CENTER *for* BIOLOGICAL DIVERSITY

THE JOHN MUIR PROJECT *of* EARTH ISLAND INSTITUTE

June 30, 2014

Mike Dietle
Land Management Plan Revision
USDA Forest Service
Ecosystem Planning Staff
1323 Club Drive
Vallejo, CA 94592

Sent to: R5planrevision@fs.fed.us

Re: Comments on Need for Change Analysis

Dear Mr. Dietle:

On behalf of the John Muir Project of Earth Island Institute (JMP) and the Center for Biological Diversity (CBD), we submit the following comments on the revised "need for change" documents recently released by Region 5 of the Forest Service (May 22 and June 5 documents).

Our organizations have been participating in the plan revision process for over a year now, including the submission of extensive written comments regarding the Science Synthesis, the Bio-regional Assessment, the Natural Range of Variation reports, as well as each Forest-specific Assessment (Inyo, Sequoia, and Sierra National Forests). Our comments were detailed and contained numerous scientific citations that directly pertain to the Sierra Nevada ecosystem, especially as to wildlife conservation and fire. The Final Assessments released by the Forest Service do not reflect the important and highly relevant scientific knowledge we submitted.

In the revised, need for change documents, we appreciate, for example, the explicit reference to "complex early seral forest." However, we wish to reemphasize that important and relevant science continues to be ignored and is not being incorporated into the plan revision as of yet. As described below, we have significant concerns about both the content and scope of the revised need for change documents, and these issues must be addressed going forward.

<u>May Document</u>

The May document refers to the desire to "[d]evelop plan components to manage for resilient ecosystems to withstand fires." The word choice – "withstand" – should be changed because it represents a one-sided view of both fire and resilience. This is not just a technicality. It is actually quite important because word choice impacts how the public perceives fire. If the Forest Service is projecting a need for "withstand[ing]" fire, then the public will be unlikely to embrace what is actually called for – i.e., more fire on the landscape. We therefore believe it is absolutely necessary to use a more appropriate word than "withstand," such as: "[d]evelop plan components that incorporate the ecological importance of fires." Furthermore, resilience should not be equated with engineering. Resilience requires reestablishing the ecological disturbances that forests and wildlife evolved with. For example, wildlife evolved with fire, and therefore resilience is achieved through management that seeks to allow fire back on the landscape and to conserve post-fire wildlife habitat.

The May document further states:

> "Add desired conditions for post-fire management, addressing ecological integrity; Update desired conditions to specifically address old forest components and function, such as large tree densities, heterogeneity, understory vegetation, snags, logs, and connectivity at multiple spatial scales; Revise current management direction to encourage restoration and maintenance of old forests to a resilient state by emphasizing desired conditions and strategies."

Generally speaking, we appreciate and agree with this approach. The details, however, are important because in the past the Forest Service has used similar language to argue for *eliminating* post-fire early seral areas under the guise of more quickly returning the areas to "old forest." That approach is not scientifically sound as it does not acknowledge that the journey is just as important as the destination in regard to forest succession (e.g., Donato et al. 2012). Old forest derives from early forest in the sense that important components, like snags, downed wood, shrubs, and natural heterogeneity (from natural regeneration) derive, in large part, from complex early seral forest (e.g., Swanson et al. 2011). Put another way, it does not make sense to achieve ecological integrity by destroying complex early seral forest to more quickly achieve old forest – instead, both are damaged ecologically in such an effort.

The May document further states: "Update management direction that incorporates the new Federal Wildland Fire Management Policy and the National Cohesive Wildland Fire Management Strategy to increase the pace and scale of restoration and maintenance, and the effectiveness and efficiency of restoration and maintenance." Such a statement is entirely dependent on context. Increasing pace and scale has thus far caused significant harm to owl habitat, fisher habitat, and woodpecker habitat, and therefore, from a wildlife perspective, increasing pace and scale could be extremely detrimental. Thus, and as explained further below, it is crucial that the Forest Service establish explicit standards and guidelines that conserves wildlife habitat, especially a) dense, closed-canopy, complex green forest and b) high snag density, complex, post-fire forest.

June Document

The document argues that:

> "Vegetation density remains high and uniform, perpetuating uncharacteristic fire. Biodiversity (e.g., birds, mammals) associated with patchy vegetation (heterogeneity) has declined and continuous to decline. Understory plants dependent on or enhanced by recurrent low and moderate intensity fire continue to decline. Old forest structure continues to decline with large-scale high intensity fire."

This statement lacks scientific rigor/integrity. It may reflect the view of silviculturalists or others within the Forest Service, but does not reflect the breadth of science in regard to fire ecology and wildlife biology.

First, the blanket assertion that "[v]egetation density remains high and uniform, perpetuating uncharacteristic fire" has no basis in meaningful evidence. Where exactly is this "uncharacteristic" fire? Is the Forest Service referring to the Angora Fire, the Storrie Fire, the Moonlight Fire, the McNally Fire, the Chips Fire, the Reading Fire, the Rim Fire? If so, then it is important to acknowledge that the fires that have actually been studied – e.g., the Angora, the Storrie, the Moonlight, the McNally – have all been shown to contain *exceptionally important wildlife habitat in the places that burned severely*. There is actual evidence for this, namely, Bond et al. 2009, 2013; Buchalski et al. 2013; Burnett et al. 2010, 2012; Hanson and North 2007; Hanson 2013; Malison and Baxter 2010; Manley and Tarbill 2012; Roberts 2008, 2011; Seavey et al. 2012; Siegel et al. 2011, 2013. In other words, the places that the Forest Service is seeking to condemn and avoid are the places that wildlife needs and thrives upon because wildlife has evolved to depend on severely burned forest.

The statement that "[b]iodiversity (e.g., birds, mammals) associated with patchy vegetation (heterogeneity) has declined and continuous to decline" is accurate. However, this includes species associated with severely burned forest such as the extremely rare black-backed woodpecker. Thus, any implied message that there is too much severe fire is false, and moreover, no effort has been made to account for the devastating ecological impacts of post-fire salvage logging. For example, the comparison of biodiversity in unlogged versus logged burned forest in Burnett et a. 2010, 2012, shows how dramatic things are in regard to salvage logged landscapes. Likewise, Lee et al. 2012 shows that it is post-fire salvage logging that is likely harming spotted owls and their habitat, while unlogged severely burned forest can enhance owl habitat (Bond et al. 2009).

The statement "[u]nderstory plants dependent on or enhanced by recurrent low and moderate intensity fire continue to decline" likewise reflects an unsubstantiated bias against severe fire. The post-fire vegetation associated with severe burns – e.g., shrubs and nitrogen fixers and oaks – is extremely important and rare as well—see, e.g., Nagel and Taylor 2005, Cocking et al. 2014, Burnett et al, 2010, 2012, Siegel et al. 2011, Bond et al. 2009, Manley and Tarbill 2012.

The statement that "[o]ld forest structure continues to decline with large-scale high intensity fire" cannot be taken seriously unless what was meant to be said is that salvage logging after high intensity fire is what is causing harm to old forest structure. Moreover, no mention is made of the severe harm to old forest structure from mechanical treatments via loss of understory vegetation as well as the logging of small, medium, and even mature trees. Thus, the statement should read "[o]ld forest structure continues to be harmed by widespread mechanical treatments and intensive post-fire salvage logging after large-scale high intensity fire. Mechanical treatments reduce forest complexity by removing snags, small and medium sized trees (and sometimes even mature trees), understory vegetation, and downed wood. Salvage logging does the same by removing and/or damaging snags, future downed wood, downed wood, and natural conifer and vegetation regeneration."

Also neglected is the fact that conifer forests of the Sierra Nevada rely on fire of all severities to maintain ecosystem integrity, but currently, Sierra forests are in an extreme fire deficit of *all* severities. (See, e.g., Miller et al. 2012, Odion and Hanson 2013, Mallek et al. 2013, Hanson and Odion 2014, Odion et al. 2014.) This fire deficit means that, generally speaking, when fires do occur in the Sierras, they are <u>restorative</u> events because they return fire and its ecological value to the landscape, providing, for example, essential (and very rare) wildlife habitat (see, e.g., Bond et al. 2009, 2013; Buchalski et al. 2013; Burnett et al. 2010, 2012; Hanson and North 2007; Malison and Baxter 2010; Manley and Tarbill 2012; Roberts 2008; Seavey et al. 2012; Siegel et al. 2011, 2013). In addition, because they burn in a mosaic of severities, fires increase forest heterogeneity at multiple scales (stand, watershed, and landscape scales, for example), an outcome that the Forest Service often states it desires (and thus should welcome). And, contrary to assumptions, large, high-severity fire patches are not homogenous—rather, they contain stand level heterogeneity because they vary in size and importantly, contain within them high levels of variation in regard to post-fire vegetation and snags.

Miller et al. (2012) found that the current high-intensity fire rotation in Sierra Nevada montane conifer forests is 801 years; thus, within any 20-year period, for instance, only about 2.5% of the landscape is snag forest habitat even if none of it is subjected to post-fire salvage logging and artificial replanting. The authors recommended increasing high-severity fire amounts [i.e., decreasing rotation intervals] in the Cascades-Modoc region *and on the western slope of the Sierra Nevada* (which together comprise most of the forest in the Sierra Nevada management region), where the current high-severity fire rotation is 859 to 4650 years [Table 3]. The authors noted that "high-severity rotations may be too long in most Cascade-Modoc and westside NF locations, especially in comparison to Yosemite…" Moreover, even when the 2012 and 2013 fires are integrated into the analysis (including the Rim fire), the high-severity fire rotation interval (in the slightly longer time period than that analyzed in Miller et al. 2012) is still slightly above 800 years, using the same approach as that used in Miller et al. (2012).

Historical high-severity fire rotation intervals in mixed-conifer forests of the Sierra Nevada were generally in the range of 200 to 300 years, indicating that we now have much less habitat created by high-severity fire now than we had historically—even *before* habitat removal from post-fire logging is taken into account (e.g., Odion et al. 2013, Hanson and Odion 2014, Odion et al. 2014).

An additional study from the Forest Service, Mallek et al. (2013, Table 3), also found in its results that we now have less low, moderate, *and* high-severity fire than we did historically in the

Sierra Nevada, and estimated that we have a little over half as much high-severity fire now compared to historical levels in the following forest types: oak woodlands, dry mixed conifer, moist mixed conifer, yellow pine, and red fir (8,693 hectares annually now versus 15,569 hectares historically (see AAHS = annual area of high-severity fire, Table 3 of Mallek et al. 2013)). However, it is important to note that Mallek et al. was based upon a modeling assumption of only 6% high-severity fire effects in historical mixed-conifer and yellow pine forests, borrowing from a similar modeling assumption in Stephens et al. (2007). The empirical studies that Mallek et al. (2013, Table 2) used for all other historical fire parameters, such as Beaty and Taylor (2001) and Bekker and Taylor (2001), concluded that historical high-severity fire percentages in these forest types were generally in the range of 20-35% (and often higher). Thus, while even Mallek et al. (2013) found significant deficits of all severities of fire, it greatly *underestimates* the magnitude of the current deficit of high-severity fire.

The fire deficit has resulted in a deficit of post-fire wildlife habitat. In other words, even setting aside salvage logging for the moment, there is <u>already</u> a substantial deficit of post-fire wildlife habitat in the Sierras due to the lack of all severities of fire on the landscape. There is no basis, therefore, for the assertion that fire/burned forest is the threat to old forest when in fact there is an extreme deficit of fire/burned forest and when it does occur, the Forest Service logs substantial portions of it.

Also unsubstantiated (in this document or any previous document such as the Science Synthesis or Assessments) is the statement that "emphasiz[ing] closed canopied conditions [] contribute[s] to reduced fire resilience and [is] inconsistent with new science on forest heterogeneity." This "new" science is not provided nor cited, and the best available wildlife science shows that closed canopy conditions provide essential habitat to, e.g., spotted owls, fishers, and martens, and, when such closed canopy areas burn severely, provides habitat to many avian species such as the black-backed and white-headed woodpeckers. Again, it may be that silviculturalists desire a dearth of severe fire on the landscape, but that is irreconcilable with the best available science showing the essential nature of closed canopy, both in its pre-fire and post-fire state, to Sierra wildlife (we have already provided the numerous citations in our previous comments such as the literature regarding spotted owls, regarding fishers, and regarding woodpeckers and other avian species—e.g., Bond et al. 2009, 2013; Buchalski et al. 2013; Burnett et al. 2010, 2012; Hanson and North 2007; Hanson 2013; Malison and Baxter 2010; Manley and Tarbill 2012; Roberts 2008, 2011; Seavey et al. 2012; Siegel et al. 2011, 2013).

The following attacks on severe fire are also troubling given that they are unsubstantiated and do not reflect reality:

> "There is a lack of widespread within-patch and landscape heterogeneity to provide landscape connectivity of these habitat types."
>
> "Large-scale fires and other factors are resulting in fragmentation of habitat for wide-ranging species."

The June document (any previous document such as the Science Synthesis or Assessments) fails to substantiate its attack on large patches of severely burned forest and does not mention that salvage logging is widespread in severely burned areas and therefore associated with any "lack of widespread within-patch and landscape heterogeneity" cannot be attributed to fire, but must address that salvage logging is the real issue. Current salvage logging and reforestation practices contribute to the degradation and loss of complexity and heterogeneity. Likewise, the other statement, at best, should instead read: "Large-scale salvage logging and other factors are resulting in fragmentation of habitat for wide-ranging species."

The June document goes on to state that the "current plan direction was developed specifically to try to reduce the rate of loss of old forests and California spotted owl habitat from wildfire while protecting key habitat areas and key habitat elements. However, for a variety of reasons, the pace and scale of fuels reducing activities has not been sufficient to reduce the wildfire threats to habitat." Again, this is unsubstantiated and erroneous. There is an entire body of data that shows that mechanical treatments that reduce forest canopy cover are a primary driver of the California spotted owl declines that have been observed on all Forest Service-managed lands in the Sierra Nevada over the past 20+ years. Therefore, increasing the pace and scale of mechanical fuels treatments would also increase the pace and scale of the spotted owl decline. Likewise, current data indicates that California spotted owls use burned areas of all severities for foraging and/or nesting, but do not use areas that burned and were subsequently salvage logged. The adverse effects of reducing canopy cover and forest complexity, and the adverse effects of salvage logging, must be acknowledged and properly addressed. Based on the declines in spotted owl populations on Forest Service lands and the correlation of the decline to fuels treatments and salvage logging (despite the protections afforded to the species through the existing forest plans in the form of Protected Activity Centers and Home Range Core Areas), it is clear that the Forest Service should take this opportunity to change the current plan components to *better* protect spotted owls from the adverse effects of fuels treatments and salvage logging. In the central Sierra Nevada, Seamans and Gutierrez (2007), for example, found that altering mature forest within California spotted owl territories negatively affected colonization and increased the likelihood of breeding dispersal within 0.7 mile of a territory center. And Lee et al. (2012) reported that mixed-severity fire, averaging 32% high-severity fire effects, did not reduce occupancy of California spotted owls in the Sierra Nevada and, in fact, occupancy in mixed-severity fire areas was slightly higher than in unburned mature forest, and even most territories with >50% high-severity fire remained occupied (at levels of occupancy comparable to unburned forests). This, however, was not the case in salvage logged sites, as every site that was salvage logged lost occupancy, even though they were occupied after the fire but before the salvage logging (Lee et al. 2012). Specifically, salvage logging occurred on eight of the 41 burned sites; seven of the eight sites were occupied immediately after the fire but none were occupied after salvage logging. Further, California spotted owls have been found to preferentially select unlogged high-severity fire areas in mature conifer forest for foraging habitat (Bond et al. 2009).

The June document also argues that the "current plan direction provides general direction for providing for post- fire complex early-seral habitat." This is not accurate. Rather, the current plan direction has promoted salvage logging, with no limitations (other than LOPs and minimal retention [e.g. 4-6 snags per acre]) in complex early-seral habitat, to the detriment of owls, woodpeckers and myriad other species found, post-fire, over time, in severely burned areas. For example, Siegel et al. (2011) explains that not only black-backed woodpeckers, but many other species, are utilizing complex early seral forest left unlogged: "Many more species occur at high burn severity sites starting several years post-fire, however, and these include the majority of ground and shrub nesters as well as many cavity nesters. Secondary cavity nesters, such as swallows, bluebirds, and wrens, are particularly associated with severe burns, but only after nest cavities have been created, presumably by the pioneering cavity-excavating species such as the Black-backed Woodpecker. Consequently, fires that create preferred conditions for Black-backed Woodpeckers in the early post-fire years will likely result in increased nesting sites for secondary cavity nesters in successive years." Similarly, Burnett et al. (2012_ found that "while some snag associated species (e.g. black-backed woodpecker) decline five or six years after a fire [and move on to find more recent fire areas], [species] associated with understory plant communities take [the woodpeckers'] place resulting in similar avian diversity three and eleven years after fire (e.g. Moonlight and Storrie)." Burnett et al. (2012) also noted that "there is a five year lag before dense shrub habitats form that maximize densities of species such as Fox Sparrow, Dusky Flycatcher, and MacGillivray's Warbler. These species have shown substantial increases in abundance in the Moonlight fire each year since 2009 but shrub nesting species are still more abundant in the eleven year post-burn Storrie fire. This suggests early successional shrub habitats in burned areas provide high quality habitat for shrub dependent species well beyond a decade after fire." And Manley and Tarbill (2012) found, in the post-fire area of the Angora fire, that woodpeckers play a keystone role that can only be accomplished when post-fire habitat is maintained, not logged:

> Although woodpecker species differed in their influence on recovery of birds and small mammals, all three species observed in our study played an important role in supporting the cavity-dependent community through habitat creation for nesting, resting, denning, and roosting. The Black-backed Woodpecker was a significant contributor to the establishment of bird and small mammal species and communities in areas with high burn intensities, and it appeared to have a more narrow range of suitable habitat conditions for nest site selection compared to the Hairy Woodpecker. Thus, the habitat requirements of the Black-backed Woodpecker serve as a useful threshold for managing burned sites for wildlife recovery.

It is therefore imperative that Plans, as required, establish plan components, including standards or guidelines, to conserve the ecological integrity of post-fire, complex early seral habitat, especially the key characteristics, such as high snag density, extensive shrub cover, downed wood, and natural conifer regeneration. The June document only appears to refer to desired conditions, which is inadequate legally.

Moreover, the last year of salvage logging proposals from the Forest Service – for the American, Aspen, and Rim Fires – demonstrates that current plan direction is contrary to complex early seral forest conservation and that therefore forest plans absolutely need meaningful additional plan components, including objectives, standards and guidelines, that address salvage logging and reforestation practices. The current atmosphere, in which the ecological benefit of burned trees is lost to a significant degree, and the development of complex early seral forest prevented via intensive post-fire planting and herbicide use needs to be addressed in the forest plan. These actions are in direct conflict with the development of this important ecological condition. Further, as already noted, the belief that "acceleration" of tree growth is necessary to develop large trees in other seral stages needs to be addressed and avoided where ecological integrity is the goal.

The June document goes on to express internal "concern with the impacts of large fires." However, one would hope that there is also internal concern about the fire deficit, the rarity of complex early seral forest, and the ecological importance of complex early seral forest for many wildlife species.

Finally, the statement that "herbicide use is currently well regulated, and a need to change current plan direction was not identified," misses the point that herbicide use is a problem because of its impact to complex early seral forest via shrub destruction. That needs to be addressed in the Plan revisions.

We reiterate comments already submitted below:

A. The Forest Assessments and the "Need for Change"

Forest planning includes developing plans that promote "ecosystems and watersheds with ecological integrity and diverse plant and animal communities." 36 CFR 219.1. That is why our organizations, over the past year, took the time and effort to extensively comment on the available literature as to wildlife conservation in the Sierra Nevada's forests – biological diversity/ecological integrity is one of most important aspects of the forest revision process and we wanted to ensure that the new Forest Plans meaningfully incorporated the large body of literature that has accumulated over the past two decades.

The NFMA regulations state that in developing a new plan the responsible official "shall review relevant information from the assessment and monitoring to identify a preliminary need to change the existing plan and to inform the development of plan components and other plan content." 36 CFR 219.7(c)(2)(i). The assessments and the need for change statement are therefore obviously related—the "need for change" flows directly from the assessments. Yet, because our comments as to the assessments were largely unaddressed in the Final Assessments, our comments are thereby not being incorporated into the "need for change" document. As we pointed out in our comment letters (which are attached to, and incorporated into, this letter), significant information was omitted from the forest assessments (as well as from the Science Synthesis and NRVs).

Furthermore, information on the effectiveness of the current forest plans was not presented in the forest assessments. For example, there was no discussion of the effectiveness of the current plans as to post-fire specialists such as the black-backed woodpecker. Thus, the "need for change" document is significantly flawed because information necessary to complete one has either a) been ignored, or b) not been divulged.

We respectfully request more be done to address all the necessary issues. To do otherwise will fail to incorporate important and substantial information which will lead to flawed, inadequate, and illegal forest plans, which in turn will lead to habitat loss and serious harm to wildlife in the Sierras—the very opposite of ecological integrity.

B. Wildlife Conservation

Wildlife conservation should be its own emphasis area, as it meets the vast majority of the "criteria for emphasis areas to focus on immediately." It is "important to many people, and provides many benefits to people." "There is a threat to losing [these] benefits if the Forest Service doesn't act within the near future." This is especially so for post-fire specialists, as well as wildlife that focuses on dense unburned forest (like the fisher and spotted owl), given the extent of salvage logging that has been proposed for the 2012 and 2013 Fires, and the extent of thinning projects in the Sierras. "[E]cological sustainability [is] at risk in the mid- and long-terms." For example, a Conservation Strategy for the Black-backed Woodpecker has identified this to be true, as does current data for the spotted owl (e.g., Connor et al. 2013). "Current management direction as described and implemented does not provide benefits sustainably." Again, this is very true for post-fire wildlife given that current management allows and seeks extensive salvage logging, and is true for species like the spotted owl, whose habitat is targeted for thinning projects. "There is substantial controversy over current management and general agreement among most people on approaches to improve aspects of current direction." Again, this is very true as to salvage logging and post-fire management in general, as well as in regard to forest thinning of mature forest habitat. "Forest plans have the ability to do something substantial about the condition in the next ten years" – true again as to wildlife that relies on post-fire habitat, as well as wildlife that prefers dense forest habitat. And, "[a]lternatives and plan components can be developed within the plan revision timeline (April to May 2014)." For the wildlife just described, the scientific foundations now exist to address their needs in the plan revision timeline.

Wildlife conservation is of course central to the National Forest Management Act. The conservation of wildlife therefore needs to be an emphasis area because so many species are negatively affected by current management objectives (e.g., thinning and salvage logging), and other human activities (e.g., OHV use, grazing, recreation). Wildlife conservation should also be its own emphasis area in light of the magnitude of the situation. Each forest has a high number of species identified as at risk, and the 2012 planning rule requires "maintaining the diversity of plant and animal communities and the persistence of native species in the plan area." 36 CFR 219.9.

Moreover, there is significant controversy as to wildlife issues, which is yet another reason to make it its owns emphasis area. For example, the Final Assessments continue to misstate the relevant science as to spotted owls and continue to largely ignore the condition of species like the black-backed woodpecker, olive-sided flycatcher, sooty grouse, mountain bluebird, fringed myotis, lazuli bunting, western wood pewee, hairy woodpecker, white-headed woodpecker, pallid bat, fox sparrow and mountain quail. Further, because the information provided in the forest assessments is so incomplete, it remains extremely unclear what the real intent is as to wildlife in the forest planning process. Wildlife issues have, for decades now, most often been treated as subordinate to other objectives, such as logging. By making wildlife its own emphasis area, the Forest Service can begin to end its past trend, and can instead treat wildlife as something that, per NFMA, deserves its own focus.

Finally, in combining wildlife with other issues, the Forest Service has wrongly conflated generalized fire impacts with how fire impacts wildlife. For example, the document generically states that "[l]arge, intense fires are impacting beneficial uses at an increasing rate," and that a "single large fire, such as the Rim Fire, can have major impacts." For wildlife, though, such large, intense fires can be critical to *maintaining* habitat; indeed, the Rim Fire created important habitat for the black-backed woodpecker and many other species, and therefore, should not be cast as somehow being only a negative when in fact it was restorative. By giving wildlife its own emphasis area, this important issue can be much better addressed because then the issue of impacts from fire can focus on its interactions with wildlife. Moreover, pursuant to the way wildlife is currently being handled, the public is completely left in the dark as to the importance of wildfire – including large, intense wildfire – to wildlife. And, by only referring to what the Forest Service claims is a limited "pace and scale of restoration", the Forest Service entirely ignores how this so-called "restoration" harms wildlife habitat, and further, ignores important issues like salvage logging that can and must be addressed in the forest plan revisions.

The same is true as to insects. We are not aware of any data to support the assertion of harm or adverse impact on wildlife from insects; rather, insects help create snags, an important wildlife feature, and provide food to wildlife. Nor has any information been provided in the assessment to show that current insect conditions are somehow outside the range of what it natural.

It is crucial that wildlife be prioritized and treated appropriately. The current approach does n to achieve that for all the reasons just described and we therefore respectfully request that the Forest Service change its approach and instead give wildlife conservation the due consideration it needs and deserves.

C. Fire, the WUI, and Post-fire Management

Fire, and how to protect human communities from fire, is another one of the most important issues at stake in the forest plan revision process. We submitted numerous comments and scientific citations on this issue that have been largely ignored or wrongly dismissed – in other words, the information has been made available to the Forest Service, but it is not being incorporated.

New literature continues to demonstrate our points, such as the restorative value of all severities of fire. For example, Crotteau et al. 2013 notes that "the Storrie Fire generated diverse vegetative responses, potentially aiding in the reintroduction of the diverse landscape mosaic homogenized by a century of landscape-scale fire exclusion." Cocking et al. 2014 similarly notes that its "results indicate that high-severity fire promotes persistence and restoration of ecosystems containing resprouting species, such as California black oak, that are increasingly rare due to widespread fire exclusion in landscapes that historically experienced more frequent fire." These results, and the many others we have presented, should not be brushed aside – they are directly relevant to the issues at stake and go to the heart of the how to plan for the future. It is therefore imperative that the Forest Service not continue to arbitrarily pick and choose what to incorporate into the plan revision process. Doing do is illegal, but just as importantly, it violates the integrity of the process and the ability of the public to understand fully the situation and what is at stake.

Fire, including higher-severity fire (i.e., greater than 50% basal mortality), is essential to Sierra Nevada ecosystems. Presently, there is a significant deficit of all fire severities in the Sierra Nevada, and yet this reality continues to largely be dismissed. For example, higher-severity fire continues to be treated as though it must be eradicated when in fact it needs to be restored. In addition, the science surrounding post-fire management has changed vastly since the last forest plan and currently there is almost no meaningful direction in the forest plans on managing landscapes that have been affected by wildfire. Given the desire for "ecological restoration," explicit direction in the forest plans is needed to protect post-fire wildlife habitat and to identify that post-fire logging is extremely harmful to the landscape. There is absolutely no reason at all for the forest plan revision not to address post-fire management, especially salvage logging.

In light of the fact that most of our comments have not been incorporated or addressed in the final assessments and the need for change, we reiterate some of them here again:

- In order to achieve more fire on the Sierra landscape, the Forest Service can do the following:
    - Identify constraints on prescribed fire and managed wildland fire (e.g., air quality; personnel availability; monetary resources; weather windows);
    - Set guidelines to assist in avoiding the identified constraints;
    - Remove all currently existing Plan restrictions (e.g., restrictions on the use of managed wildland fire outside of Wilderness) that prohibit or inhibit managed wildland fire or prescribed fire and instead set guidelines for how to achieve more prescribed fire and managed wildland fire;
    - Increase education regarding effective home protection from fire and, in regard to protecting human communities from fire, focus resources on making homes and structures fire resilient;
- In order to maintain the ecological value of fire:
    - It is essential that you address the current lack of protection for post-fire habitat. For example, the recommendations from the completed, "A Conservation Strategy for the Black-backed Woodpecker" (Bond et al. 2012), must be incorporated into the upcoming forest plan revision in order to protect wildlife that relies on burned forest habitat;
    - You should change the current inadequate standard/guideline (which protects only 10% of burned forest [note that this 10% is not specific to moderate/high severity burned areas and therefore 100% of such areas can potentially be salvaged logged under current guidelines/standards]) to protect 100% of burned forest (except for hazard tree felling - i.e., human safety exemptions would be allowed). There does not exist any ecological basis for salvage logging and this is especially so in light of the deficit of such habitat on the landscape, especially the specific kind of

habitat that some species rely on (e.g., post-moderate/high severity burned forest that pre-fire was CWHR 4D or above);

- Do not use a desire for old forest conditions to drive post-fire actions – post-fire areas are complex and ecologically rich themselves, and should therefore not be seen as competition for old forest conditions. They should be allowed to regenerate on their own, especially since such areas can themselves offer the types of values associated with late seral conditions (e.g., DellaSala et al. 2013; Donato et al. 2012);

- In addition to prohibiting salvage logging (except for safety reasons), the Forest Service should acknowledge and promote the importance of natural regeneration. Post-fire areas that are manipulated by salvage logging and/or by reforestation efforts are, from an ecological perspective, no longer as valuable as post-fire areas; rather, post-fire salvage logging and reforestation substantially reduce, and often locally eliminate, wildlife species strongly associated with the forest habitat created by moderate and high-severity fire patches (Hanson and North 2008, Hutto 2008, Burnett et al. 2011, 2012, Seavy et al. 2012, Siegel et al. 2012, 2013). Time since fire also provides important insights into the need to protect post-fire areas from manipulation. There is a continuum of use of post-fire areas over time by different species. Black-backed woodpeckers, for example, are well known to require areas with very high snag densities immediately post-fire – i.e., mature forest that has very recently experienced higher-severity fire, and has not been salvage logged (Hanson and North 2008, Hutto 2008, Saab et al. 2009, Seavy et al. 2012, Siegel et al. 2010, 2011, 2012, 2013). However, "while some snag associated species (e.g. black-backed woodpecker) decline five or six years after a fire [and move on to find more recent fire areas], [species] associated with understory plant communities take [the woodpeckers'] place resulting in similar avian diversity three and eleven years after fire (e.g. Moonlight and Storrie)." (Burnett et al. 2012). Burnett et al. (2012) also noted that "there is a five year lag before dense shrub habitats form that maximize densities of species such as Fox Sparrow, Dusky Flycatcher, and MacGillivray's Warbler. These species have shown substantial increases in abundance in the Moonlight fire each year since 2009 but shrub nesting species are still more abundant in the eleven year post-burn Storrie fire. This suggests early successional shrub habitats in burned areas provide high quality habitat for shrub dependent species well beyond a decade after fire." (Burnett et al. 2012). Raphael et al. (1987) found that at 25 years after high-severity fire, total bird abundance was slightly higher in snag forest than in unburned old forest in eastside mixed-conifer forest of the northern Sierra Nevada; and bird species richness was 40% higher in snag forest habitat. In earlier post-fire years, woodpeckers were more abundant in snag forest, but were similar to unburned forest by 25 years post-fire, while flycatchers and species associated with shrubs continued to increase to 25 years post-fire (Raphael et al. 1987). In ponderosa pine and Douglas-fir forests of Idaho at 5-10 years post-fire, levels of aquatic insects emerging from streams were two and a half times greater in high-severity fire areas than in unburned mature/old forest, and bats were nearly 5 times more abundant in riparian areas with high-severity fire than in unburned mature/old forest (Malison and Baxter 2010). Schieck and Song (2006) found that bird species richness increased up to 30 years after high-severity fire, then decreased in mid-successional forest [31-75 years old], and increased again in late-successional forest [>75 years]).

- It is imperative that "salvage" logging not be equated with ecological restoration, or forest management objectives other than economically-motivated multiple use. Noss and others (2006b: 485-86) caution that post-fire logging is counter to resilience of fire-adapted forest ecosystems for six reasons: "Our key findings on post-fire management are as follows. First, post-burn landscapes have substantial capacity for natural recovery. Re-establishment of forest following stand-replacement fire occurs at widely varying rates; this allows ecologically critical, early-successional habitat to persist for various periods of time. Second, post-fire (salvage) logging does not contribute to ecological recovery; rather, it negatively affects recovery processes, with the intensity of impacts depending upon the nature of the logging activity (Lindenmayer et al. 2004). Post-fire logging in naturally disturbed forest landscapes generally has no direct ecological benefits and many potential negative impacts (Beschta et al. 2004; Donato et al. 2006; Lindenmayer and Noss 2006). Trees that survive fire for even a short time are critical as seed sources and as habitat that sustains biodiversity both above- and belowground. Dead wood, including large snags and logs, rivals live trees in ecological importance. Removal of structural legacies, both living and dead, is inconsistent with scientific understanding of natural disturbance regimes and short- and long-term regeneration processes. Third, in forests subjected to severe fire and post-fire logging, streams and other aquatic ecosystems will take longer to return to historical conditions or may switch to a different (and often less desirable) state altogether (Karr et al. 2004). Following a severe fire, the biggest impacts on aquatic ecosystems are often excessive sedimentation, caused by runoff from roads, which may continue for years. Fourth, post-fire seeding of non-native plants is often ineffective at reducing soil erosion and generally damages natural ecological values, for example by reducing tree regeneration and the recovery of native plant cover and biodiversity (Beyers 2004). Non-native plants typically compete with native species, reducing both native plant diversity and cover (Keeley et al. 2006). Fifth, the ecological importance of biological legacies and of uncommon, structurally complex early-successional stands argues against actions to achieve rapid and complete reforestation. Re-establishing fully stocked stands on sites characterized by low severity fire may actually increase the severity of fire because of fuel loadings outside the historical range of variability. Finally, species dependent on habitat conditions created by high severity fire, with abundant standing dead trees, require substantial areas to be protected from post-fire logging (Hutto 1995)."

- It is not appropriate to generalize and frame current forest conditions as "forests are now too dense." Density is not the problem, the lack of fire and its associated heterogeneity is the problem. Moreover, not only is density not to be considered a generic problem, it is instead important to recognize that dense forest habitat, especially dense mature forest habitat, is critical habitat for rare species (i.e, what the literature shows they preferentially select) like the California spotted owl, Pacific fisher, and black-backed woodpecker (e.g., Zielinski et al. 2006, Purcell et al. 2009, Underwood et al. 2010). Therefore, for rare species like the owl and fisher, it is critical to acknowledge the importance of dense habitat and ensure its protection.

- Post-fire landscapes, especially post-moderate/high severity fire landscapes, must be acknowledged as creating high bio-diversity and essential habitat for many species (e.g., Raphael et al. 1987, Burnett et al. 2010, Burnett et al. 2012, Hanson and North 2008, Hutto 2008, Saab et al. 2009, Swanson et al. 2011, Seavy et al. 2012, Buchalski et al. 2013, Siegel et al. 2010, 2011, 2012, 2013). For example, in the Moonlight Fire area, researchers explained that "[i]t is clear from our first year of monitoring three burned areas [Cub, Moonlight and Storrie Fires] that post-fire habitat, especially high severity areas, are an important component of the Sierra Nevada ecosystem." (Burnett et al. 2010). They also found that "[o]nce the amount of the plot that was high severity was over 60% the density of cavity nests increased substantially," and that "more total species were detected in the Moonlight fire which covers a much smaller geographic area and had far fewer sampling locations than the [unburned] green forest." (Burnett et al. 2010);

- The available wildlife science regarding post-fire bio-diversity shows that the mixed-severity fires that are occurring, such as the McNally Fire, are critical habitat for many rare species. In regard to the McNally Fire, for example, one study (Buchalski et al. 2013) found that most phonic groups of bats showed higher activity in areas burned with moderate to high-severity (see also Malison and Baxter 2010, finding greater bat activity was observed in high-severity burned riparian habitat within mixed-conifer forest than at unburned areas of similar habitat in central Idaho). Similarly, in the McNally area, California spotted owls were found to be preferentially selecting high-severity fire areas for foraging (Bond et al. 2009). And recent research indicates that Pacific fishers may benefit from mixed-severity fire (e.g., Hanson 2013—this is the only study to date that examines fisher response to an actual wildfire event).

- In regard to Bond et al. 2009, the Forest Service continues to wrongly state the following: "One study in a single high severity burned patch of the McNally fire (2002) showed that California spotted owls foraged at higher frequency in high severity burned areas. However, results of this study were limited (four territories) in a single high severity burned patch (Bond et al. 2009). Nesting habitat was not evaluated and may be more limiting for the 34 California spotted owl in the Sierra (Verner 1999, Keane 2013)."

    - These statements, written in an attempt to minimize the Bond study, are highly misleading and mischaracterize the existing science on California spotted owls and fire, and therefore must be corrected. First, the sampling unit of a foraging resource selection study is the individual owl, not the territory, because male and females in a pair forage independently and represent a unique dataset of foraging habitat selection. Thus, the true sample size is 7 owls, not 4 territories. Second, according to the Forest Service's own survey data from local biologists, there were 9 spotted owl territories within and adjacent to the McNally Fire. Four of the 9 territories did not have a sufficient road network for effective radio-telemetry and Bond et al. were unable to detect owls at another territory. Thus, the 4 territories where Bond et al. (2009) collected data represented all the available territories where radio-telemetry was feasible to track owls with the high degree of precision and efficient accumulation of a large data set on foraging locations that is required for a foraging resource selection study (30 – 50 foraging locations per owl). The study included 44% of all the known spotted owl territories affected by the McNally Fire and this sample included widely dispersed locations in both the Greenhorn Mountains and the Kern Plateau (a distance of ~ 13 km). The Bond et al. (2009) study included 7 independently foraging owls in 4 territories that encompassed a mosaic of hundreds of patches consisting of unburned, low-, moderate-, and high-severity burned stands over more than 1,000 hectares of forest land. Bond et al. (2009) represents the best available science on resource selection of foraging and roosting California spotted owls in burned landscapes of the Sierra Nevada. The results show that radio-marked owls foraged in many stands burned by high-severity fire over the course of the breeding season, not in "a single high severity burned patch" as the Forest Service has claimed. The results clearly indicate that California spotted owls exhibited a strong preference for foraging in high-severity burned forest patches. Furthermore, the Forest Service claims that "nesting habitat was not evaluated," when in fact, Bond et al (2009) did quantify the characteristics of the nest tree and the burn severity of the nest stand as well as of dozens of roosting locations. Additionally, a comprehensive analysis of nesting habitat and fire was done in Lee et al. (2012). That study used 11 years of nesting-site survey data from 41 California Spotted Owl territories burned in six forest fires (including the McNally fire) and 145 territories in unburned areas from throughout the Sierra Nevada, California, to compare probabilities of occupancy between burned and unburned nesting sites. Lee et al. (2012) found no significant effects of fire, suggesting that even fire that burns on average 32% of suitable forested habitat at high severity within a California Spotted Owl nest site, does not threaten the persistence of the subspecies on the landscape. Finally, Verner (1999) is not an appropriate citation. Verner (1999) is not a published study, and is a 14-year old response in a status report that was found online, and has no bearing on the statement that "nesting habitat may be more limiting for the 34 California spotted owl [sic] in the Sierra." If the Forest Service intended to cite Verner (1992), this is a general account of spotted owl biology from 20 years ago that makes a single statement that is unsupported by data or citation: "Sometimes adult birds are displaced from established territories by loss of habitat through fire, logging, or other major disturbances." Keane (2013) refers to the document "California Spotted Owl: Scientific Considerations for Forest Planning." This citation provides a summary of the current literature regarding fire and spotted owls and concludes that owls can persist in areas affected by mixed-severity fire at least within a decade or so after fire. However, similar to Verner (1999), this document does not evaluate nesting habitat for 34 California spotted owls in the Sierra Nevada.

- Regarding fire size and fire intensity trends in the Sierras, Hanson and Odion (2013) conducted the first comprehensive assessment of fire intensity since 1984 in the Sierra Nevada using 100% of available fire intensity data, and using Mann-Kendall trend tests (a common approach for environmental time series data – one which has similar or greater statistical power than parametric analyses when using non-parametric data sets, such as fire data). They found no increasing trend in terms of high-intensity fire proportion, area, mean patch size, or maximum patch size. Hanson and Odion checked for serial autocorrelation in the data, and found none, and used pre-1984 vegetation data (1977 Cal Veg) in order to completely include any conifer forest experiencing high-intensity fire in all time periods since 1984 (the accuracy of this data at the forest strata scale used in the analysis was 85-88%). Hanson and Odion also checked the results of Miller et al. (2009) and Miller and Safford (2012) for bias, due to the use of vegetation layers that post-date the fires being analyzed in those studies. Hanson and Odion found that there is a statistically significant bias in both studies ($p = 0.025$ and $p = 0.021$, respectively), the effect of which is to exclude relatively more conifer forest experiencing high-intensity fire in the earlier years of the time series, thus creating the false appearance of an increasing trend in fire severity. Miller et al. (2012a), acknowledged the potential bias that can result from using a vegetation classification data set that post-dates the time series. In that study, conducted in the Klamath region of California, Miller et al. used a vegetation layer that preceded the time series, and found no trend of increasing fire severity. Miller et al. (2009) and Miller and Safford (2012) did not, however, follow this same approach. Hanson and Odion also found that the regional fire severity data set used by Miller et al. (2009) and Miller and Safford (2012) disproportionately excluded fires in the earlier years of the time series, relative to the standard national fire severity data set (www.mtbs.gov) used in other fire severity trend studies, resulting in an additional bias which created, once again, the inaccurate appearance of relatively less high-severity fire in the earlier years, and relatively more in more recent years.

- Resilience requires reestablishing the ecological disturbances that forests and wildlife evolved with. For example, wildlife evolved with fire, not mechanical treatments, and therefore resilience is achieved through management that seeks to put fire back on the landscape such as via prescribed fire and managed wildland fire. Mechanical thinning, on the other hand, does not mimic natural wildlfire and can eliminate or reduce the value of mature forest habitat by eliminating or reducing structural complexity (which many rare wildlife species preferentially selects for). Structural complexity is key for species like the California spotted owl, Pacific fisher, and black-backed woodpecker, and therefore, mechanical thinning, when used in dense mature forest habitat, can eliminate or reduce the value of that habitat for these species, and reduce ecological resilience (see, e.g., Zielinski et al. 2006, Purcell et al. 2009, Bond et al. 2009, Hanson 2013).

The following citations from our previous comments are examples of science that was presented but has not been incorporated:

Bekker, M. F. and Taylor, A. H. 2010. Fire disturbance, forest structure, and stand dynamics in montane forest of the southern Cascades, Thousand Lakes Wilderness, California, USA. Ecoscience 17: 59-72. ***(In mixed-conifer forests of the southern Cascades in the Sierra***

Nevada management region, reconstructed fire severity within the study area was dominated by high-severity fire effects, including high-severity fire patches over 2,000 acres in size [Tables I and II]).

Beaty, R.M., and A.H. Taylor. 2001. Spatial and temporal variation of fire regimes in a mixed conifer forest landscape, Southern Cascades, USA. Journal of Biogeography 28: 955–966. ***(On the western slope of the southern Cascades in California, historic fire severity in mixed-conifer forests was predominantly moderate- and high-severity, except in mesic canyon bottoms, where moderate- and high-severity fire comprised 40.4% of fire effects [Table 7].)***

Buchalski, M.R., J.B. Fontaine, P.A. Heady III, J.P. Hayes, and W.F. Frick. 2013. Bat response to differing fire severity in mixed-conifer forest, California, USA. PLOS ONE 8: e57884. ***(In mixed-conifer forests of the southern Sierra Nevada, rare myotis bats were found at greater levels in unmanaged high-severity fire areas of the McNally fire than in lower fire severity areas or unburned forest.)***

Burnett, R.D., P. Taillie, and N. Seavy. 2010. Plumas Lassen Study 2009 Annual Report. U.S. Forest Service, Pacific Southwest Region, Vallejo, CA. ***(Bird species richness was approximately the same between high-severity fire areas and unburned mature/old forest at 8 years post-fire in the Storrie fire, and total bird abundance was greatest in the high-severity fire areas of the Storrie fire [Figure 4]. Nest density of cavity-nesting species increased with higher proportions of high-severity fire, and was highest at 100% [Figure 8]. The authors noted that "[o]nce the amount of the plot that was high severity was over 60% the density of cavity nests increased substantially", and concluded that "more total species were detected in the Moonlight fire which covers a much smaller geographic area and had far fewer sampling locations than the [unburned] green forest.")***

Burnett, R.D., P. Taillie, and N. Seavy. 2011. Plumas Lassen Study 2010 Annual Report. U.S. Forest Service, Pacific Southwest Region, Vallejo, CA. ***(Black-backed Woodpecker nesting was eliminated by post-fire salvage. See Figure 11 [showing nest density on national forest lands not yet subjected to salvage logging versus private lands that had been salvage logged.)***

Burnett, R.D., M. Preston, and N. Seavy. 2012. Plumas Lassen Study 2011 Annual Report. U.S. Forest Service, Pacific Southwest Region, Vallejo, CA. ***(Black-backed Woodpecker potential occupancy rapidly approaches zero when less than 40-80 snags per acre occur, or are retained (Burnett et al. 2012, Fig. 8 [occupancy dropping towards zero when there are fewer than 4-8 snags per 11.3-meter radius plot—i.e., less than 4-8 snags per 1/10th-acre, or less than 40-80 snags per acre.)***

Hanson, C. T. and M. P. North. 2008. Postfire woodpecker foraging in salvage-logged and unlogged forests of the Sierra Nevada. Condor 110: 777–782. ***(Black-backed woodpeckers depend upon dense, mature/old forest that has recently experienced higher-severity fire, and has not been salvage logged; Black-backed Woodpeckers selected dense, old forests that experienced high-severity fire, and avoided salvage logged areas [see Tables 1 and 2].)***

Hanson, C.T., and D.C. Odion. 2013. Is fire severity increasing in the Sierra Nevada mountains, California, USA? International Journal of Wildland Fire: dx.doi.org/10.1071/WF13016 (published online September 10, 2013). ***(Hanson and Odion (2013) conducted the first comprehensive assessment of fire intensity since 1984 in the Sierra Nevada using 100% of available fire intensity data, and, using Mann-Kendall trend tests (a common approach for environmental time series data—one which has similar or greater statistical power than parametric analyses when using non-parametric data sets, such as fire data), found no increasing trend in terms of high-intensity fire proportion, area, mean patch size, or maximum patch size. Hanson and Odion (2013) checked for serial autocorrelation in the data, and found none, and used pre-1984 vegetation data (1977 Cal-Veg) in order to completely include any conifer forest experiencing high-intensity fire in all time periods since 1984 (the accuracy of this data at the forest strata scale used in the analysis was 85-88%). Hanson and Odion (2013) also checked the results of Miller et al. (2009) and Miller and Safford (2012) for bias, due to the use of vegetation layers that post-date the fires being analyzed in those studies. Hanson and Odion (2013) found that there is a statistically significant bias in both studies (p = 0.025 and p = 0.021, respectively), the effect of which is to exclude relatively more conifer forest experiencing high-intensity fire in the earlier years of the time series, thus creating the false appearance of an increasing trend in fire severity. Interestingly, Miller et al. (2012a), acknowledged the potential bias that can result from using a vegetation classification data set that post-dates the time series. In that study, conducted in the Klamath region of California, Miller et al. used a vegetation layer that preceded the time series, and found no trend of increasing fire severity. Miller et al. (2009) and Miller and Safford (2012) did not, however, follow this same approach. Hanson and Odion (2013) also found that the regional fire severity data set used by Miller et al. (2009) and Miller and Safford (2012) disproportionately excluded fires in the earlier years of the time series, relative to the standard national fire severity data set (www.mtbs.gov) used in other fire severity trend studies, resulting in an additional bias which created, once again, the inaccurate appearance of relatively less high-severity fire in the earlier years, and relatively more in more recent years. The results of Hanson and Odion (2013) are consistent with all other recent studies of fire intensity trends in California's forests that have used all available fire intensity data, including Collins et al. (2009) in a portion of Yosemite National Park, Schwind (2008) regarding all vegetation in California, Hanson et al. (2009) and Miller et al. (2012a) regarding conifer forests in the Klamath and southern Cascades regions of California, and Dillon et al. (2011) regarding forests of the Pacific (south to the northernmost portion of California) and Northwest.)***

Hodge, W.C. 1906. Forest conditions in the Sierras, 1906. U.S. Forest Service. Eldorado National Forest, Supervisor's Office, Placerville, CA. ***(Historically in mixed-conifer and ponderosa pine forests of the western Sierra Nevada, density ranged generally from about 100 to 1000 trees per acre, and stands were often comprised mostly of white fir and incense-cedar, and were dominated by smaller trees.)***

Hutto, R. L. 2008. The ecological importance of severe wildfires: Some like it hot. Ecological Applications 18:1827–1834. ***(Figure 4a, showing about 50% loss of Black-backed Woodpecker post-fire occupancy due to moderate pre-fire logging [consistent with***

mechanical thinning] in areas that later experienced wildland fire.)

Lee, D.E., M.L. Bond, and R.B. Siegel. 2012. Dynamics of breeding-season site occupancy of the California spotted owl in burned forests. The Condor 114: 792-802. ***(Mixed-severity wildland fire, averaging 32% high-severity fire effects, did not decrease California spotted owl territory occupancy, but post-fire logged sites experienced a loss of occupancy.)***

Leiberg, J. B. 1902. Forest conditions in the northern Sierra Nevada, California. USDI Geological Survey, Professional Paper No. 8. U.S. Government Printing Office, Washington, D.C. ***(High-severity fire patches over 5,000 acres in size mapped in mixed-conifer forest that had not been logged previously during the 19th century, prior to fire suppression. In the 19th century, prior to fire suppression, composition of mixed-conifer forests in the central and northern Sierra Nevada was quantified in unlogged areas for several watersheds, and in dozens of specific locations within watersheds. The study reported that, while some of these areas were open and parklike stands dominated by ponderosa pine, Jeffrey pine, and sugar pine, the majority were dominated by white fir, incense-cedar, and Douglas-fir, especially on north-facing slopes and on lower slopes of subwatersheds; such areas were predominantly described as dense, often with "heavy underbrush" from past mixed-severity fire. Natural heterogeneity, resulting from fire, often involved dense stands of old forest adjacent to snag forest patches of standing fire-killed trees and montane chaparral with regenerating young conifers: "All the slopes of Duncan Canyon from its head down show the same marks of fire—dead timber, dense undergrowth, stretches of chaparral, thin lines of trees or small groups rising out of the brush, and heavy blocks of forest surrounded by chaparral." [p. 171])***

Miller, J.D., B.M. Collins, J.A. Lutz, S.L. Stephens, J.W. van Wagtendonk, and D.A. Yasuda. 2012b. Differences in wildfires among ecoregions and land management agencies in the Sierra Nevada region, California, USA. Ecosphere 3: Article 80. ***(Current high-severity fire rotation interval in the Sierra Nevada management region overall is over 800 years. The authors recommended increasing high-severity fire amounts [i.e., decreasing rotation intervals] in the Cascades-Modoc region and on the western slope of the Sierra Nevada (which together comprise most of the forest in the Sierra Nevada management region), where the current high-severity fire rotation is 859 to 4650 years [Table 3]. The authors noted that "high-severity rotations may be too long in most Cascade-Modoc and westside NF locations, especially in comparison to Yosemite…" These areas, in which the authors concluded that there is far too little high-severity fire, comprise 75% of the forests in the Sierra Nevada management region [Table 3].)***

Nagel, T.A. and Taylor, A.H. 2005. Fire and persistence of montane chaparral in mixed conifer forest landscapes in the northern Sierra Nevada, Lake Tahoe Basin, California, USA. J. Torrey Bot. Soc.132: 442-457. ***(The authors found that large high-severity fire patches were a natural part of 19th century fire regimes in mixed-conifer and eastside pine forests of the Lake Tahoe Basin, and montane chaparral created by high-severity fire has declined by 62% since the 19th century due to reduced high-severity fire occurrence. The authors expressed concern about harm to biodiversity due to loss of ecologically rich montane chaparral.)***

Powers, E.M., J.D. Marshall, J. Zhang, and L. Wei. 2013. Post-fire management regimes affect carbon sequestration and storage in a Sierra Nevada mixed conifer forest. Forest Ecology and Management 291: 268-277. ***(In Sierra Nevada mixed conifer forests, the highest total aboveground carbon storage was found to occur in mature/old forest that experienced 100% tree mortality in wildland fire, and was not salvage logged or artificially replanted, relative to lightly burned old forest and salvage logged areas [Fig. 1b]).***

Saab, V.A., R.E. Russell, and J.G. Dudley. 2009. Nest-site selection by cavity-nesting birds in relation to postfire salvage logging. Forest Ecology and Management 257:151–159. ***(Black-backed Woodpeckers select areas with about 325 medium and large snags per hectare [about 132 per acre], and nest-site occupancy potential dropped to near zero when snag density was below about 270 per hectare, or about 109 per acre [see Fig. 2A, showing 270 snags per hectare as the lower boundary of the 95% confidence interval].)***

Seavy, N.E., R.D. Burnett, and P.J. Taille. 2012. Black-backed woodpecker nest-tree preference in burned forests of the Sierra Nevada, California. Wildlife Society Bulletin 36: 722-728. ***(Black-backed Woodpeckers selected sites with an average of 13.3 snags per 11.3-meter radius plot [i.e., 0.1-acre plot], or about 133 snags per acre.)***

Show, S.B. and Kotok, E.I. 1924. The role of fire in California pine forests. United States Department of Agriculture Bulletin 1294, Washington, D.C. ***(Historically, within ponderosa pine and mixed-conifer/pine forests of the Sierra Nevada, high-severity crown fires, though infrequent on any particular area, "may extend over a few hundred acres" in patches [p. 31; see also Plate V, Fig. 2, Plate VII, Fig. 2, Plate VIII, Plate IX, Figs. 1 and 2, and Plate X, Fig. 1], with some early-successional areas, resulting from high-severity fire patches, covering 5,000 acres in size or more [pp. 42-43]. The authors distinguished high-severity fire patches of this size from more "extensive" patches occurring in the northern Rocky Mountains [p. 31], where high-severity fire patches occasionally reach tens of thousands, or hundreds of thousands, of acres in size, and noted that patches of such enormous size were "almost" unknown in Sierra Nevada ponderosa pine and mixed-conifer forests. Within unlogged areas, the authors noted many large early-successional habitat patches, dominated by montane chaparral and young, regenerating conifer forest, and explained that such areas were the result of past severe fire because: a) patches of mature/old forest and individual surviving trees were found interspersed within these areas, and were found adjacent to these areas, indicating past forest; b) snags and stumps of fallen snags, as well as downed logs from fallen snags, were abundant in these areas; c) the species of chaparral found growing in these areas are known to sprout abundantly following severe fire; and d) natural conifer regeneration was found on most of the area [p. 42], often growing through complete chaparral cover [p. 43].)***

Show, S.B. and Kotok, E.I. 1925. Fire and the forest (California pine region). United States Department of Agriculture Department Circular 358, Washington, D.C. ***(Historically, within the ponderosa pine and mixed-conifer/pine belt of the Sierra Nevada, 1 acre out of every 7 on average was dominated by montane chaparral and young regenerating conifer forest***

following high-severity fire [Footnote 2, and Figs. 4 and 5]; on one national forest 215,000 acres out of 660,000 was early-successional habitat from severe fire [p. 17].)

Siegel, R.B., M.W. Tingley, R.L. Wilkerson, M.L. Bond, and C.A. Howell. 2013. Assessing home range size and habitat needs of Black-backed Woodpeckers in California: Report for the 2011 and 2012 field seasons. Institute for Bird Populations. ***(Black-backed woodpeckers strongly select large patches of higher-severity fire with high densities of medium and large snags, generally at least 100 to 200 hectares (roughly 250 to 500 acres) per pair, and post-fire salvage logging eliminates Black-backed woodpecker foraging habitat [see Fig. 13, showing almost complete avoidance of salvage logged areas]. Suitable foraging habitat was found to have more than 17-20 square meters per hectare of recent snag basal area [pp. 45, 68-70], and suitable nesting habitat was found to average 43 square meters per hectare of recent snag basal area and range from 18 to 85 square meters to hectare [p. 59, Table 13].)***

Stephens, S.L., R.E. Martin, and N.E. Clinton. 2007. Prehistoric fire area and emissions from California's forests, woodlands, shrublands, and grasslands. Forest Ecology and Management 251:205–216. *(**Estimated high-severity fire proportion and frequency indicate historic high-severity fire rotation intervals of approximately 250 to 400 years in historic ponderosa pine and mixed-conifer forests in California**.)*

Swanson, M.E., J.F. Franklin, R.L. Beschta, C.M. Crisafulli, D.A. DellaSala, R.L. Hutto, D. Lindenmayer, and F.J. Swanson. 2010. The forgotten stage of forest succession: early-successional ecosystems on forest sites. Frontiers Ecology & Environment 9: 117-125. ***(A literature review concluding that some of the highest levels of native biodiversity found in temperate conifer forest types occur in complex early successional habitat created by stand-initiating [high-severity] fire.)***

USFS (United States Forest Service). 1910-1912. Timber Survey Field Notes, 1910-1912, U.S. Forest Service, Stanislaus National Forest. Record Number 095-93-045, National Archives and Records Administration—Pacific Region, San Bruno, California, USA. ***(Surveys were conducted within unlogged forest to evaluate timber production potential in 16.2-ha (40-acre) plots within each 259.1-ha (640-acre) section in ponderosa pine and mixed-conifer forest on the westside of the Stanislaus National Forest, using one or more 1.62-ha transect per plot. Surveyors noted that surveys for individual tree size, density and species were not conducted in areas that had experienced high-severity fire sufficiently recently such that the regenerating areas did not yet contain significant merchantable sawtimber. Surveyors noted that the dominant vegetation cover across the majority of many 259.1-ha sections was montane chaparral and young conifer regeneration following high-severity fire. For example (from a typical township in the data set): a) T1S, R18E, Section 9 ("Severe fire went through [this section] years ago and killed most of the trees and land was reverted to brush", noting "several large dense sapling stands" and noting that merchantable timber existed on only four of sixteen 16.2-ha plots in the section); b) T1S, R18E, Section 14 ("Fires have killed most of timber and most of section has reverted to brush"); c) T1S, R18E, Section 15 (same); d) T1S, R18E, Section 23 ("Most of timber on section has been killed by fires which occurred many years ago"); T1S, R18E, Section 21 ("Old fires killed most of timber on this section and most of area is now brushland".***

Moreover, with regard to understory density, the USFS 1911 Stanislaus data set (USFS 1910-1912) recorded average sapling density on 72 ponderosa pine forest sections (and some mixedconifer) (each section one square mile in size), with an average density of 102 saplings per acre (252 per hectare) in sections noted as having no previous logging. This is not consistent with the assumption of very low densities of saplings historically. In addition, the 1911 Stanislaus data set also recorded percent shrub cover on 57 sections (each one square mile) in ponderosa pine forests (and some mixed-conifer), with an average of 28% shrub cover in unlogged sections within forested areas with merchantable timber. In a total of 35 sections, surveyors recorded the proportion of the one-square-mile section comprised by montane chaparral areas (which often included natural conifer regeneration in the seedling, sapling, and/or pole-sized successional stage) with no merchantable timber. These montane chaparral areas represented 12,200 acres out of a total of 22,400 acres, or about 54%. As discussed above, in many of these montane chaparral areas, the visible signs of past high-severity fire were still evident, and surveyors specifically recorded large high-severity fire patches. The total area covered by the surveys was vastly larger than the small subset analyzed in Scholl and Taylor 2010 and Collins et al. 2011.) (This report constitutes new information under NEPA because it was not discovered/revealed until recently).

As to the WUI, we have pointed out that it is most efficient and productive to focus on a small defense zone. For example,

Cohen, J.D., and R.D. Stratton. 2008. Home destruction examination: Grass Valley Fire. U.S. Forest Service Technical Paper R5-TP-026b. U.S. Forest Service, Region 5, Vallejo, CA. ***(The vast majority of homes burned in wildland fires are burned by slow-moving, low-severity fire, and defensible space within 100-200 feet of individual homes [reducing brush and small trees, and limbing up larger trees, while also reducing the combustibility of the home itself] effectively protects homes from fires, even when they are more intense)***

Gibbons, P. et al. 2012. Land management practices associated with house loss in wildfires. PLoS ONE 7: e29212. ***(Defensible space work within 40 meters [about 131 feet] of individual homes effectively protects homes from wildland fire. The authors concluded that the current management practice of thinning broad zones in wildland areas hundreds, or thousands, of meters away from homes is ineffective and diverts resources away from actual home protection, which must be focused immediately adjacent to individual structures in order to protect them.)***

Moreover, not only has the size of the WUI never been justified, the need for change document does not provide information to support it as an emphasis area. Even more problematic is the need for change document's claim that there needs to be an "[i]ncreased pace and scale of restoration of resilience in the surrounding, larger landscape." This assertion is baseless and no meaningful explanation is provided for it. Rather, the WUI should be drastically reduced in size in order to make effective use of resources and achieve the desired outcome—i.e., protection of humans and human structures.

Thank you for your time, and we look forward to achieving a forest plan revision process that addresses all the necessary issues and incorporates the data and science we have presented.

Sincerely,

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