CENTER *for* BIOLOGICAL DIVERSITY

THE JOHN MUIR PROJECT *of* EARTH ISLAND INSTITUTE

October 20, 2013

On behalf of the John Muir Project of Earth Island Institute (JMP) and the Center for Biological Diversity (CBD), we submit the following comments regarding the Bald Mountain Project.

First, the EA's description of the "proposal for the creation of 100 square feet of snag basal area across two - 200 acre patches" is factually inaccurate and is not supported in any way at all. Second, the proposal to essentially clearcut several acres—including removing large live conifers over 30 inches in diameter—ostensibly to effectuate aspen regeneration is both a violation of the forest plan and unnecessary and scientifically inaccurate. Third, the 2004 Sierra Nevada Forest Plan Amendment (2004 Framework), pursuant to which the project was prepared, is obsolete and inadequate under NEPA due to significant new information. The project's purpose and need statement, and proposed prescriptions, reflect those of the 2004 Framework. Moreover, the project fails to meet NEPA's "hard look" requirement. For these reasons, we request that you withdraw the project as currently proposed.

Proposal for the Creation of 100 Square Feet of Snag Basal Area Across Two 200 Acre Patches

The EA states that "[a]n alternative was suggested that would create two 200-acre snag patches within the Project area." The EA claims, however, that "[t]he recommendation was not supported by factual information related to the forest type or wildlife species thought to be benefited." This is wrong. As the attached documents make plain, the proposal was well explained as to species, as well as forest types:

> ## Improving Habitat for Black-backed Woodpeckers and Other Species
>
> To generate habitat for black-backed woodpeckers as well as species such as the Hairy woodpecker, White-headed woodpecker, and Mountain Bluebird, create two 200 acre areas with 100 ft2/acre of snag basal area. The trees selected for snag creation should be of greater than 15 inches and in the fir and lodgepole pine forest types [outside of WUI and outside of PACs]. The acreage and snag density targets are based on Tarbill (2010), Seavy et al 2012, and Siegel et al. (2012). The snag creation activity would first recognize the existing density of class 1 (recent) snags and then create additional snags, primarily from live lodgepole pine and secondarily red fir, to bring the density to the target level. The snags could be

> scattered across the acreage among existing live trees or preferably be clumped with patches of existing snags and/or almost dead trees.

Moreover, not only was the proposal well explained during the Dinkey Collaborative, a majority of Collaborative members supported the proposal. And, as the attached email chains show, there was a lengthy discussion about the proposal between the Forest Service and members of the Collaborative in which more citations and description were provided, e.g.:

> [T]he reason we proposed "two 200 acre areas with 100 ft2/acre of snag" was because we wanted to create the kind of habitat that black-backed woodpeckers prefer. More specifically, there are two main components to black-backed woodpecker habitat that we were focusing on -- 1) home-range size, and 2) snag basal area. For black-backeds, the existing data indicate that they select areas generally at least 200-300 acres in size with approximately 100 square feet per acre or higher of recent snag basal area within middle/upper montane, mature/old, conifer forest with moderate to high premortality canopy cover (Goggans et al. 1989, Hutto and Gallo 2006, Russell et al. 2007, Bonnot et al. 2008, Hanson and North 2008, Hutto 2008, Saab et al. 2009, Cahall and Hayes 2009, Bonnot et al. 2009, Siegel et al. 2012, Burnett et al. 2012, Seavy et al. 2012).

Thus, there is no basis at all for the Forest Service to claim that the recommendation was not supported by factual information related to the forest type or wildlife species thought to be benefited. It clearly was supported, and therefore the EA is in error.

The EA goes on to state that "[i]n context, 100 square feet of snag basal area across 400 acres does not allow managers to understand what the prescriptive goal (outcome) is intended and so application is difficult, if not impossible." This too is ridiculous. The intended goal was clearly stated to the Forest Service in the proposal, in many discussions, and in emails. Again, the goal is very straightforward – to benefit wildlife that rely on this kind of snag habitat, which is currently a very rare habitat type, especially on the Sierra National Forest.

The EA further claims that "[t]his alternative was also eliminated because implementation would lead to even greater fuel loads, making the Project area and nearby human communities even more susceptible to impacts from an uncharacteristically severe wildfire. Snags decay further over time and would eventually fall to the forest floor, where they would contribute negatively to the fuel loading." No basis or citation is provided for this claim, and none could be, and moreover, the proposal was clearly explained that it would be conducted outside the Defense Zone, and even outside the Threat Zone. Further, as the proposal clearly articulates in the excerpts above, patches of high tree mortality are a desired ecological outcome for many rare and imperiled wildlife species, including the Black-backed Woodpecker, so the implication that it is somehow a categorically bad outcome if dead trees in the two 200-acres patches might increase future fire intensity in these patches (should fire occur) is inconsistent with the science and with the very purpose of the proposal.

In light of the above factual errors, the EA must be withdrawn.

The Proposed Action Violates the Forest Plan, and is Scientifically Inaccurate, with Regard to Aspen

The Proposed Action would essentially allow clearcutting on 5 acres—including removal of live healthy conifers over 30 inches in diameter—ostensibly for aspen regeneration (see Figure. 13, page 106 of EA, showing removal of nearly all live tree basal area; and Table 21, page 105 of EA, showing removal of 4 trees per acre over 30 inches in diameter in aspen units). However, the forest plan language quoted on pages 96-97 of the EA merely implies that conifer encroachment may be addressed to benefit aspens—in no way does it, or could it, override the clear prohibition in the forest plan against removal of live conifers over 30 inches in diameter (2004 Sierra Nevada Forest Plan Amendment Record of Decision, p. 50). The only exception to this prohibition is very narrow: equipment operability (which is not the reason the EA gives for removal of these large trees). Thus, the Proposed Action would violate the forest plan, and therefore the National Forest Management Act. Second, the EA is scientifically inaccurate on this issue in that it implies that removal of nearly all trees, including large trees over 30 inches in diameter, is somehow *necessary* to effectuate aspen regeneration. The EA (pp. 96-97) cites Shepperd et al. (2006) and Shepperd (2001), and Jones et al. (2005). However, Shepperd (2001) merely presents some anecdotal accounts (through photos) of some clearcut patches in which aspen regeneration occurred (and did not discuss clearcut areas where aspen regeneration goals were unsuccessful, e.g. in numerous areas on the Eagle Lake Ranger District of the Lassen National Forest, east of Lassen National Park), and Shepperd et al. (2006) did not present any data whatsoever but, rather, merely expressed the hypothesis, or policy position, that all or nearly all conifers should be removed near aspen. Neither report looked at whether much less intensive prescriptions, or alternate prescriptions, would effectuate aspen regeneration. Jones et al. (2005) involved thinning of some conifers up to 24 inches in diameter—and doing so within only 9 meters of aspen. This is a much shorter distance than much of the logging proposed in the Bald Mountain EA, which proposes to nearly clearcut up to "at least one dominant tree height" away from aspen—typically at least 50 meters, or more (EA, p. 25). Jones et al. (2005), Figure 3, shows that there were conifers over 24 inches in diameter that existed in these stands, and were retained. The result was vigorous aspen regeneration. Thus, nearly clearcutting, and removing large conifers over 30 inches in diameter, up to 50 meters or more from aspen, is not necessary for aspen regeneration. Moreover, the EA (pp. 25-26) does not discuss whether merely thinning small conifers (e.g., under 12 inches in diameter), and girdling larger conifers (to create ecologically important snags, rather than removing such trees and leaving only stumps) could accomplish the same objective, while enhancing habitat value rather than clearcutting. Nor does the EA (pp. 25-26) provide any ecological rationale as to why some of the conifers over 30 inches in diameter that would be felled would also be removed (and hauled to a timber mill), while others would be left on the ground as large downed log habitat. Why not leave all of the large downed logs for habitat, and remove none of them (or leave some standing as snags)? Further, the EA (pp. 25-26) acknowledges that prescribed fire can achieve aspen regeneration (naturally aspen regenerates best after fire), but dismisses this option without any sound basis, implying (without adequate explanation) that it would require attention to timing of burning treatments.

<u>The 2004 Framework Has Been Rendered Inadequate and Obsolete by Significant New Information, and a Supplemental Environmental Impact Statement (SEIS), or a Sierra Nevada-wide Cumulative Effects EIS, Must Be Prepared Before Further Logging Projects May Proceed</u>

The 2004 Framework forest plan was based upon several key assumptions and conclusions about forest ecology and management that have now been refuted or strongly challenged (and the weight of scientific evidence now indicates a different conclusion) by significant new scientific information, which requires a fundamental reevaluation of the plan under NEPA through a supplemental EIS. In addition, these issues are bioregional in nature, and are not particular to the analysis area in the EA; thus, the cumulative effects analysis in the EA cannot adequately analyze the impacts and cumulative effects of these issues, and a Sierra Nevada-wide EIS must be prepared to address this information and its implications for wildlife species that range throughout the Sierra Nevada mountains.

Below we describe specific issues in this regard, and identify the key new scientific sources pertaining to each issue. For each issue, we first identify the affected assumption/conclusion from the 2004 Framework, and then list or cite and discuss the new scientific sources that now undermine these assumptions/conclusions. Where we have included the scientific references, we have included annotations ***(in parentheses, in bold, italicized font following the citation)***, where necessary, to describe central findings that may not be immediately apparent.

<u>Issue #1—Fire/Fuel Condition Class</u>

<u>2004 Framework Assumptions/Conclusions</u>:

The 2004 Framework EIS (p. 28) stated that one of the main purposes of the 2004 Framework was to “chang[e] a substantial acreage from Fuel Condition Class 2 or 3 to Condition Class 1”. Condition Class was described as representing the number of normal fire return intervals that had been missed due to past suppression of fires by government agencies, with higher Condition Classes indicating higher levels of fuel accumulation and higher potential for high-severity fire, or fire patches in which most or all trees are killed (EIS, p. 126).

The EIS concluded that, due to fuel accumulation from fire suppression, and resulting Condition Class 2 and 3 areas dominating the landscape, “fires that affect significant portions of the landscape, which once varied considerably in severity, are now almost exclusively high-severity, large, stand-replacing fires.” However, the EIS did not offer any data source to support this statement.

<u>New Scientific Information</u>:

The studies empirically investigating this question have consistently found that forest areas that have missed the largest number of fire return intervals in California’s forests are burning predominantly at low/moderate-severity levels, and are not experiencing higher fire severity than areas that have missed fewer fire return intervals:

Miller JD, Skinner CN, Safford HD, Knapp EE, Ramirez CM. 2012a. Trends and causes of severity, size, and number of fires in northwestern California, USA. Ecological Applications 22, 184-203.

Odion, D.C., E.J. Frost, J.R. Strittholt, H. Jiang, D.A. DellaSala, and M.A. Moritz. 2004. Patterns of fire severity and forest conditions in the Klamath Mountains, northwestern California. Conservation Biology 18: 927-936.

Odion, D.C., and C.T. Hanson. 2006. Fire severity in conifer forests of the Sierra Nevada, California. Ecosystems 9: 1177-1189.

Odion, D.C., and C.T. Hanson. 2008. Fire severity in the Sierra Nevada revisited: conclusions robust to further analysis. Ecosystems 11: 12-15.

Odion, D. C., M. A. Moritz, and D. A. DellaSala. 2010. Alternative community states maintained by fire in the Klamath Mountains, USA. Journal of Ecology, doi: 10.1111/j.1365-2745.2009.01597.x.

van Wagtendonk, J.W., K.A. van Wagtendonk, and A.E. Thode. 2012. Factors associated with the severity of intersecting fires in Yosemite National Park, California, USA. Fire Ecology 8: 11-32.

Below is a more detailed discussion of these studies:

Six empirical studies have been conducted in California's forests to assess the longstanding forest management assumption that the most fire-suppressed forests (i.e., the forests that have missed the largest number of fire return intervals) burn "almost exclusively high-severity", as the 2004 Sierra Nevada Forest Plan Amendment Final EIS (Vol. 1, p. 124) presumed. These studies found that the most long-unburned (most fire-suppressed) forests burned mostly at low/moderate-severity, and did not have higher proportions of high-severity fire than less fire-suppressed forests. Forests that were not fire suppressed (those that had not missed fire cycles, i.e., Condition Class 1, or "Fire Return Interval Departure" class 1) generally had levels of high-severity fire similar to, or higher than, those in the most fire-suppressed forests.

1)

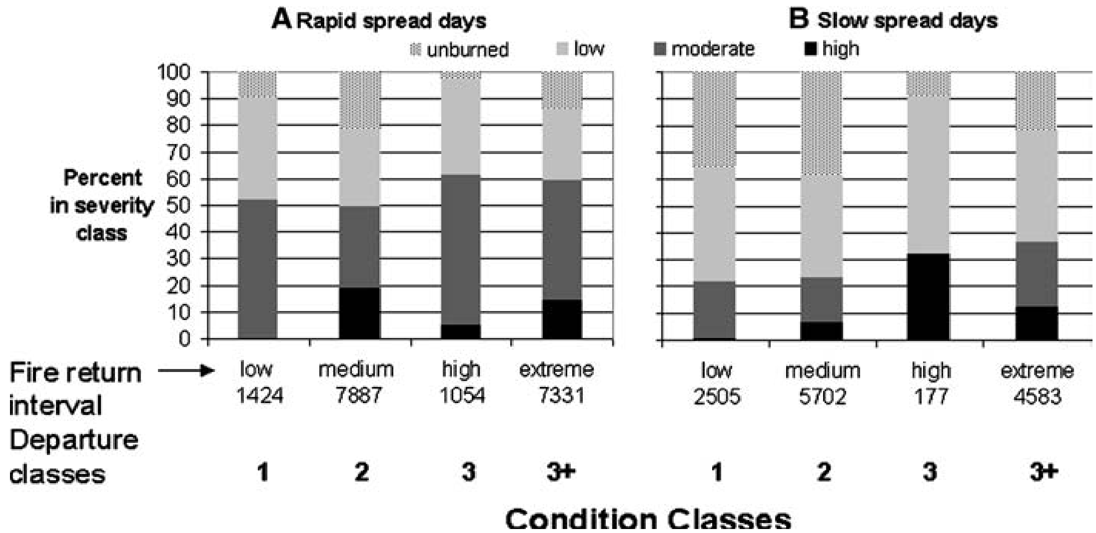

Figure 5 from Odion and Hanson (2006) (*Ecosystems*), based upon the three largest fires 1999-2005, which comprised most of the total acres of wildland fire in the Sierra Nevada during that time period (using fire severity data from Burned Area Emergency Rehabilitation (BAER) aerial overflight mapping), showing that the most long-unburned, fire-suppressed forests (Condition "Class 3+", corresponding to areas that had missed more than 5 fire return intervals, and generally had not previously burned for about a century or more) experienced predominantly low/moderate-severity fire.

2)

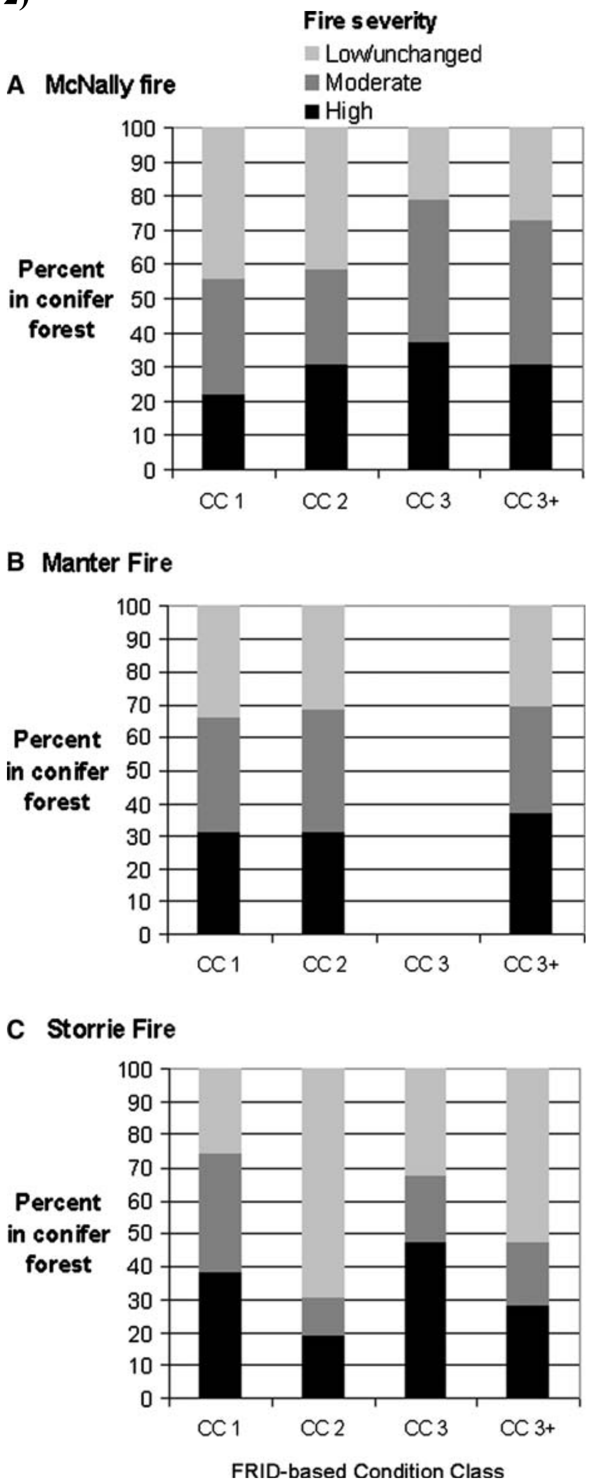

Figure 1 from Odion and Hanson (2008) (*Ecosystems*) (using fire severity data from satellite imagery for the same three fires analyzed in Odion and Hanson 2006), showing that the most long-unburned, fire-suppressed forests (no fire for a century or more) burned mostly at low/moderate-severity, and had levels of high-severity fire similar to less fire-suppressed forests (in one case, even less than Condition Class 1).

3) van Wagtendonk et al. (2012) (*Fire Ecology*), analyzing 28 fires from 1973-2011 in Yosemite National Park, found the following:

> "The proportion burned in each fire severity class was not significantly associated with fire return interval departure class…[L]ow severity made up the greatest proportion within all three departure classes, while high severity was the least in each departure class (Figure 4)."

The most long-unburned, fire-suppressed forests—those that had missed 4 or more fire return intervals (in most cases, areas that had not burned since at least 1930)—had only about 10% high-severity fire (Fig. 4 of van Wagtendonk e al. 2012).

4) Odion et al. (2004) (*Conservation Biology*), conducted in a 98,814-hectare area burned in 1987 in the California Klamath region, found that the most fire-suppressed forests in this area (areas that had not burned since at least 1920) burned at significantly *lower* severity levels, likely due to a reduction in combustible native shrubs as forests mature and canopy cover increases:

> "The hypothesis that fire severity is greater where previous fire has been long absent was refuted by our study…The amount of high-severity fire in long-unburned closed forests was the lowest of any proportion of the landscape and differed from that in the landscape as a whole ($Z = -2.62$, $n = 66$, $p = 0.004$)."

5) Odion et al. (2010) (*Journal of Ecology*), empirically tested the hypothesis articulated in Odion et al. (2004)—i.e., that the *reduction* in fire severity with increasing time-since-fire was due to a reduction in combustible native shrubs as forests mature and canopy cover increases—and found the data to be consistent with this hypothesis.

6) Miller et al. (2012a) (*Ecological Applications*), analyzing all fires over 400 hectares 1987-2008 in the California Klamath region, found low proportions of high-severity fire (generally 5-13%) in long-unburned forests, and the proportion of high-severity fire effects in long-unburned forests was either the same as, or *lower than*, the high-severity fire proportion in more recently burned forests (see Table 3 of Miller et al. 2012a).

Issue #2—"Ecological Collapse" Due to High-intensity Fire

2004 Framework Assumptions/Conclusions:

With regard to the effects of wildland fire in Condition Class 2 and 3 areas, the 2004 Framework EIS made the following conclusion:

> "Condition Classes 2 and 3 are the targets for treatment. Condition Class 2 is composed of lands where fire regimes have been altered from their historic ranges, creating a moderate risk of losing key ecosystem components as a result of wildfire. The vegetative

composition, structure, and diversity of lands in Condition Class 3 have been significantly altered due to multiple missing fire return intervals. These lands 'verge on the greatest *risk of ecological collapse*.'"

2004 Framework EIS, p. 126 (emphasis added). The EIS did not cite to any scientific source to support this statement. The EIS (p. 126) stated that approximately 4 million acres of forest were in Condition Class 2, and about 3 million acres were in Condition Class 3.

<u>*New Scientific Information*</u>:

High-intensity fire patches, including large patches, in large fires are natural in Sierra Nevada mixed-conifer forests, and create very biodiverse, ecologically important, and unique habitat (often called "snag forest habitat"), which often has higher species richness and diversity than unburned old forest. Natural conifer forest regeneration occurs following high-intensity fire. Miller et al. (2012b) 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. In contrast, the old-growth stands dominated by the largest trees, and multi-level canopy cover, CWHR class 6, comprise 1,120,000 acres—more than 10% of the forested area in the Sierra Nevada (2001 Sierra Nevada Forest Plan Amendment Final EIS, Table 4.4.2.1f).

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]).***

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.")***

Donato, D.C., J.B. Fontaine, W.D. Robinson, J.B. Kauffman, and B.E. Law. 2009. Vegetation response to a short interval between high-severity wildfires in a mixed-evergreen forest. Journal of Ecology 97: 142-154. ***(The high-severity re-burn [high-severity fire occurring 15 years after a previous high-severity fire] had the highest plant species richness and total plant cover, relative to high-severity fire alone [no re-burn] and unburned mature/old forest; and the high-severity fire re-burn area had over 1,000 seedlings/saplings per hectare of natural conifer regeneration.)***

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]).***

Shatford, J.P.A., D.E. Hibbs, and K.J. Puettmann. 2007. Conifer regeneration after forest fire in the Klamath-Siskiyous: how much, how soon? Journal of Forestry April/May 2007, pp. 139-146.

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 2010; doi:10.1890/090157. ***(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.)

<u>Issue #3—Spotted Owl PACs "Lost" Due to High-Intensity Fire</u>

<u>2004 Framework Assumptions/Conclusions</u>:

The 2004 Framework FEIS (p. 143-144) claimed that 4.5 California spotted owl Protected Activity Centers (PACs) were "lost" to higher-intensity fire since 1999 (providing a list of the 18 PACs), and claimed that an average of 4.5 PACs were being "lost" to fire each year. The 2004 Framework Record of Decision (ROD), on page 6, echoed this claim about losses of spotted owls to fire, and concluded that increased logging intensity was necessary in order to combat the threat of fire: "[G]iven that valuable [spotted owl] habitat is at high risk of being lost to wildfire, I cannot conclude that maintaining higher levels of canopy closure and stand density everywhere is the right thing to do."

<u>New Scientific Information</u>:

On August 1, 2004, the Associated Press published two investigative news stories on this claim of "lost" PACs, and found that: a) these PACs were generally still occupied by spotted owls; and b) the lead U.S. Forest Service wildlife biologist had been countermanded when he informed the Forest Service that the assertions about owl PACs being lost to fire were inaccurate (see attached news stories). Further, in 2009, scientists discovered, in a radiotelemetry study, that, while California spotted owls choose unburned or low/moderate-severity fire areas for nesting and roosting, the owls *preferentially select* high-severity fire areas (that have not been salvage logged) for foraging (Bond et al. 2009). Roberts (2008) found that spotted owl reproduction rates were 60% higher in mixed-severity fire areas (not salvage logged) than in unburned forest. Moreover, Lee et al. (2012) found that mixed-severity wildland fire (with an average of 32% high-severity fire effects) does not reduce California spotted owl occupancy in Sierra Nevada forests (indeed, a number of the PACs that the 2004 Framework FEIS claimed to be "lost" remain occupied), but post-fire logging appears to reduce spotted owl occupancy considerably. Moreover, new science concludes that logging within the home range of spotted owls reduces occupancy.

Bond, M. L., D. E. Lee, R. B. Siegel, & J. P. Ward, Jr. 2009a. Habitat use and selection by California Spotted Owls in a postfire landscape. Journal of Wildlife Management 73: 1116-1124. ***(In a radiotelemetry study, California spotted owls preferentially selected high-severity fire areas, which had not been salvage logged, for foraging.)***

Bond, M.L., D.E. Lee, R.B. Siegel, and M.W. Tingley. 2013. Diet and home-range size of California spotted owls in a burned forest. Western Birds 44: 114-126 ***(Home range size of spotted owls in the McNally fire was similar to, or smaller than, home ranges in unburned forests in the Sierra Nevada; owls in burned forest had a diet rich in small mammals, including pocket gophers.)***

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, and probability of territory extinction was lower in mixed-severity fire areas than in unburned mature/old forest. Post-fire salvage logging largely eliminated occupancy in areas that were occupied by owls after mixed-severity fire, but before salvage logging.)***

Roberts, S.L. 2008. The effects of fire on California spotted owls and their mammalian prey in the central Sierra Nevada, California. Ph.D. Dissertation, University of California at Davis. ***(California spotted owl reproduction was 60% higher in a mixed-severity fire area [no salvage logging] than in unburned mature/old forest.)***

Seamans, M.E., and R.J. Gutiérrez. 2007. Habitat selection in a changing environment: the relationship between habitat alteration and spotted owl territory occupancy and breeding dispersal. The Condor 109: 566-576. ***(The authors found that commercial logging of as little as 20 hectares, or about 50 acres, in spotted owl home ranges significantly reduced occupancy.)***

Issue #4—Spotted Owl Population Trend

2004 Framework Assumptions/Conclusions:

The 2004 Framework FEIS (pp. 141-142) stated that, using the most current methods, at that time, of determining California spotted owl population trend, the data indicate "a stable population" for all of the Sierra Nevada spotted owl study areas.

New Scientific Information:

Gutierrez et al. (2012), at page 14, found that spotted owls likely have a downward trend on the Eldorado Study Area, which previously reported a likely increasing trend based upon data that was later discovered to be faulty: "The random-effects means model suggested that the average λ over the study period for the modified data set may have been < 1.0, the value for a stable population (λ_t = 0.984, 95% C.I. = 0.955 to 1.013). For comparison, the average λ for the unmodified data set was λ_t = 0.989 (95% C.I. = 0.956 to 1.021). Annual population rate of change exhibited relatively low temporal variability ($\hat{\sigma}^2_{temporal}$ = 0.002, 95% C.I. = 0.000 to 0.018). Estimates of realized population change (which show the proportion of the initial population size remaining each year) suggested a decline in owl abundance (Δ = 0.81, 95% C.I. = 0.54 to 1.22; Figure 6), similar to the decline in the number of occupied territories (Fig. 5). Even the unmodified data set suggested a decline in owl abundance (Δ = 0.89, 95% C.I. = 0.58 to 1.36; Figure A3)…[W]e found considerable support for a negative, log-linear trend in fecundity and productivity over the course of our study (Table 6)."

Further, the Forest Service's Plumas Lassen Administrative Study Report from the Lassen region found the following: "The estimated mean lambda for the Lassen Demographic Study between

1990-2010 was 0.979 (SE = 0.0097), with 95% confidence limits ranging from 0.959-0.999 (Scherer et al. 2010)…These results suggest a decline in the CSO population within the Lassen study area over the 20-year study period" (Keane et al. 2011, p. 119-120).

Moreover, Munton et al. (2012), on page 6, found that the Sierra National Forest Study Area now appears to be declining as well: "The estimated realized population change from 1992 to 2010 for SIE was below 1.0 ($\Delta_t = 0.85$), but the 95% CI included 1.0, indicating no strong evidence of population decline (Figure 5). However, the last four estimates of Δ_t were among the lowest of the study period." Munton et al. (2012) found that the Sequoia-Kings Canyon Study Area, which is entirely on protected national park lands (where logging does not occur), likely has a stable, or possibly increasing, population.

In addition, Conner et al. (2013) found that two California spotted owl study areas that have experienced substantial mechanical thinning have seen declines in owl populations (11-21%), while the one study area in protected forest (no logging) has seen a 22% increase.

Thus, the only spotted owl study area in the Sierra Nevada with an apparently stable or increasing population is the one on protected forests with no logging, and all three of the study areas on national forest lands, which have been subjected to considerable mechanical thinning and post-fire salvage logging, either have declining trends or appear to have declining trends, according to the Forest Service's own science.

Issue #5—Black-backed Woodpecker Habitat Needs and Population Threats

2004 Framework Assumptions/Conclusions:

The 2004 Framework FEIS did not recognize any significant conservation threats to the Black-backed Woodpecker, and the 2004 Framework ROD (p. 52) allowed post-fire clearcutting in 90% of any given fire area, and allowed up to 100% of high-severity fire areas to be subjected to post-fire clearcutting by requiring retention of only 10% of the total fire area unlogged (i.e., the 10% retention can be in low-severity fire areas).

New Scientific Information:

Black-backed Woodpeckers rely upon large patches (generally at least 200 acres per pair) of recently killed trees (typically less than 8 years post-mortality) with very high densities of medium and large snags (usually at least 80-100 per acre), and any significant level of post-fire salvage logging largely eliminates nesting and foraging potential. Moreover, Hanson et al. (2012) (the Black-backed Woodpecker federal Endangered Species Act listing petition) found that there are likely less than 700 pairs of Black-backed Woodpeckers in the Sierra Nevada, and they are substantially threatened by ongoing fire suppression, post-fire salvage logging, mechanical thinning "fuel reduction" logging projects, and possibly climate change. On April 8, 2013, the U.S. Fish and Wildlife Service determined that the Sierra Nevada and eastern Oregon Cascades population of this species may warrant listing under the ESA. In addition, in the fall of 2012, the Forest Service determined that there is a significant concern about the conservation of Black-backed Woodpecker populations, in light of new scientific information indicating that current populations may be dangerously low and that populations are at risk from continued habitat loss due to fire suppression, post-fire logging, and mechanical thinning, recommending some key conservation measures to mitigate impacts to the population (Bond et al. 2012).

Bond, M.L., R.B. Siegel, and D.L. Craig. 2012. A Conservation Strategy for the Black-backed Woodpecker (*Picoides arcticus*) in California—Version 1.0. The Institute for Bird Populations, Point Reyes Station, California, For: U.S. Forest Service, Pacific Southwest Region, Vallejo, CA. ***(Conservation recommendations include: a) identify the areas of the highest densities of larger snags after fire, and do not salvage log such areas (Recommendation 1.1); b) in areas where post-fire salvage logging does occur, do not create salvage logging patches larger than 2.5 hectares in order to maintain some habitat connectivity and reduce adverse impacts on occupancy (Recommendation 1.3); c) maintain dense, mature forest conditions in unburned forests adjacent to recent fire areas in order to facilitate additional snag recruitment (from beetles radiating outward from the fire) several years post-fire, which can increase the longevity of Black-backed Woodpecker occupancy in fire areas (Recommendation 1.4); d) do not conduct post-fire salvage logging during nesting season, May 1 through July 31 (Recommendation 1.5)); and e) maintain dense, mature/old unburned forests in order to facilitate high quality Black-backed Woodpecker habitat when such areas experience wildland fire (Recommendation 3.1).***

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 selected dense, old forests that experienced high-severity fire, and avoided salvage logged areas [see Tables 1 and 2].)***

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.)***

Odion, D.C., and Hanson, C.T. 2013. Projecting impacts of fire management on a biodiversity indicator in the Sierra Nevada and Cascades, USA: the Black-backed Woodpecker. The Open Forest Science Journal 6: 14-23 (in press). ***(High-severity fire, which creates primary***

habitat for Black-backed Woodpeckers, has declined >fivefold since the early 20th century in the Sierra Nevada and eastern Oregon Cascades due to fire suppression. Further, the current rate of high-severity fire in mature/old forest (which creates primary, or high suitability, habitat for this species) in the Sierra Nevada and eastern Oregon Cascades is so low, and recent high-severity fire in mature/old forest comprises such a tiny percentage of the overall forested landscape currently (0.66%, or about 1/150th of the landscape), that even if high-severity fire in mature/old forest was increased by several times, it would only amount to a very small proportional reduction in mature/old forest, while getting Black-backed Woodpecker habitat closer to its historical, natural levels. Conversely, the combined effect of a moderate version of current forest management—prefire thinning of 20% of the mature/old forest (in order to enhance fire suppression) over the next 27 years, combined with post-fire logging of one-third of the primary Black-backed Woodpecker habitat, would reduce primary Black-backed Woodpecker habitat to an alarmingly low 0.20% (1/500th) of the forested landscape, seriously threatening the viability of Black-backed Woodpecker populations.)

Rota, C.T. 2013. Not all forests are disturbed equally: population dynamics and resource selection of Black-backed Woodpeckers in the Black Hills, South Dakota. Ph.D. Dissertation, University of Missouri-Columbia, MO. (***Rota (2013) finds that Black-backed Woodpeckers only maintain stable or increasing populations (i.e., viable populations) in recent wildland fire areas occurring within dense mature/older forest (which have very high densities of large wood-boring beetle larvae due to the very high densities of medium/large fire-killed trees). And, while Black-backeds are occasionally found in unburned forest or prescribed burn areas, unburned "beetle-kill" forests (unburned forest areas with high levels of tree mortality from small pine beetles) and lower-intensity prescribed burns have declining populations of Black-backed Woodpeckers (with the exception of a tiny percentage of beetle-kill areas). The study shows that unburned beetle-kill forests do not support viable populations, but very high snag-density beetle-kill areas tend to slow the population decline of Black-backed Woodpeckers in between occurrences of wildland fire. Population decline rates are alarmingly fast in low-intensity prescribed burn areas, indicating that such areas do not provide suitable habitat. Black-backed Woodpeckers are highly specialized and adapted to prey upon wood-boring beetle larvae found predominantly in recent higher-severity wildland fire areas. Moreover, while Black-backed Woodpeckers are naturally camouflaged against the charred bark of fire-killed trees, they are more conspicuous in unburned forests, or low-severity burned forests, and are much more vulnerable to predation by raptors in such areas. For this reason, even when a Black-backed Woodpecker pair does successfully reproduce in unburned forest or low-severity fire areas, both juveniles and adults have much lower survival rates than in higher-severity wildland fire areas.)***

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.)***

Siegel, R.B., M.W. Tingley, and R.L. Wilkerson. 2011. Black-backed Woodpecker MIS surveys on Sierra Nevada national forests: 2010 Annual Report. A report in fulfillment of U.S. Forest Service Agreement No. 08-CS-11052005-201, Modification #2; U.S. Forest Service Pacific Southwest Region, Vallejo, CA. ***(Black-backed woodpecker occupancy declines dramatically by 5-7 years post-fire relative to 1-2 years post-fire, and approaches zero by 10 years post-fire [Fig. 15a].)***

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]. Moreover, Appendix 2, Fig. 2 indicates that the Sierra Nevada population of Black-backed Woodpeckers is genetically distinct from the Oregon Cascades population, though additional work needs to be conducted to determine just how distinct the two populations are. Siegel et al. 2013 also found that the small number of Black-backed Woodpeckers with mostly unburned forest home ranges had home ranges far larger than those in burned forest, and that the birds in unburned forest were traveling more than twice as far as those in burned forest in order to obtain lesser food than those in burned forests, indicating that such areas do not represent suitable, viable habitat for this species.)***

Tarbill, G.L. 2010. Nest site selection and influence of woodpeckers on recovery in a burned forest of the Sierra Nevada. Master's Thesis, California State University, Sacramento. ***(In post-fire eastside pine and mixed-conifer forests of the northern Sierra Nevada, Black-backed woodpeckers strongly selected stands with very high densities of medium and large snags, with well over 200 such snags per hectare on average at nest sites [Table 2], and nesting potential was optimized at 250 or more per hectare, dropping to very low levels below 100 to 200 per hectare [Fig. 5b].)***

USFWS. 2013. 90-day Finding on a Petition to List Two Populations of Black-backed Woodpecker as Threatened or Endangered. U.S. Fish and Wildlife Service, Washington, D.C., April 9, 2013. ***(USFWS (2013), on page 14, "conclude[d] that the information provided in the petition or in our files present substantial scientific or commercial information indicating that the petitioned action may be warranted for the Oregon Cascades-California and Black Hills populations of the black-backed woodpecker due to***

the present or threatened destruction, modification, or curtailment of the populations' habitat or range as a result of salvage logging, tree thinning, and fire suppression activities throughout their respective ranges." USFWS (2013), on page 19, also "conclude[d] that the information provided in the petition and available in our files provides substantial scientific or commercial information indicating that the petitioned action may be warranted due to small population sizes for the Oregon Cascades-California and Black Hills populations, and due to climate change for the Oregon Cascades-California population." USFWS (2013), at pages 18-19, concluded that substantial scientific evidence indicates that current populations may be well below the level at which a significant risk of extinction is created based upon Traill et al. (2010), and concluded that, while some climate models predict increasing future fire, others predict decreasing future fire (due to increasing summer precipitation), and, in any event, models predict a shrinking acreage of the middle/upper-elevation conifer forest types upon which Black-backed Woodpecker depend most (range contraction).)

Issue #6—Pacific Fishers, Fire, and Forest Structure

2004 Framework Assumptions/Conclusions:

The 2004 Framework FEIS (pp. S-15, 138, 243, and 246) assumed that mixed-severity fire, including higher-severity fire patches, was a primary threat to Pacific fishers, and the Framework FEIS (p. 242) did not include density of small/medium-sized trees among the important factors in its assessment of impacts to fishers.

New Scientific Information:

The data indicate that one of the top factors predicting fisher occupancy is a very high density of small/medium-sized trees, including areas dominated by fir and cedar, and that Pacific fishers may benefit from some mixed-severity fire.

Garner, J.D. (2013). Selection of disturbed habitat by fishers (*Martes pennanti*) in the Sierra National Forest. Master's Thesis, Humboldt State University. ***(Fishers actively avoided mechanically thinned areas when the scale of observation was sufficiently precise to determine stand-scale patterns of selection and avoidance—generally less than 200 meters).***

Hanson, C.T. (2013). Pacific fisher habitat use of a heterogeneous post-fire and unburned landscape in the southern Sierra Nevada, California, USA. The Open Forest Science Journal 6: 24-30 ***(Pacific fishers are using pre-fire mature/old forest that experienced moderate/high-severity fire more than expected based upon availability, just as fishers are selecting dense, mature/old forest in its unburned state as well. When fishers are near fire perimeters, they strongly select the burned side of the fire edge.)***

Underwood, E.C., J.H. Viers, J.F. Quinn, and M. North. 2010. Using topography to meet wildlife and fuels treatment objectives in fire-suppressed landscapes. Environmental

Management 46: 809-819. ***(Fishers are selecting the densest forest, dominated by fir and cedar, with the highest densities of small and medium-sized trees, and the highest snag levels.)***

Zielinski, W.J., R.L. Truex, J.R. Dunk, and T. Gaman. 2006. Using forest inventory data to assess fisher resting habitat suitability in California. Ecological Applications 16: 1010-1025. ***(The two most important factors associated with fisher rest sites are high canopy cover and high densities of small and medium-sized trees less than 50 cm in diameter [Tables 1 and 3].)***

Zielinski, W.J., J.A. Baldwin, R.L. Truex, J.M. Tucker, and P.A. Flebbe. 2013. Estimating trend in occupancy for the southern Sierra fisher (*Martes pennanti*) population. Journal of Fish and Wildlife Management 4: 1-17. ***(The authors investigated fisher occupancy in three subpopulations of the southern Sierra Nevada fisher population: the western slope of Sierra National Forest; the Greenhorn mountains area of southwestern Sequoia National Forest; and the Kern Plateau of southeastern Sequoia National Forest area, using baited track-plate stations. The Kern Plateau area is predominantly post-fire habitat [mostly unaffected by salvage logging] from several large fires occurring since 2000, including the Manter fire of 2000 and the McNally fire of 2002. The baited track-plate stations used for the study included these fire areas [Fig. 2]. Mean annual fisher occupancy at detection stations was lower on Sierra National Forest than on the Kern Plateau. Occupancy was trending downward on Sierra National Forest, and upward on the Kern Plateau, though neither was statistically significant, possibly due to a small data set.)***

Issue #7: Fire Severity Trend

2004 Framework Assumptions/Conclusions:

The 2004 Framework FEIS (p. 125) assumed that fire severity/intensity is increasing in Sierra Nevada forests.

New Scientific Information:

Collins, B.M., J.D. Miller, A.E. Thode, M. Kelly, J.W. van Wagtendonk, and S.L. Stephens. 2009. Interactions among wildland fires in a long-established Sierra Nevada natural fire area. Ecosystems 12:114–128. ***(No increase in high-severity fire found in the study area within Yosemite National Park.)***

Crimmins, S.L., et al. 2011. Changes in climatic water balance drive downhill shifts in plant species' optimum elevations. Science 331:324-327. ***(Precipitation was found to be increasing [Figs. 2A and S1-C].)***

Dillon, G.K., et al. 2011. Both topography and climate affected forest and woodland burn severity in two regions of the western US, 1984 to 2006. Ecosphere 2:Article 130. ***(No increase in fire severity was found in most forested regions of the western U.S., including***

no increasing trend of fire severity in forests of the Pacific Northwest and Inland Northwest, which extended into the northern portion of the Sierra Nevada management region.)

Hanson, C.T. , D.C. Odion, D.A. DellaSala, and W.L. Baker. 2009. Overestimation of fire risk in the Northern Spotted Owl Recovery Plan. Conservation Biology 23:1314–1319. ***(Fire severity is not increasing in forests of the Klamath and southern Cascades or eastern Cascades.)***

Hanson, C.T., and D.C. Odion. 2013. Is fire severity increasing in the Sierra Nevada mountains, California, USA? International Journal of Wildland Fire: http://dx.doi.org/10.1071/WF13016. ***(Hanson and Odion 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 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. 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 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 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.)***

Miller, J.D., C.N. Skinner, H.D. Safford, E.E. Knapp, and C.M. Ramirez. 2012a. Trends and causes of severity, size, and number of fires in northwestern California, USA. Ecological Applications 22:184-203. ***(No increase in fire severity was found in the Klamath region of California, which partially overlaps the Sierra Nevada management region.)***

<u>Issue #8: Home Protection from Wildland Fire</u>

<u>2004 Framework Assumptions/Conclusions</u>:

The 2004 Framework assumed that home protection is best accomplished by a ¼-mile wide "Defense Zone" surrounding towns, and groups of cabins, as well as an additional 1.5-mile wide "Threat Zone" surrounding the Defense Zone.

<u>New Scientific Information</u>:

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.)***

Sincerely,

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