covering the Kern Plateau, the Breckinridge Mountains, and the Sierra National Forest indicated that a majority of meadows exhibited features such as ingrowth of trees, unstable banks, off-highway vehicle trails, headcuts, and gullies (Fryjoff-Hung and Viers, 2013)."

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"Consequences specific to Alternative D.
Addressing the proper scale of restoration of aquatic habitat while increasing the pace and scale of restoration across the landscape is important. Effective protection of aquatic habitat from sedimentation, erosion, and nutrient mobilization; impediments to connectivity, and undesirable vegetation conditions is essential to ensure the resilience of aquatic habitats in the face of climate change, drought, and fire. Existing headcuts in meadows and streams; impaired hydrologic connectivity and ecological connectivity; lack of mature willows, alders, and cottonwoods; sediment impacts from roads; legacy grazing impacts; and impacts from recreation use are all identified as areas in need of restoration.

Under alternative D increased restoration actions within focus landscapes would result in proportional increases in aquatic habitat restoration. Alternative D would reduce the risk of uncharacteristically large wildfires, thus reducing the risk of undesirable short-term impacts to aquatic ecosystems while still allowing for the historically beneficial role of fire to be expressed. The goal of encouraging restoration of habitats using partnerships could address many legacy restoration needs in areas prioritized for species and is similar to alternatives B and C."

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"Water Quality
Some management activities and forest infrastructure such as mechanical vegetation management treatments, roads, campgrounds, and grazing management have the potential to cause both short- and long-term adverse impacts to water quality that are evaluated and mitigated at the site-specific project level when projects are proposed and designed." (Chapter 3. Affected Environment and Environmental Consequences Draft Environmental Impact Statement Revision of the Inyo, Sequoia, and Sierra National Forests Land Management Plans – Vol. 1 page 285)

"Affected Environment
Many of the terrestrial ecosystems that support wildlife species in this portion of the Sierra Nevada are outside the range of natural variation due to a variety of past and current land use practices as well as changing climate conditions. Past activities like dam construction and water diversion, livestock grazing, various kinds of timber harvest, and fire suppression have contributed to these vegetation types changing away from their natural states. Changing climate conditions like drought and warming temperatures are also fostering increasingly stressed vegetation conditions that are vulnerable to high-severity effects of large and frequent wildfires, and pest and insect outbreaks, among other disturbances." (Chapter 3. Affected Environment and Environmental Consequences

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“Range Management
All alternatives maintain the same level of livestock grazing as the current plans (alternative A) and each national forest proposes to manage grazing similar to the current practices (although this approach differs by national forest) (Sequoia and Sierra National Forests: RANG-FW-STD-01 to 03; SPEC-GGO-GDL-01; Inyo National Forest: MA-RWLD-STD-02; DA-RNA-SUIT-08; SPEC-SHP-STD-01; RANG-FW-STD-01 to 02). This includes grazing management in meadows (MA-RCA-STD-11 to 17; MA-RCA-GDL-06 to 08). Grazing can adversely affect habitat for terrestrial wildlife species, particularly those that nest or forage in meadows, riparian areas, and grasslands. The standards and guidelines listed above from the draft forest plans are anticipated to improve grazing management, and result in positive meadow and riparian conservation area trends over time. These actions improve vegetative conditions, stability and resilience over time.

A recent study found a weak negative correlation between grazed meadows on Stanislaus National Forest allotments and vole abundance (Kalinowski et al. 2014). Although these findings indicate the need for further evaluation, there are a number of potentially confounding variables that influence these results, including the fact that some grazed meadows were surveyed before grazing for the season began, making it difficult to compare before and after or even grazed and ungrazed meadows. Grazing can cause structural changes to willow flycatcher habitat that could “expose nests, reduce substrate for insects, and diminish foliage cover that protects nests” (Mathewson et al. 2007). While poorly managed grazing can change the hydrologic and vegetative characteristics of meadows and contribute to poor quality habitat for nest selection and increased visibility (vulnerability) of nests to predation (Brookshire et al. 2002, Auble et al. 1994, Stanley and Knopf 2002, Scott et al. 2003), grazing on the national forests is managed to minimize and avoid these effects.

Some grazing can be beneficial for butterflies, but heavy grazing can degrade habitat. Livestock grazing, especially in and near Sierran meadows, may affect breeding success of the Sierra marten by reducing understory vegetation (Zielinski 2014). Livestock grazing levels have been substantially reduced over the last several decades and some grazing allotments are now currently vacant and ungrazed. Specific decisions on the numbers, types, seasons, and level and intensity of livestock grazing are made during allotment management planning. Allotment management plans also include monitoring of grazing activities so that the need for adjustments to livestock grazing practices and amounts can be identified and addressed in annual operations or in the allotment management plans. This would be the same under all alternatives. If new grazing allotments or activities are proposed in habitat that supports a threatened, endangered, proposed, or candidate species, the U.S. Fish and Wildlife service would be consulted prior to making allotment management plan decisions.”

Draft Environmental Impact Statement Revision of the Inyo, Sequoia, and Sierra National Forests Land Management Plans – Vol. 1 page 345-346.

Comments

Desired conditions and other plan components under this heading apply to rangeland management, which includes the authorized use and management of National Forest System lands for the purpose of livestock production and utilization of forage resources by livestock.

Range Desired Conditions introduce and spread invasive species that increase wildfire intensity and conflict with the need to combat climate change.

Livestock grazing contributes to the spread of cheatgrass. There are two primary reasons. First, preferential grazing of native perennial grasses by livestock gives cheatgrass a competitive advantage in the struggle to obtain water, nutrients and space for growth. Second, and perhaps the most important factor contributing to the spread of cheatgrass is soil disturbance, in particular, livestock trampling of biological crusts.

Biological crusts, which cover the soil surface in between native bunchgrasses, make it difficult for the seeds of cheatgrass to successfully germinate and grow. Biological crusts also contribute nitrogen to soils, and can act as a mulch reducing soil moisture losses due to evaporation — both of which enhance survival of native bunchgrasses.

Cumulative cattle-associated methane emission values for California during 2013 have been released by the California Air Resources Control Board. Approximately 1,911,000,000 pounds of cattle-associated methane were released into the atmosphere in 2013 -- 997,000,000 pounds by way of enteric emissions and 914,000,000 pounds by way of manure-related emissions. Using the IPCC AR5th 20-year interval methane GWP, the carbon dioxide equivalent (CO2e) value associated with this mass of methane is comparable to an amount of carbon dioxide that would be annually released by 19.1 coal-fired electricity generation (CFEG) plants that would then trap heat in the atmosphere for 20 years before being sequestered. Using an IPCC AR5th 100-year interval methane GWP, the CO2e value associated this mass of methane is comparable to an amount of carbon dioxide that would be annually released by 6.36 CFEG plants that would then trap heat in the atmosphere for 100 years before being sequestered.

Three recent studies [3] have documented linkage between heightened greenhouse gas emission levels, increased atmospheric heat, and the high pressure ridge that has formed and persisted in the Pacific Ocean, known colloquially as the "Ridiculously Resilient Ridge" (RRR). This RRR high pressure ridge has been responsible for re-routing Pacific storm activity well to the north of

[3] The first study demonstrating this linkage was published by Stanford University researchers on September 29, 2014 (co-authors Diffenbaugh, Swain, Rajaratnam, et alia) in a supplement to the Bulletin of American Meteorological Society. The study was summarized extensively in the Stanford Report issue of September 30, 2014. http://news.stanford.edu/news/2014/september/drought-climate-change-092914.html. The second study demonstrating this linkage was published in Environmental Research Letters, Jan 6, 2015, and coauthored by Rutgers Professor Jennifer Francis and Stephen Vavrus. The title of the study is "Evidence for a wavier jet stream in response to rapid Arctic warming." (Source: http://iopscience.iop.org/1748-9326/10/1/014005). The third study was authored by Wang, S.-Y. (Simon Wang), Larry Hipps, Robert Gillies, and Jin-Ho Yoon, and is summarized in Fire and Ice—California Drought and "Polar Vortex" in a Changing Climate, Science and Technology Infusion Climate Bulletin NOAA's National Weather Service, 39th NOAA Annual Climate Diagnostics and Prediction Workshop St. Louis, MO, 20–23 October 2014.]

California over the last few years.

Of the three studies noted above, one has also linked these three phenomena with rapid Arctic heating and decline in Arctic sea ice. The Wang study, which did not assert a link to rapid Arctic warming, noted that "there is a traceable anthropogenic warming footprint in the enormous intensity of the anomalous ridge during winter 2013–2014 and the associated drought." Finally, John P. Holdren, President Obama's senior science director, has argued powerfully that climate change should be considered one of the drought's major contributors. This statement can be accessed at:
https://www.whitehouse.gov/sites/default/files/microsites/ostp/critique_of_pielke_jr_statements_on_drought.pdf.

These findings were predicted in peer-reviewed scientific literature over ten years ago by Sewall and Sloan (2004). (For a full explanation and some thoughts on Sewall and Sloan's theory from prominent climatologists, see this 2014 article.) Moreover, anthropogenic climate change has already increased the probability that more megadroughts will occur in California. Ault et al. (2014) conclude:

> In the current generation of global climate models, the risk of a decade-scale drought occurring this century is at least 50% for most of the greater southwestern United States and may indeed be closer to 80% ... The probability of multidecadal megadrought is also high: the likelihood of a 35-yr event is between 10% and 50% depending on how much climate change is realized during the coming century. The probability of even longer events (50-yr, or "permanent," megadrought) is non-negligible (5%–10%) for the most intense warming scenario (p. 7545).

Such megadroughts, if they occur, will undoubtedly exacerbate the water shortages and species extinction that are already afflicting California. (Cook, 2015; Diffenbaugh et al. 2015).

This assessment is also consistent with the argument presented in the recently-published study by Kevin Trenberth et al. (2015), which emphasizes how the impact of human-induced warming has affected the climate system's thermodynamic state and consequently intensified major climatic events in recent years. Trenberth et al. also summarize the Diffenbaugh et al. (2015) study in a manner that highlights how anthropogenic warming has already increased the odds of increased drought risk and drought risk severity:

Another very recent example is the California drought beginning in 2012. Whereas one study found no significant trends in winter precipitation in recent decades, another [the Diffenbaugh et al. 2015 study] pointed out the critical role of the record high annual mean temperatures in combination with record low annual mean precipitation for 2013 which led to increased evapotranspiration and more intense drought. The combination of these had impacts on water shortages, vegetation and agriculture, and increased wildfire risk. The odds of this combination have increased with human-induced climate change and anthropogenic warming has increased drought risk (footnote numbers removed). [Kevin Trenberth et al. (2015)]

We also note for the record that the U.S. Geological Survey just released a study: "Temperature Impacts on the Water Year 2014 Drought in California" by Shraddhanand Shukla et al.

(http://onlinelibrary.wiley.com/wol1/doi/10.1002/2015GL063666/abstract), which finds that high heat has multiple damaging effects during drought, increasing the vulnerability of California's water resources and agricultural industry. Not only does high heat intensify evaporative stress on soil, it has a powerful effect in reducing snowpack, a key to reliable water supply for the state. In addition to decreased snowpack, higher temperatures can cause the snowpack to melt earlier, dramatically decreasing the amount of water available for agriculture in summer when it is most needed. "If average temperatures keep rising, we will be looking at more serious droughts, even if the historical variability of precipitation stays the same," Shukla said. "The importance of temperature in drought prediction is likely to become only more significant in the future."

Thus, the best available science demonstrates that continued GHG emissions in the present and near future are likely to further accelerate the warming of the planet generally and heating of the Arctic in particular. Such heating will likely increase the probability that more high pressure ridges will form in the Pacific. These high pressure ridges will then likely continue steering Pacific storm activity around (but not through) California in the future, thus aggravating the California drought. This best available science also indicates that GHG-associated global warming is likely to intensify the duration and severity of such future droughts and the adverse impacts associated with such projected future droughts.

The comparison of alternatives is "the heart" of the NEPA review process, and the NEPA implementing regulations require an agency to analyze a range of reasonable alternatives. Here the Forest Service knows full well that it does not have to issue a grazing permit. The courts have cautioned against constructing a purpose and need so narrowly as to exclude other alternatives. *Simmons v. United States Army Corps of Engineers*, 120 F.3d 664, 666 (7th Cir. 1997). The Forest Service should make its purpose and need such that it does pre-ordain the outcome of the NEPA analysis.

The EIS needs to consider a range of alternatives that are different. These must include current management (i.e. no change in season) and No Grazing alternatives to provide the environmental background, so that the baseline for comparison of action alternatives is fully described and so that the effects of cattle grazing on all of the public resources can be fully understood. We propose one other alternative that analyzes and considers the impacts of livestock-caused downcutting in meadows from continued grazing in those meadows, the impacts to forest resources and increased fire threat from the introduction of invasive grasses and removal of brush due to livestock grazing, and the impacts from livestock on air quality and greenhouse gas forcing that exacerbates climate change.

Congress recognized that managing natural resources in National Forests was "highly complex" and enacted the Forest and Rangeland Renewable Resources Planning Act. The Act requires that the Forest Service develop an inventory of "present and potential renewable resources, and an evaluation of opportunities for improving their yield of tangible and intangible goods and services." In addition the Act requires that all forest management activities to be preceded by a "comprehensive assessment" of environmental and economic impacts in order to create a management plan that is consistent with MUSYA and NEPA. Congress emphasized the "fundamental need" for the management plans to "protect and, where appropriate, improve the quality of soil, air, and water resources." Developing an inventory of air quality and soil quality for each meadow and at locations where salt licks are placed to attract livestock, would be appropriate places to monitor for air and soil quality in order to assess the conditions in the air and of the soil when compared with the conditions in other un-grazed areas. Surface and groundwater resources in the area of meadows and streams exiting meadows should also be part of an assessment of the environmental impacts on surface and groundwater including potential impacts from livestock grazing and would be an integral step in ensuring that a management plan protects the water quality in Sequoia, Inyo, and Sierra National Forests.

W. <u>The Use of defoliants, herbicides, fungicides, and poisons In the Forest Ecosystem must be justified by Scientific Research to Prove they Benefit all Forest Species – Not Just Industry Profits.</u>

These Forest Plans promote the use of poisons that kill animals, birds, vertebrates and invertebrates, and the system of fungi and roots that deliver nutrients to the trees in the forest.

These Forest Plans tell managers how to poison the environment.

> "Selective herbicides may be applied to suppress competing plants, reducing competition for soil moisture and sunlight."
>
> "02 Limit pesticide applications to cases where project level analysis indicates that pesticide applications are consistent with riparian conservation area desired conditions."
>
> "03 Within 500 feet of known occupied sites for foothill yellow-legged frog and mountain yellow-legged frog, design pesticide applications to avoid adverse effects to individuals and their habitats."
>
> "04 Within riparian conservation areas only, prohibit storage of fuels and other toxic materials except at designated administrative sites and sites covered by special use authorization." "Prohibit refueling within riparian conservation areas except if there are no other alternatives."
>
> "Work with tribes to determine priority areas for weed prevention and control, especially focused on traditional gathering areas that are threatened by weed infestations. Consult with tribes before using pesticides or herbicides that may affect traditional gathering."
>
> "Timber harvest, prescribed burning, wildfire, herbicides, biological controls and grazing may be used to manage vegetation to meet the desired conditions of the management area."
>
> "Depending on conditions, release can be performed using hand tools, herbicides or mechanically."

<u>Comments</u>
These Forest Plans only feign limited use of poisons in riparian areas, but even with sham limits these poisons are transported throughout the ground and forest. These Forest Plans promote poisons in the environment because nature is considered by the U.S. Department of Agriculture just another crop to be harvested and a profit center for the timber industry rather than the "lungs

of the earth" where oxygen is produced, carbon is sequestered, and from where clean water originates.

X. <u>The Plan Revision Should Protect Limited Special Habitats Areas - Botanical Areas - Geological Areas - Forest Service Scenic Byways and - Historical Landmarks</u>

The Plan Revision speaks to the issue of Limited Special Habitats. Sequoia National Forest has many special habitats that that should be protected as areas of foot traffic only to reduce exposure of these areas to heat sources that could initiate human-caused fire, to invasive species that could out-compete the native species, and to heavy equipment that could excessively disturb the soil.

These National Forest Plans consider high biodiversity areas for special treatment with the following statements:

> **"Limited Special Habitats**
> There are several types of special habitats: (1) those limited to small areas with uncommon rock types and/or soils types, called "edaphic habitats;" (2) remnant plant communities (**such as giant sequoia groves**); and (3) **communities of unusually high biodiversity**, such as aspen. There is draft plan direction that specifically addresses special habitats. That direction is not limited to but includes these habitats described here."
>
> "Special Habitats (TERR-SH-DC) Special habitats are generally small scale habitat or vegetation types that may support unique assemblages of plants and animals, especially at-risk species. Special habitats typically include uncommon rock types, harsh soils or rock outcrops. Examples include dry sandy and gravelly soils, limestone or serpentine soils, alkali or acidic soils, metamorphic, volcanic or granitic rocky soils or rock outcrops, caves, and alpine talus or fell fields. Many at-risk plant and animal species are found in rocky or gravelly habitats; the plan area has an abundance of exposed granitic rock, but only some of which is habitat for at-risk species. Aquatic and riparian special habitat examples include fens, seeps and springs. Given the localized nature of these special habitats, they are challenging to address comprehensively at the forest scale since they may be uniquely affected by different activities or trends in ecological conditions. For example, restoring the for the Sequoia National Forest composition and structure of a red fir forest where outcrops are present would not automatically restore desired ecological conditions on the outcrops. 01 The integrity of special habitats is maintained or improved. Composition, diversity and structure are maintained in all areas, including those with multiple use activities. 02 Microclimate or smaller scale habitat elements provide habitat and refugia for species with a specific geographic or other restricted distribution."

Chapter 2. Vision Draft Revised Forest Plan, p. 33.

<u>Comments</u>
The following special botanical habitats must be protected by being allowed to naturally adjust to the changing conditions without intrusion by motorized and non-motorized mechanical vehicles.

Management should mirror those of the National Park Service, which manages the Sequoia groves in Sequoia and Kings Canyon National Parks by natural processes.

Botanical Areas
Sequoia National Forest lands which have high concentrations of rare and endemic plants (usually associated with atypical geology and unusual soil types) are designated as Botanical Areas (BAs).

1. The 780 acre **Baker Point BA** is a granite bedrock peak with sweeping views, many rare plants, and an historic lookout tower.

2. The 4,190 acre **Freeman Creek Grove BA** contains the Freeman Creek Giant Sequoia Grove, the easternmost grove of giant sequoias and considered to be among the most recently established. Part of the grove is underlain by a three million year old volcanic basalt flow.

3. The 500 acre **Slate Mountain BA** is unique because of its abundance of four different rare plants. It sits on the rocky northern summit of Slate Mountain and is comprised of pre-cretaceous metamorphic and meta-sedimentary rocks surrounded by granitic rocks. Nearly 95 percent of the total population of Twisselmann's buckwheat occurs on Slate Mountain.

4. The 446 acre **Bald Mountain BA** is geologically unique and is underlain by pre-cretaceous meta-sedimentary rocks (made up of layered rock deposits). This mountain not only offers one of the best views in the southern Sierra Nevada, but also an opportunity to experience the unique plant assemblages that occur here.

5. The 860 acre **Ernest C. Twisselmann BA** is located on the Kern Plateau. It is named after a local rancher and lay botanist whose herbarium is still maintained in the Kern River Ranger District office. The area is characterized by a subalpine coniferous ecosystem with a diverse mix of foxtail, limber, western white, Jeffrey, and lodgepole pine, and red and white fir. Many plants found here are in their southernmost location in the Sierra Nevada.

6. The 270 acre **Inspiration Point BA** is located in the northern Piute Mountains and offers spectacular views of the Lake Isabella Reservoir, Kern River Valley, Greenhorn Mountains, and Kern Plateau. The common rock types are metamorphic with mafic schist and gneiss and a large prominent limestone ridge. Floristics is very unusual in this BA with limber pine (a subalpine tree) growing with pinyon pine. (Sequoia National Forest assessment published in December 2013) [The Piute Fire from 2008, destroyed almost the entire BA.]

7. The 860 acre **Bodfish Piute Cypress BA** is also located in the Piute Mountains. It is underlain by soils derived from mafic igneous gabbro and hornfels. This BA supports the largest grove of the endemic Piute cypress, which is only found in 13 small groves surrounding Lake Isabella. [The 2010 Canyon Fire burned with crown fire through a significant part of the BA and the BLM RNA.]

Geological Areas

1. The 40 acre **Packsaddle Cave Geological Area** is located approximately 15 miles north of Kernville, California, and was designated for its special geologic features. The cave consists of a large room-like passage, with minor rooms at the rear. The Kern Canyon Fault, recently determined to be an active fault, runs through this geological area.

2. The 3,500 acre **Windy Gulch Geological Area** is located in the Giant Sequoia National Monument and contains a number of outstanding formations, including caves and marble roof pendants. Mesozoic granitic rocks are the dominant rock type and consist of several plutons approximately 100 million years old. The metamorphic rocks are known as the Kings Terrain. The most extensive of these are the Lower Kings River, Kaweah River, and Tule River roof pendants. The Lower Kings River roof pendant includes the Boyden Cave roof pendant, whose marble contains several caves including Boyden Cave and Church Cave.

Forest Service Scenic Byways

- **Kings Canyon Scenic Byway** was designated in 1990 as a National Forest Scenic Byway for scenic beauty and recreational value. The byway is popular year around; however the majority of the use is in the summer months. The road into the canyon from the Hume Lake turnoff is closed during the winter months. This road receives high visitor use because it is the only access to Cedar Grove in Kings Canyon National Park, and use is expected to increase in the future. The road condition is good and more interpretive signs will be installed in 2014. Graffiti and vandalism have increased I the last several years, based on staff observation in 2013.

  For more detailed information on scenic byways see the August 2, 2013 snapshot of the Sequoia National Forest Living Assessment Chapter 15, lines 823-839

Historical Landmarks

1. The **Walker Pass National Historic Landmark** includes approximately 111 acres of federal lands on the Sequoia National Forest, as well as the Bureau of Land Management Caliente and Ridgecrest Resource Areas. Walker Pass was designated a national register property and national historic landmark on July 4, 1961. Walker Pass is named after Joseph Rutherford Walker and his use of the pass for actions that contributed significantly to the exploration and settlement of California by the United States of America in the years 1834, 1843, and 1845.

2. **Moses Mountain** is a candidate for national landmark designation. The Sequoia National Forest is coordinating with the National Park Service in on site landmark evaluation studies.

Kings River Special Management Area

The 49,000 acre **Kings River Special Management Area** (KRSMA) includes five miles of wild and scenic river (segment 2), plus an additional 13 miles of the river (segment 1) that was not designated Wild and Scenic. The special management area falls in two national forests, the Sequoia National Forest and the Sierra National Forest.

The portion of the KRSMA on the Sequoia National Forest is bounded on the north by the Kings River and within the Giant Sequoia National Monument. The area is generally steep with brush and grass covered canyons, 1,000 feet to 5,000 feet in elevation, not very accessible, and provides great opportunities for solitude. Native American use and needs may preclude some interpretation. Existing off highway vehicle routes are not passable. Management challenges include risks associated with wildfire aggravated by extremely steep slopes.

The Kings River Special Management Area receives low use in most areas, but moderate use along the river and on the trail to the Boole Tree. This trend is expected to continue, based on staff observation 2013. The Kings River offers whitewater recreation opportunities. The Sierra National Forest manages the boating permits for outfitters and guides. The demand for recreation opportunities associated with the river is expected to continue and expand into the future.

These special areas in Sequoia National Forest (Limited Special Habitats Areas - Botanical Areas - Geological Areas - Forest Service Scenic Byways and - Historical Landmarks) should be protected by the Revised Management Plan as areas of foot traffic only to reduce exposure of these areas to heat sources that could initiate human-caused fire, to reduce invasive species that could out-compete the native species, and to eliminate heavy equipment that could excessively disturb the soil of these special habitat areas of high biodiversity.

CONCLUSION

These draft Forest Plans are unacceptable and would degrade rather than restore our forest. We urge you to respond to and incorporate our concerns, issue a revise DEIS for comment, and issue revised draft Forest Plans for review that better serve the public and wildlife, not timber, ranching, or motorized interests.

For Sequoia ForestKeeper and the Kern-Kaweah Chapter of the Sierra Club,

René Voss – Attorney at Law
renepvoss@gmail.com

Attachments:

Exhibit A – November 20, 2015 comment letter by Sequoia ForestKeeper and Kern Kaweah Chapter Sierra Club on recommendations on the Wilderness Evaluation Process

Exhibit B – February 1, 2016 comment letter by Sequoia ForestKeeper and Kern Kaweah Chapter Sierra Club on recommendations for Wilderness and Wild and Scenic Rivers

Exhibit C – January 28, 2016 comment letter by Tule River Conservancy regarding Consideration of the Tule River for Inclusion in the National Wild and Scenic Rivers System

Exhibit D – Forest and Wildland Fire Science Synthesis

Exhibit E – Open Letter to U.S. Senators and President Obama from Scientists Concerned about Post-fire Logging and Clearcutting on National Forests

Exhibit F – August 9, 2016 letter by Dr. Chad Hanson to Governor Jerry Brown Snag Forests Fire Severity

Exhibit G – Zielinski et al. (2013b)

Exhibit H – Garner (2013)