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THE JOHN MUIR PROJECT of EARTH ISLAND INSTITUTE

June 15, 2014

Susan Skalski, Supervisor
Stanislaus National Forest

Sent via email to: comments-pacificsouthwest-stanislaus@fs.fed.us

Re: Rim Fire Recovery Project

Dear Supervisor:

On behalf of the John Muir Project of Earth Island Institute and the Center for Biological Diversity, we offer the following comments on the Draft Environmental Impact Statement (DEIS) for the proposed "Rim Fire Recovery" Project (Project) with the hope that the project will be changed and improved to protect rare post-fire wildlife habitat.

Conifer forests of the Sierra Nevada rely on fire 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 restorative 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, 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.

As explained below, the DEIS does not, and cannot, justify the extensive proposed logging, and it is unlawful under NEPA, NFMA, and the ESA because, for example, it is contrary to the best available science, fails to take the requisite "hard look," violates standards & guidelines, is antithetical to even the Forest Service's stated desires, and fails to follow the Forest Service's own guidance documents, as well as guidance from wildlife biologists. Furthermore, because the DEIS is prepared pursuant to the 2004 Sierra Nevada Framework, that too is unlawful because the assumptions and analysis of impacts behind the 2004 Framework are not supported by current science. In other words, the 2004 Framework is no longer lawful under NEPA due to significant new information, and an SEIS is necessary. 40 CFR 1502.9.

I. Summary of Violations

- Failure to acknowledge and account for the breadth of current science regarding fire ecology, forest ecology, and the detrimental impacts of salvage logging to forest wildlife;

- Failure to acknowledge and account for the fire deficit in the Sierra region, especially the deficit of moderate and high severity fire;

- Failure to rely on the best available science regarding the relationship between salvage logging and future fire;

- Failure to analyze and account for shrub fuels when analyzing future fire;

- Failure to analyze and address impacts to post-fire shrub habitat;

- Failure to account for the cumulative effects associated with salvage logging and reforestation;

- Failure to complete one EIS to address both salvage logging and reforestation;

- Failure to properly acknowledge and account for post-fire flushing (see Hanson and North 2009);

- Failure to acknowledge and account for the post-fire conifer—especially pine—regeneration that is already occurring in the project area;

- Failure to rely on the best available science as to post-fire wildlife habitat;

- Failure to address the use of post-fire conifer forest by Pacific fishers;

- Failure to adequately protect Black-Back Woodpecker habitat from intensive salvage logging (see attached maps showing extensive overlap of Alt 4 salvage units in BBWO habitat; see also attached Excel document showing relationship between Alt 4 Units and BBWO Habitat);

- Failure to follow the Conservation Strategy for the Black-Backed Woodpecker;

- Failure to follow the workshop recommendation to protect enough Black-Backed Woodpecker habitat to maintain at least 75% of the modeled pairs;

- Failure to analyze as an alternative the scientific recommendation to protect enough Black-Backed Woodpecker habitat to maintain at least 75% of the modeled pairs;

- Failure to protect goshawks and goshawk PACs despite known presence of goshawks in or near retired goshawk PACs;

- Failure to protect great grey owls, a state listed endangered species;

- Failure to adequately protect California spotted owl habitat, including both PACs and HRCAs, from intensive salvage logging (see attached maps showing extensive overlap/adjaceny of Alt 4 salvage units in pre-fire PACs and HRCAs; see also attached Excel document showing relationship between Alt 4 Units and CSO PACs/HRCAs);

- Wrongful retirement of ten pre-fire PACs despite presence of owls in six of the PACs (3 singles and 3 pairs), and despite best available science showing owl use of unsalvaged, severely burned forest;

- Illegal redrawing of pre-fire PACs and HRCAs to facilitate intensive salvage logging (see attached maps showing redrawn PACs and original PACs);

- Failure to ensure the viability of California spotted owls;

- Failure to address the importance of severely burned forest to avian diversity and ecosystem integrity in general;

- Failure to properly address soil and watershed impacts;

- Failure to properly analyze level 1 and 2 roads;

- Failure to properly educate the public about burned forests and to accurately describe the Rim Fire area;

- Failure to take the requisite “hard look”;

- Failure to adhere to the best available science and to ensure scientific accuracy and integrity;

- Failure to consider a reasonable range of alternatives;

- Failure to consult pursuant to the ESA as to federally listed frogs;

- Failure to complete an SEIS as to the outdated 2004 Sierra Framework;

II. The Project's Extensive Logging Proposal Is Contrary to Forest Ecology and Would Eliminate Essential Wildlife Habitat

A. Background on Burned Forests and Salvage Logging

> "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)."
>
> - Noss and others, *Frontiers in Ecology & Environment* (2006: 485-86)

The above quote succinctly lays out the numerous problems associated with an EIS that promotes extensive salvage logging, such as the Rim Fire project here. However, since 2006, much more has been learned about post-fire wildlife habitat, and this new literature only further supports the ecological need to maintain post-fire habitat in the Sierras. The very high densities of dead trees created by severe fire – known as "snag forest habitat" – are critical habitat for native bird species (e.g., Siegel et al. 2013, Burnett et al. 2010), and nests of cavity-nesting birds, as well as shrub-nesting birds, are by far the highest in these areas (e.g., Raphael et al. 1987, Burnett et al. 2010, Burnett et al. 2012). Post-fire logging, however, destroys this critical wildlife habitat (see, e.g., Siegel et al. 2013; Burnett et al. 2010, 2011, 2012; Bond et al. 2009,

2013; Buchalski et al 2013; Hanson and North 2008, Hanson 2013, Lee et al. 2012, Manley and Tarbill 2012).

Furthermore, some of the best available wildlife science demonstrating the need to protect post-fire habitats in the Sierras comes from the Forest Service itself. For example, 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.

Not only are post-fire areas that burned at moderate to high intensity known to be essential for wildlife species in the Sierras (and indispensable, therefore, to maintaining ecological integrity and biological diversity), it is remarkable that the EIS proposes to log moderate severity areas, when, for years now, the Forest Service itself has acknowledged the deficit of such fire on the landscape. In other words, the EIS's proposal directly contradicts the Forest Service's past and recent actions in regard to ecosystem integrity. These post-fire areas (of low, moderate, and high severity) support rare and imperiled species like the California spotted owl, Pacific fisher, and black-backed woodpecker.

B. The Proposed Project and Its Impacts

The Project proposes to post-fire log 28,326 acres, and conduct 16,315 acres of roadside logging along roads not maintained for public use (DEIS, p. 25), ostensibly to "reduce fuels for future forest resiliency" (DEIS, p. 7). And Alternative 4 is little different. It includes salvage logging on up to 27,826 acres including 24,176 acres of ground based, 16 acres of ground based/skyline swing, 2,568 acres of helicopter, and 1,066 acres of skyline treatments. Proposed fuels treatments include: 7,975 acres of biomass removal, 20,320 acres of machine piling and burning and 3,650 acres of jackpot burning, 1,309 acres of mastication, and 1,798 acres of drop and lop. Alternative 4 involves felling and removing of hazard trees (green and dead) adjacent to 324.6 miles of forest roads, amounting to 15,692 acres, outside of proposed salvage units. Alternative 4 further includes 315.0 miles of road reconstruction and 209.3 miles of maintenance.

C. All of the Action Alternatives Are Outdated, Contrary to Current Science, and Illegal

The proposed action alternatives presented in the DEIS represent an outdated and inappropriately narrow view of forests in the Sierra Nevada. Salvage logging is not appropriate because, in

addition to directly killing natural post-fire conifer regeneration through ground-based logging, it damages soils (see, e.g., Karr et. al. 2004), and disturbs or eliminates a critical aspect of forest succession – i.e., the post-fire shrubs and vegetation (e.g., manzanita, *Ceanothus*, wildflowers, and nitrogen fixing plants), the post-fire dead trees (snags), and the post-fire live trees (that were not killed by the fire, including, but not limited to, trees that appear dead but later flush [see, e.g., Hanson and North 2009]), associated with what is now known as "complex early seral forest." This forest type is indeed forest (contrary to the Forest Service's claim that it is somehow "deforested"), and importantly, is currently the rarest habitat type in the Sierras. Thus, there is no ecological justification for the claim the salvage logging is somehow necessary for forest recovery.

Salvage logging is likewise completely inappropriate and unnecessary to achieve a stated desire by the Forest Service to more quickly return to mature forest conditions. First, complex early seral forest can itself provide some of the same attributes as late seral forest (e.g., Donato et al. 2012). Second, in order for the forest to contain the complexity that makes late seral forests what they are, it is necessary to maintain (i.e., not log or disturb) the snags, logs, shrubs, and other post-fire structure – i.e., "biological legacies" – as this structure and vegetation is what helps the later stages of forest succession to contain the structural and vegetative complexity they are known for (e.g., Swanson et al. 2011). Put another way, by destroying or harming complex early seral forest, the eventual late seral forest will likewise be harmed. Therefore, the Forest Service's assertions are not supportable – mature forests are much more than just large trees and instead are complex areas that can only be achieved by protecting, not logging or destroying, the attributes that will ensure a complex forest.

A letter (dated October 30, 2013) to Congress from hundreds of scientists across the nation stated the following with regard to the post-fire habitat created by higher-severity fire: "This post-fire habitat, known as 'complex early seral forest,' is quite simply some of the best wildlife habitat in forests and is an essential stage of natural forest processes. Moreover, it is the least protected of all forest habitat types and is often as rare, or rarer, than old-growth forest, due to damaging forest practices encouraged by post-fire logging policies…Numerous studies also document the cumulative impacts of post-fire logging on natural ecosystems, including the elimination of bird species that are most dependent on such conditions, compaction of soils, elimination of biological legacies (snags and downed logs) that are essential in supporting new forest growth, spread of invasive species, accumulation of logging slash that can add to future fire risks, increased mortality of conifer seedlings and other important re-establishing vegetation (from logs dragged uphill in logging operations), and increased chronic sedimentation in streams due to the extensive road network and runoff from logging operations. We urge you to consider what the science is telling us: that post-fire habitats created by fire, including patches of severe fire, are ecological treasures rather than ecological catastrophes, and that post-fire logging does far more harm than good to the nation's public lands."

Similarly, post-fire areas are now known to contain preferred foraging habitat for spotted owls — therefore, protecting them, not logging them, will best achieve owl conservation. This is especially true given that natural conifer regeneration (as explained further below) is abundant in unlogged post-fire areas. In other words, by protecting, not logging, post-fire areas, the Forest Service would actually achieve the goal of protecting old forest emphasis areas and California

spotted owl habitat. Put simply, the journey towards mature forest is itself integral to maintaining ecological integrity because it allows for a) complex early seral habitat that is important to owls and other wildlife, while b) also ensuring that the mature forest will contain the biological attributes (e.g., snags and downed wood) necessary to make that mature forest meaningful to wildlife.

In addition, soil disturbance and movement of vehicles, equipment and personnel on burned sites increases the likelihood of weed invasion, with potentially significant impacts to ecosystem function and disturbance regime (Brooks et al. 2004, Lindenmayer et al. 2008). Untreated logging slash may inhibit plant growth, and logging operations may virtually eliminate nitrogen-fixing shrub and forb species (Donato et al. 2006, Hanson and Stuart 2005, Reinhardt and Ryan 1998). Furthermore, inhibited plant regeneration would preclude burned slope stabilization and result in greater loss of topsoil and increased sedimentation in aquatic habitats than would occur in the absence of post-fire logging (Beschta et al. 2004). Loss of site productivity is a costly impact of post-fire logging because of its deleterious effect on nitrogen and carbon cycling and on future forest growth (Lindenmayer et al. 2008). Loss of soil productivity caused by loss of topsoil and inhibited early-successional plant regeneration is a long-term and irretrievable adverse impact to the forest ecosystem (Beschta et al. 2004).

The propose action alternatives, as explained further below, fail to account for current science and would wrongly destroy important and essential wildlife habitat in violation of NEPA, NFMA, and the ESA.

III. The Project Ignores the Fire Deficit in the Sierra Region and Violates the Forest Service's Own Principles

There is currently a severe fire deficit of all severities in conifer forest in the Sierras (e.g., Stevens et al. 2007, Miller et al. 2012, Mallek et al. 2013, Odion and Hanson 2013, Hanson and Odion 2014, Odion et al. 2014).

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 concluded 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 already a substantial deficit of post-fire wildlife habitat in the Sierras. Thus, given this extreme scarcity of habitat, the Forest Service should be working to correct the deficit of post-fire wildlife habitat, not exacerbate it via salvage logging. Yet the Project at hand seeks to conduct massive and intensive salvage logging on almost 30,000 acres with an additional 16000 acres of roadside logging. Thus, the Project flies in the face of reality and must not go forward as planned.

Further, the Forest Service is working to increase the amount of fire on the Sierra landscape to address ecosystem integrity, not to increase logging. The Rim project, on the other hand, directly contradicts this basic reality by proposing to log burned forest even though the Forest Service is otherwise working to increase fire on the landscape. Given that even the Forest Service is actively working to reduce the fire deficit via prescribed fire and managed wildfire, there is absolutely no reason to log in the Rim area other than felling some trees for public safety reasons. Logging will only exacerbate the problems that even the Forest Service claims it wants to rectify by removing the very things that fire helps ensure on the landscape – e.g., snags, downed logs, post-fire vegetation (including shrubs), etc. Consequently, if ecosystem integrity is truly a desired outcome, then the Project cannot go forward under any of the proposed action alternatives (1, 3, or 4).

IV. The Project's Objective Regarding Future Fire Is Unsupported

One of the project's stated purposes is to reduce fuels in order to reduce future potential fire intensity. But multiple lines of research positively correlate post-fire logging with *increased* fire hazard (Donato et al. 2006, Thompson et al. 2007, McGinnis et al. 2012, Donato et al. 2013). Moreover, the DEIS fails to account for the fuels associated with shrubs, which when accounted for show that there is little difference in the future as to logging versus not logging.

Donato et al. 2006 (p. 352) found that "the lowest fire risk strategy may be to leave dead trees standing as long as possible (where they are less available to surface flames), allowing for aerial decay and slow, episodic input to surface fuel loads over decades." Thompson and others (2007) controlled for past management, weather and topographical influences on fire behavior and severity in replicated post-fire logging treatments across many test plots that burned in both the 1987 Silver fire and the 2002 Biscuit fire in the Siskiyou National Forest of Oregon. They report more severe effects in 2002 where post-fire logging followed the 1987 event than in areas where no logging occurred and snags were allowed to fall and accumulate on the ground over 15 years.

Furthermore, McGinnis et al. (2010) studied four fire areas in the Sierra Nevada and found that: 1) post-fire logging conducted to reduce fuels and future fire intensity actually increased fuels in the short-term and did not reduce fuels in the long-term; and 2) post-fire logging, artificial conifer planting and herbicide spraying increased the spread and occurrence of highly combustible noxious/invasive weeds, and did not effectively reduce future fire intensity, with 92% tree mortality predicted in subsequent fire (more than two decades postfire-logging/planting/spraying) in high fire weather, and 87% mortality predicted even in low fire weather (Table 6). The authors noted that, because the postfire-logging/planting/spraying scenario greatly increases pyrogenic invasive weeds, which tend to increase fire frequency and intensity (especially in areas with active human presence in terms of recreation, hunting, and tree cutting, which can provide sources of ignition), each successive fire would be likely to increase invasive weeds more, and thus increase fire intensity more, and so on, thus undermining goals of reestablishing mature conifer forest.

In addition, Ritchie et al. (2013) found (p. 118): "When surface fuel biomass (>7.6 cm) was expressed as a percent of retained biomass, we found no linear relationship with basal area retention at any period of the study (Fig. 7)." In other words, retaining high levels of snags – even 100% retention – did not lead to an increase in surface fuel. Further, Ritchie et al. (2013), at p. 119, "found no evidence of a treatment effect on either 1–10 h fuel ($p = 0.5536$), or 100 h fuel ($p = 0.7769$)." The authors identified these categories (pertaining to material less than 7.6 cm in diameter [less than 3 inches in diameter]) as the most relevant to future fire spread and intensity; thus, post-fire logging did not reduce fuels in the categories most relevant to fire either.

McIver and Ottmar (2007) found "no differences among treatments in mortality of young trees" at 25, 50 or 100 years post-fire, and found that post-fire logging increased fuels and fire potential for at least 15 years post-fire relative to no logging.

The DEIS's Fire and Fuels section simply fails to properly address these studies. The only reference to studies concluding that post-fire logging does not effectively reduce future fire intensity is on p. 215, in the Soils section, and that conclusion is not addressed in the Fire and Fuels section, which makes a contradictory conclusion based upon modeling assumptions (assumptions that are inconsistent with the description of the action alternatives, as discussed below).

In addition, the reference to Brown et al. (2003) on p. 143 of the DEIS is misleading and inaccurate with regard to the action alternatives. Brown et al. (2003) specifically states that the

"resistance to control" issue stems from logs less than 10 inches in diameter – not from the larger trees that are also being targeted for removal by the project.

Further, the proposed alternatives would "lop and scatter" slash, *i.e.*, spread hazardous fuels created by logging on the ground across treatment units, which will create a uniform bed of uncompressed fine (<10 hour) fuels. Moreover, post-fire logging will impair forest resilience to future fires by removing fire-resistant woody structure that was not consumed in the fire and replacing it with flammable logging slash and planted trees, which will increase fire hazard. In addition, the project will facilitate the spread of invasive flora, particularly exotic grass, which will lead to a more flammable and less fire-resilient landscape, contrary to the stated purpose and need for action.

The objective of post-fire logging is to remove commercially valuable trees that were not consumed by fire. The proposed action will therefore impair forest recovery and fire resilience by removing trees and snags that were not consumed by the fire. The unconsumed boles of large-diameter snags and trees feature high surface area-to-volume (S/V) ratios that limit the amount of oxygen feeding combustion, canopy biomass located high above the ground surface that resists ignition, and high water content that dampens fire intensity (Amaranthus et al. 1989, DellaSala et al. 2004). Large standing snags and trees and large downed logs obstruct solar radiation and ground-level wind movement, and their microclimatic influences tend to moderate ground temperatures, increase moisture of live and dead fuels, reduce the speed and variability of surface winds, and inhibit extreme fire behavior compared to sites cleared by logging (Countryman 1955, McIver and Starr 2000). Predominance of large trees, snags and logs at stand scales reduces fire effects compared to their absence (Arno 2000, Rothermel 1991).
The time required for snags to fall is proportional to their size. It may take many decades for some fire-killed trees to fall. Once on the ground, larger (>9 inches) diameter logs do not readily ignite due to high S/V ratios and water content unless they are very dry and located in close proximity to each other – *i.e.*, one log diameter apart (Albini and Reinhardt 1997).

The DEIS also fails to explain why the salvage logging would need to be so extensive in order to reduce the danger/difficulty of addressing future fire, and fails to explain why fire would even need to be suppressed in the first instance in all of the areas proposed for post-fire logging. The DEIS improperly narrows the purpose and need by requiring all action alternatives to maximize removal of "fuels". Many of the best areas for wildlife are being proposed for logging simply to meet the Forest Service's "Strategic Fire Management" goal, but the Forest Service fails to explain why the areas chosen (see attached map of yellow "Strategic Fire Management Areas") actually need to be logged at all, or in the manner or to the extent chosen, to meet any particular goal.

Finally, the DEIS's Fire and Fuels section claims that the action alternatives would have substantially lower future potential fire intensity than no action, but this conclusion, and all analysis to support it, is predicated upon the assumption that shrubs would be substantially reduced or removed, which is <u>not</u> part of any of the action alternatives. The DEIS (p. 144) states: "As the vegetation matures, fuel loadings would increase. Continued maintenance designed to achieve the desired condition would maintain fuels profiles…The effect on fire suppression forces beyond year 20 would depend on the continued maintenance of the stands."

Table 3.05-2 on p. 139 of the DEIS clearly states that mature shrub cover is associated with high flame lengths of 12-25 feet. The DEIS, p. 147, predicts higher flame lengths and fire intensity in the No Action alternative because "[t]hese sites would be dominated by brush very similar to those effects seen on public lands in the Big Meadow Fire (2009) and observed in the North Mountain (2008), Early (2004), Stanislaus Complex (1987), and Ackerson (1996) fires." Again, however, none of the action alternatives propose brush reduction/removal, so this conclusion would apply equally to the action alternatives. For this reason, the conclusions in the DEIS regarding fire and fuels under the action alternatives are not supported, and there is no rational connection between the facts found and the conclusions made.

Rather than continue to maintain this unnecessary and unsupported logging, the Forest Service should instead see the forest for what it is – essential wildlife habitat that needs protected and maintained.

V. The DEIS Fails to Properly Address Future Reforestation Activities and a Single EIS Is Required

As stated above, the DEIS's fire/fuels analysis, and fire modeling outputs for the action alternatives (relative to no action), are either predicated upon the assumption of shrub reduction/removal or improperly eliminate shrubs from all fire/fuels analysis, creating a skewed impression of the no action versus the action alternatives.

The DEIS (p. 368) also states that the Forest Service's "future management" intentions for the high-severity fire areas of the Rim fire include "planting conifers", and the DEIS (pp. 147, 368) asserts that this is not effective unless shrubs are reduced/removed. Moreover, at the January 31, 2014 public meeting on the Rim fire in McClellan, and in a May 22, 2014 email, the Forest Service has already stated its intention to conduct an artificial reforestation project in the Rim fire area. The May 22, 2014 email message reads, in relevant part:

> **"From:** Horii, Stephanie S [mailto:shorii@ccp.csus.edu]
> **Sent:** Thursday, May 22, 2014 10:38 AM
> **To:** Undisclosed recipients:
> **Subject:** Save the Date: July 10, Rim Fire Technical Workshop
>
> Dear Interested Party,
>
> Please mark your calendars for the US Forest Service **Reforestation Workshop, Part 1** on **July 10, 2014**.
>
> The Reforestation Workshop series will be in two parts: **Part 1** will be on July 10, approximately **9:00 AM - 4:00 PM** at the **USFS Wildland Fire Training Center, Room N106 (Thirty Mile A&B),** in **McClellan, California** (about 20 minutes from downtown Sacramento). **Part 2** will be a two-day meeting in mid-August or mid-September, very likely at the same time and location."

The impacts and cumulative effects of the subsequent reforestation activities, however, are not analyzed in the DEIS. The DEIS's section on reasonably foreseeable future actions (pp. 453-455), for example, contains no mention of this future action, and the DEIS's cumulative effects

sections in each of the issue sections (e.g., Fire and Fuels, Soils, Watershed, Wildlife) fail to include discussion or analysis of the cumulative effects from reforestation activities. Moreover, the Wildlife section does not contain any analysis of adverse impacts and cumulative effects (of hastening the decline of shrubs through removal of snags, artificial planting and direct shrub reduction/ removal) to wildlife such as the Fox Sparrow, a Management Indicator Species that depends upon shrub habitat. Several fellow shrub-dependent species, which the Fox Sparrow represents, are experiencing long-term, consistent, statistically significant population declines in the Sierra Nevada, based upon Breeding Bird Survey data, including the Chipping Sparrow, Wrentit, Brewer's Blackbird, Yellow Warbler, and Orange-crowned Warbler (http://www.mbr-pwrc.usgs.gov/cgi-bin/atlasa12.pl?S15&2&12). The Forest Service has thus "evaded its duty to fully study the combined effects" of separate actions, rendering the DEIS invalid under NEPA. *Pac. Coast Fed. of Fishermen's Ass'ns v. Blank*, 693 F.3d 1084 (9th Cir. 2012).

Furthermore, the reforestation project would not occur absent the salvage logging and the two are therefore inextricably connected. The EIS is thus further in violation of NEPA because the Forest Service improperly prepared a separate EIS for salvage logging and for artificial reforestation even though these are similar, cumulative, and connected actions (see, e.g., *Klamath-Siskiyou Wildlands Ctr. v. BLM*, 387 F.3d 989, 998 (9th Cir. 2004) ["the CEQ regulations implementing NEPA require that an agency consider connected actions and cumulative actions within a single EA or EIS"]); *Thomas v. Peterson*, 753 F.2d 754, 758-59 (9th Cir. 1985) (holding that a logging project and a road to facilitate the logging required a single NEPA document because "the timber sales[could not] proceed without the road, and the road would not be built but for the contemplated timber sales").

VI. The DEIS Fails to Account for Flushing

The DEIS does not adequately address the existence and extent of post-fire conifer flushing—production, in late spring of 2014 (and ongoing), of new green needles in many thousands of ponderosa pines that had no green needles after the fire (Hanson and North 2009)—and the degree to which this alters the assumptions and conclusions in the DEIS with regard to conifer seed sources, fire/fuel loads, ground cover, and fire severity in California Spotted Owl PACs/HRCAs.

VII. The DEIS's Assumptions About Natural Conifer Regeneration in High-severity Fire Areas are Erroneous and Unsupported

The DEIS claims (p. 147) that natural post-fire conifer regeneration will not effectively occur in higher-severity fire patches, based upon an anecdotal representation of a 1949 fire (with no quantitative data provided to support the DEIS's assertion even with regard to this single area), and wholly unsupported implications about lack of conifer regeneration in a few other fires (most of which had been subjected to post-fire logging and artificial conifer planting). This claim is contradicted by the current science. The DEIS (pp. 367-368) also assumes, in the context of the analysis of impacts and cumulative effects to Pacific fishers, that conifer forest will not regenerate except in areas of low/moderate-severity fire and adjacent to the edges of high-severity fire areas. This assumption forms the basis for the DEIS's wrongful conclusion that post-fire logging and artificial planting will not harm fishers, and may benefit fishers.

The available science, which the DEIS ignored, contradicts the DEIS. One recent study found 715 naturally-regenerating conifer seedlings per hectare in high-severity fire patches in the Storrie fire—a large, intense fire of the northern Sierra Nevada and southern Cascades (Crotteau et al. 2013). An earlier study found that, in eastside mixed-conifer forests dominated by fir species prior to the fire, there were 183 conifers/ha over 2 m tall at 23 years post-fire in an unmanaged high-severity fire patch, and the natural conifer regeneration was 79% "yellow pine complex"—mostly ponderosa pine (*Pinus ponderosa*) and Jeffrey pine (*Pinus jeffreyi*) (Raphael et al. 1987). Moreover, the Vegetation Report (p. 10) misrepresents Crotteau et al. (2013) and Donato et al. (2009), which did not provide data on post-fire conifer regeneration as a function of distance into high-severity fire patches; indeed, Crotteau et al. (2013) found high natural post-fire conifer regeneration when surveys in high-severity areas were focused in very large patches (Crotteau et al. 2013, Fig. 1).

The other citations on p. 10 of the Vegetation Report on this point either do not support this assertion, or cannot be verified due to incomplete citations (e.g., citations followed by multiple question marks in the text, and citations that are not in the references section). Further, the Vegetation Report (p. 15) implies that natural post-fire conifer regeneration will not occur more than two mature tree lengths into high-severity fire patches due to lack of seed source, citing McDonald (1983). However, as discussed above, there are now numerous live conifers deep within the large high-severity fire patches due to flushing—which is not accounted for in the DEIS. Thus there are seed sources within these patches that the Forest Service did not factor into its analysis. Moreover, McDonald (1983) is not included in the references section, and did not come up in a search of the literature.

Further, the Forest Service's often asserted assumption that higher-intensity fire areas will not naturally regenerate with conifers is directly contradicted by the Forest Service's own data regarding natural post-fire conifer regeneration in large high-intensity fire patches (Collins et al. 2010). Specifically, the Forest Service found vigorous natural post-fire forest regeneration, dominated mostly by pines and oaks for trees over 1 centimeter in diameter at breast height (Collins et al. 2010, Table 5), and hundreds of trees per acre overall, within several years to about a decade after high-intensity fire, even where native shrub cover was 90-100% (Collins et al. 2010, Tables 5 and 6). This is consistent with findings from other studies (Shatford et al. 2007). And, while a more recent report from Collins and Roller (2013) claims to find little natural conifer regeneration in many high-severity fire areas, this data actually supports the conclusion that logging, not fire, is what hinders regeneration. In that study, nearly half of the area surveyed had been subjected to intensive post-fire logging, which damages soils and removes or destroys natural seed sources, and most of the other areas had been clearcut prior to the fires (which we discovered using pre-fire remote sensing data), or were naturally non-conifer forest, e.g., black oak. The results of Collins et al. (2010 [Table 5]), which found and reported substantial natural conifer regeneration—especially ponderosa/Jeffrey pine and sugar pine—in high-intensity fire patches, excluded salvage logged areas, unlike Collins and Roller (2013). Collins et al. (2010) state that "some areas within each of these fires experienced post-fire management, ranging from post fire salvage logging, tree release and weed management. These areas were removed from analysis." Specifically, Collins et al. (2010 [Table 5]) found 158 ponderosa pine and sugar pine conifers per acre regenerating in high-intensity fire patches in the Storrie fire—68% of the total natural conifer regeneration by species. Extensive natural conifer

regeneration surveys deeper into the Storrie fire, at seven years post-fire, revealed abundant natural conifer regeneration, especially pine (Hanson 2007b [Tables 1 through 4, and Appendix A]). In addition, over 95% of the conifer regeneration in Collins et al. (2010) and Collins and Roller (2013) was under 0.1 cm in diameter at breast height (Collins et al. 2010); the plots used to determine the density of conifers of this size covered only 9 square meters of area per plot, and many high-intensity fire patches in the study only had 3-5 plots for an entire high-intensity fire patch (Collins and Roller 2013). This means that, even if 200-300 naturally-regenerating conifers per hectare actually existed in a given high-intensity fire patch, the methods used by Collins and Roller (2013) would be very unlikely to detect conifers, as a matter of basic math and probability. Further, Collins and Roller (2013) did not gather data on the pre-fire stand composition by conifer species, so they have no basis to suggest that post-fire pine regeneration is less than the pre-fire proportion. In addition, we analyzed the plots selected by Collins and Roller (2013), using Google Earth imagery, and found that most had been subjected to pre-fire clearcutting, which removed the seed sources, or were pure black oak (with no pre-fire conifers), and these facts were not disclosed by Collins and Roller (2013).

The DEIS's reliance (pp. 147, 368) on the assumption that higher shrub cover precludes natural conifer regeneration, is also suspect given that Collins and Roller (2013) found that areas with shrub cover of at least 25% tended to have higher conifer regeneration in high-severity fire patches (see second paragraph of Results). The fact that (in the second to last page of the Discussion) Collins and Roller (2013) speculate that shrub cover impedes natural conifer regeneration simply indicates a bias, given that the results do not support that statement. This fallacy of the notion that high shrub cover precludes natural conifer regeneration is further demonstrated by Crotteau et al. (2013), Table 4, which shows that there were over 700 stems per hectare despite the fact that over 60% of them were overtopped by shrubs. Shatford et al. (2007) also found that shrub cover did not preclude substantial natural conifer regeneration in high-severity fire patches.

Historically, mixed-conifer stands in the Sierra Nevada were sometimes comprised mostly of white fir and incense-cedar (Hodge 1906). Moreover, Fowells and Schubert (1956) shows that ponderosa pine seeds can travel farther than fir and can travel extensively under higher wind conditions. Caprio (2006) found high pine regeneration in high severity fire: "Nearly all regeneration in the high severity areas was *P. jeffreyi*." And "this regeneration frequently occurred as small clusters that appeared to have originated from buried seed caches", demonstrating not only pine regeneration but also that there can be alternative seed dispersal mechanisms. Crotteau et al. (2013) explained that "[a]lthough fir regeneration was prolific, 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." In other words, the outcome, while not pine centric, was nonetheless extremely important because it returned fire and its associated heterogeneity to the landscape, which is exactly what occurred with the Aspen fire as well. Further, Crotteau et al. 2013 also explained that: "Although we did not observe Pinus spp. densities in the same magnitude as those of Abies spp. (Fig. 4; as in Shatford et al. (2007) and Zald et al. (2008)) analysis of the pine index confirmed that Low-, Medium-, and High-severity burns had more positive effects on the proportion of pine regeneration than the Unchanged strata in the Low-elevation Fir and Mixed Conifer forest types. Excluding the Unchanged sites, each level of disturbance severity yielded approximately the

same proportion of Pinus spp. regeneration." Thus, while fir dominated overall, pine was nonetheless prevalent and was so amongst all the severity burns, including high-severity.

Moreover, it is important to recognize the deficit of montane chaparral on the landscape and its value to wildlife (e.g., Nagel and Taylor 2005). Siegel et al. (2011) concluded that native fire-following shrubs are vitally important to biodiversity in complex early seral forest (CESF) created by high-intensity fire: "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. have found that shrub dominated landscapes are critically important wildlife habitat: "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).

Finally, the Forest Service fails to recognize that the current science has addressed the Forest Service's longstanding assumption of highly negative ecological effects from high-intensity fire areas that re-burn at high intensity within a relatively short time period after the initial burn. Donato et al. (2009) found that areas that experienced high-intensity re-burn 15 years after the initial high-intensity fire had "the highest plant species richness" compared to other habitat types, including unburned old forest. Natural conifer regeneration in these "short-interval" re-burn areas ranged from 298 to 6,086 per hectare. These results show that high-intensity re-burn areas are not things to be avoided but, rather, comprise a highly biodiverse and ecologically important *forest* habitat type, contrary to the Forest Service's assumptions.

In sum, the available science demonstrates that natural conifer regeneration is substantial, that conifer regeneration can in fact be dominated by pine, and that shrub growth is essential and critical to maintaining biodiversity. The DEIS is therefore invalid under NEPA because it fails to analyze dissenting science, fails to take a hard look at impacts, and failed to consider the best available science.

VIII. The DEIS Fails to Disclose Natural Post-fire Conifer Regeneration Currently Existing Deep within Large High-severity Fire Patches, and Fails to Analyze Adverse Impacts and Cumulative Effects of Tractor Logging on Current Conifer Seedlings in Such Areas

On May 1, 2014, approximately two weeks before the DEIS was released, we conducted a site visit of the Rim fire on the Stanislaus National Forest, focusing on the six largest high-severity fire patches within conifer forest, including the two large patches south of the Tuolumne River, the two patches north of Cherry Creek and southwest and southeast of the largest private inholding, and the large patch that is bisected by Cottonwood Road and is on the northwest of the largest private inholding. In all cases we found natural post-fire conifer regeneration already occurring—not only within 100 meters of patch edges, but also dozens to hundreds per acre (and occasionally thousands per acre) hundreds of meters—even more than a kilometer—into the interior of the largest high-severity fire patches (see photos below, taken by Chad Hanson, Ph.D., 5/1/14). Nowhere does the DEIS divulge the existence of regenerating conifers or analyze the adverse impacts and cumulative effects of proposed logging—approximately 85% of which would be ground-based tractor logging—on this natural regeneration, especially in terms of direct mortality of seedlings (see, e.g., Donato et al. 2006). This is particularly problematic given that facilitating the return of conifer forest is one of the main stated purposes and needs of the Project (DEIS, p. 8), and given that the Forest Service must have known about the natural regeneration well before the DEIS was released—a DEIS which claims (as discussed above) that natural conifer regeneration will not occur in the large high-severity fire patches except adjacent to edges.

Similarly, the DEIS fails to meaningfully divulge the existing natural regeneration of oaks in the large high-severity fire patches, or analyze the impacts and cumulative effects of ground-based logging on regenerating oaks, in violation of NEPA (see photos below, taken by Chad Hanson, Ph.D., 5/1/14).

IX. The Project's Assumptions Regarding High Severity Fire and High Severity Patch Size Are Contrary To The Science

"Snag forest habitat", also known as "complex early seral forest" – characterized by predominantly fire-killed trees from relatively recent fire, as well as abundant downed logs and montane chaparral patches and natural conifer regeneration of variable density – supports levels of native biodiversity and wildlife abundance comparable to or greater than old-growth forest, but is much rarer than old-growth forest in the Sierra Nevada (Burnett et al. 2010, 2012; DellaSala et al. (in press), Donato et al. 2012, Odion and Hanson 2013, Siegel et al. 2011, 2013, Swanson et al. 2011). Snag forest habitat is the most threatened (by post-fire logging, pre-fire thinning, and fire suppression) and least protected forest habitat type in the Sierra Nevada, and has declined by fourfold or more in the past century due to fire suppression (Odion and Hanson 2013, Odion et al. 2014).

Figure 2. Complex early-seral habitat, or "snag forest habitat", with many standing snags, downed logs, patches of montane chaparral, wildflowers, and abundant patches of natural conifer regeneration. Star Fire of 2001, Tahoe National Forest (Photo taken six years post-fire in 2007).

Fig. 3. Post-fire "salvage" logged area, devoid of most important habitat structures. Moonlight Fire of 2007, Plumas National Forest (Photo taken 2009).

Historically, prior to fire suppression and logging, high-intensity fire in mixed-conifer forests of the Sierra Nevada management region frequently ranged from 14-50%, or more, of fire effects, and large patches of high-intensity fire, up to thousands of acres in size, were a natural part of historic fire regimes (Leiberg 1902, USFS 1911, Show and Kotok 1924, Show and Kotok 1925, Beaty and Taylor 2001, Bekker and Taylor 2001, Hanson 2007, Odion et al. 2014, Baker 2014 (in press)).

Contrary to the implication in the DEIS (p. 7), and the Vegetation Report, high-severity fire patches several hundred acres to several thousand acres in size have been documented in historical mixed-conifer forests of the central and southern Sierra Nevada (e.g., USFS 1911, Baker 2014). Baker (2014, in press) documented numerous high-severity fire patches over 250 hectares in size (over 618 acres) in mixed-conifer forests of the southern/central and northern Sierra Nevada, and some were over 1,000 hectares, with the largest being 9,400 hectares in size (about 23,000 acres).

X. The Project Fails to Address the Use of Post-Fire Habitat By Pacific Fishers and Is Wrong as to Fisher Habitat

The DEIS's section on Pacific fishers ignores Hanson (2013)—the only study to ever empirically test the relationship between Pacific fishers and post-fire habitat with field data—and instead relies upon previous papers that have simply *assumed* that higher-severity fire removes fisher habitat. Hanson (2013), on p. 25 (right column), analyzed fisher use of unlogged moderate and higher-severity fire areas, where the moderate severity category corresponded to RdNBR values of 316-477 and higher-severity corresponded to RdNBR over 477, and that these two categories, in turn, corresponded to approximately 15-50% basal area mortality and over 50% basal area

mortality, respectively, based upon the findings of Miller et al. (2009) (see Fig. 4D of Miller et al. 2009). As stated in the Introduction section of Hanson (2013), the threshold of >50% basal area mortality for higher-severity fire was used because the U.S. Forest Service, Region 5 (California), has itself identified 50% basal area mortality as a key forest management threshold, categorizing basal area mortality of 50% or greater as a "deforested" condition to be avoided, based in significant part upon assumptions of harm to imperiled old forest species (see http://www.fs.fed.us/r5/rsl/projects/postfirecondition/methods/).

In other words, Hanson (2013) took the moderate severity category (RdNBR values of 316-640) described in Miller et al. (2009) and split it into two parts (above and below 50% mortality) in order to be able to correspond to the Forest Service's own position regarding "deforested" conditions. By combining the upper half of moderate severity (RdNBR values of 477-640) with high severity (RdNBR values of 641 and above), Hanson (2013) was able to make findings that correspond directly to the Forest Service's position that it is not just high severity fire, but also the upper half of moderate severity fire, that renders an area "deforested."

Hanson (2013) reported that, while the result in Table 2a (i.e., that fishers select areas of pre-fire dense, mature forest in the fire areas) was not statistically significant at alpha = 0.05, it was statistically significant at alpha = 0.10 (in lay terms, this essentially means that, statistically, the result was not over 95% certain, but it was over 90% certain), and Hanson (2013) concluded that areas of high biomass and structural complexity (including high biomass of snags, downed logs, and shrubs) are important to Pacific fishers, and that post-fire logging is likely to harm fishers by removing most of the biomass and structural complexity in higher-severity fire areas.

Further, Table 4 of Hanson (2013) shows that fishers are using moderate/higher-severity areas (again, corresponding to areas of 15-50% basal area mortality and over 50% basal area mortality) at levels comparable to low-severity areas (actually, the use of moderate/higher-severity areas was slightly higher, but the difference was not statistically significant). And, Hanson (2013) (Fig. 2) found that fishers use of areas increased when the proportion of higher-severity fire (over 50% basal area mortality) increased within a 500-meter radius, and this result was statistically significant. Hanson (2013) concluded that areas of dense, mature/old forest that burn at higher-severity, and have not been subjected to post-fire logging, shrub removal, and artificial conifer plantation establishment, are suitable Pacific fisher habitat.

Because the DEIS ignored the findings of Hanson (2013), the DEIS erroneously assumed that only areas dominated by larger live trees and moderate to high canopy cover are suitable fisher habitat, leading the DEIS to improperly minimize adverse effects of proposed logging to fishers.

In light of the above, and in light of the failure of the DEIS to analyze reasonably foreseeable cumulative effects of shrub reduction and artificial conifer planting, as discussed above, the DEIS failed to take a hard look at impacts and cumulative effects to fishers, and failed to consider the best available science, in violation of NEPA and NFMA.

Further, the so-called "forest carnivore connectivity corridor (FCCC)" in Alt. 3 & 4 is anything but that. Instead of protecting the corridor, the DEIS seeks to intensively log it pursuant to outdated notions of snag retention (e.g., 4 to 6 conifer snags per acres). There is no basis to

assume that 4 to 6 conifer snags per acre is adequate for fisher habitat in the future, and more importantly, there is no basis to assume that salvage logged areas will provide habitat value to fishers in the forseeable future. Moreover, the FCCC includes habitat to the south of Cherry Lake considered to have low/no probability for fisher occurrence according to Spencer et al. 2010 (Proposed FCCC map on page 54 of the Rim Recovery DEIS). And the FCCC does not encompass mature forest on the west side of Cherry Lake that burned with low or moderate severity during the Rim Fire. This second area west of Cherry Lake is considered high probability for fisher occupancy (Spencer et al. 2010). The emphasis on habitat protection for forest carnivores in the proposed FCCC should therefore a) actually protect the post-fire habitat presently available, and b) not just focus on low quality habitat areas.

XI. The DEIS Fails to Adequately Analyze Impacts to the Black-backed Woodpecker And the Forest Service Wrongly Ignored Guidance Regarding Black-backed Woodpecker Conservation

A. Background

On May 2, 2012, a Petition was filed to list the subspecies of Black-backed Woodpeckers in California/Oregon (Sierra Nevada and eastern Oregon Cascades) as threatened or endangered under the Endangered Species Act. On April 8, 2013, the U.S. Fish and Wildlife Service issued a positive "90-day" finding, determining that substantial scientific evidence had been presented indicating that listing the California/Oregon subspecies as threatened or endangered under the federal Endangered Species Act may be warranted, citing in particular the lack of suitable habitat and perilously low population size resulting from fire suppression and post-fire logging, the U.S. Forest Service's failure to initiate meaningful protections for this species and its habitat after fire on national forest lands, as well as increasing threats from range contraction of middle/upper montane conifer forest, and possible decreases in future fire (due to vegetation changes and increased precipitation), from anthropogenic climate change (USFWS 2013).

In the fall of 2012, the U.S. Forest Service, in conjunction with the Institute for Bird Populations, explained that there is a significant concern regarding the conservation of the black-backed woodpecker population in California, and therefore released a Conservation Strategy for this species (Bond et al. 2012). The Conservation Strategy established a number of measures to reduce the risk of losing population viability of this species in California.

In 2013, new findings were issued showing the importance of post-fire snag density for creating high quality woodpecker habitat. Siegel et al. (2013), at page 45, found that, except for the three birds that foraged substantially in unburned forest (and for which Siegel et al. expressed major concerns), every bird had mean snag basal areas of more than 17 square meters/hectare, i.e., more than 74 square feet/acre of snag basal area. Areas selected by Black-backed Woodpeckers for foraging had about 13 snags in a 10-meter radius plot (0.031 hectares), or about 415 snags per hectare (about 170 snags per acre) (Siegel et al. 2013, p. 49, Table 6). The level of snags in places used by Black-backed Woodpeckers was about four times higher than random locations (Siegel et al. 2013, p. 49, Table 6). The three most significant factors in determining successful Black-backed Woodpecker foraging were large snags, medium snags, and small snags (Siegel et al. 2013, p. 49). Snag levels were even higher in sites selected for nesting by Black-backed

Woodpeckers, averaging about 18 snags per 10-meter radius plot, or about 570 snags/hectare (about 232/acre) (Siegel et al. 2013, p. 59, Table 13). Black-backed Woodpecker occupancy was positively related to fire severity (Siegel et al. 2013, p. 47). Further, Siegel et al. (2013), on page 33, noted "the general absence of foraging locations within the post-fire harvest areas."

B. Project Impacts

The DEIS (p. 386) states that under the Proposed Action, 63% of the suitable Black-backed Woodpecker habitat, and 59% of the modeled pairs, would be removed by logging on the Stanislaus National Forest portion of the Rim fire (the project area). Alternatives 3 and 4 are little better—Alt 3 removes 54% and Alt 4 removes 46% of the modeled pairs (see also attached maps showing overlay of Alt 4 units on modeled BBWO habitat).

C. DEIS Misstatements and Erroneous Conclusions As to the Status of, and the Conservation Strategy for, the BBWO

The DEIS (p. 383) cites Siegel et al. (2013) for the proposition that Black-backed Woodpeckers forage on snags of all sizes. This is misleading because Siegel et al. (2013), at pp. 49-50, found that Black-backed Woodpeckers preferentially forage on larger snags, significantly more than expected based upon availability. Siegel et al. (2013) obtained radio tracking data from 20 black-backed woodpeckers across three recent fires on National Forests in California and found that woodpeckers significantly avoided the salvaged areas (almost total avoidance of any salvage logged areas). Siegel et al. (2013) even states: "Note the general absence of foraging locations within the post-fire harvest areas." Further, the woodpeckers that used unburned forest in the Siegel study had dramatically larger home ranges than the birds that foraged in burned forest indicating once again that what matters is snag density and also showing that unburned forest is likely poor habitat – as stated in Siegel et al 2013: "Our finding that home ranges across our study areas varied in size so greatly – by as much as an order of magnitude – and that the local density of snags largely explains this variation in home range size, provides a quantitative relationship (between snag availability and home range size) . . . . While the differences in most aspects of foraging behavior between burned-forest birds and unburned-forest birds were few, the foraging strategies were quite different. The unburned-forest birds traveled much greater distances between foraging events and, as a consequence, occupied much larger home ranges. It is unclear how this might translate into fitness, competitive ability, or nesting success, but the strong relationship we found between snag availability and home range size suggests intriguing avenues for further research into factors that may limit the abundance of Black-backed Woodpeckers across the larger, unburned landscape. Although Black-backed Woodpeckers are known to inhabit portions of unburned, mid-elevation conifer forests in California at low densities, they appear to be entirely or nearly absent from many such areas. One explanation for this pattern may involve prohibitively high energetic costs of foraging where prey is diffusely distributed. Extracting large larvae from deep within dead wood would appear to be a relatively energy-intensive mode of foraging. It may be that Black-backed Woodpeckers become less able to satisfy the energy demands of growing nestlings plus maintain their own body reserves as time spent foraging – and distance flown while foraging – become greater and greater. There may be a threshold prey density at which the energetic cost of foraging simply becomes too high, and

Black-backed Woodpeckers raising broods are unable to balance their energy budgets – that threshold may be exceeded in unburned forest stands with low densities of prey."

The DEIS's reference (p. 381) to a stable population distribution in the Sierra Nevada for black-backed woodpeckers is also misleading, especially from a conservation perspective. Distribution is in no way synonymous with viability, or a stable population trend. A species like the woodpecker, which uses ephemeral habitat, can be "distributed" but still be at extremely low population numbers, and be vulnerable to extinction. Indeed, the best available population estimate shows the population to be extremely low (Hanson et al. 2013), and its overall burned forest habitat to be extremely minimal (under 200,000 acres [Howell et al. 2014]). Thus, the DEIS fails to actually explain how Black-backed Woodpeckers are being adequately protected, instead merely relying on data that does not answer the issue of population or trend. Further, contrary to the implication in the DEIS (p. 381), Siegel et al. (2012) contains no data on Black-backed Woodpecker population trend; thus this study cannot be cited for the proposition that populations are "relatively stable" in the Sierra Nevada.

Further, but just as importantly, the project does not comport with the Forest Service's own guidance on this species—the Conservation Strategy, including the conservation recommendations to avoid post-fire logging in nesting season and to avoid post-fire logging patches larger than 2.5 hectares in size (Bond et al. 2012). The Forest Service is obligated to follow its own guidance and here did not. In fact, the DEIS does not ever adequately explain why it fails to follow its own guidance. The effects and cumulative effects to Black-backeds of failing to follow the Conservation Strategy are not analyzed in the DEIS.

The project would have significant, or potentially significant, impacts and cumulative effects to Black-backed Woodpeckers, in light of the above, especially given that any loss, let alone a 46-59% loss, is significant for such a rare species that currently has very little habitat on the Sierra landscape. Given the totality of the situation: a) an Endangered Species Act "may be warranted" finding; b) the best available science indicating that there are likely fewer than 700 Black-backed Woodpecker pairs remaining in California; c) the best available science indicating that Black-backed Woodpeckers have declined substantially since the early 20th century in the Sierra Nevada, due to a reduction in post-fire habitat from high-severity fire from fire suppression and post-fire logging; d) Black-backed Woodpecker populations are projected to suffer an additional substantial loss in the Sierra Nevada over the next three decades if current management direction, including salvage logging 33% of suitable Black-backed Woodpecker habitat, continues (Odion and Hanson 2013); e) the Forest Service's own Conservation Strategy (Bond et al. 2012) recommending that, in order to conserve Black-backed Woodpeckers, no salvage logging of Black-backed Woodpecker habitat should occur during nesting season, and salvage logging patches should be smaller than 2.5 hectares—both of which are cast aside in the DEIS; and f) Black-backed Woodpeckers are projected to experience a loss of most of their habitat by the end of the century, due to range contraction of the forest types upon which they depend, as a result of anthropogenic climate change, the Forest Service should adhere to the scientific recommendation from the Rim Fire workshop to protect enough habitat to maintain 75% of the modeled black-backed woodpecker pairs.

D. The DEIS Wrongly Ignores the Recommendation to Protect 75% of Modeled BBWO Pairs

The DEIS violates NEPA by failing to take a hard look at the impacts and cumulative effects of refusing to incorporate the recommendations of Tingley et al. (2014) (the recommendation that at least 75% of the Black-backed pairs on the Stanislaus National Forest portion of the Rim fire be retained), and by failing to fully analyze a reasonable range of alternatives. The DEIS (p. 46) dismisses this recommendation from a scientist panel with only a perfunctory and vague statement about not wanting to leave too much fuel, apparently referring to the medium and large snags in the higher-severity fire patches. Such a cursory dismissal of major scientific concerns cannot satisfy NEPA's requirements.

In light of the foregoing, the DEIS fails to take a hard look, and adequately analyze cumulative effects to Black-backed Woodpeckers, under NEPA.

XII. The DEIS Fails to Adequately Analyze Goshawks

The DEIS fails to divulge the fact that Northern Goshawks have been detected in 2014 in the project area, fails to divulge the location of such detections, and fails to disclose the adverse effects and cumulative effects of proposed logging in the biological home ranges of these goshawks. This fails to satisfy NEPA's hard look standard, and also necessitates production of a supplemental DEIS.

XIII. The DEIS Fails to Adequately Analyze Great Grey Owls

The DEIS fails to divulge the fact that Great Gray Owls have been detected in 2014 in the project area, fails to divulge the location of such detections, and fails to disclose the adverse effects and cumulative effects of proposed logging in the biological home ranges of these owls. This fails to satisfy NEPA's hard look standard, and also necessitates production of a supplemental DEIS.

XIV. The DEIS Fails to Adequately Analyze the Science Addressing California Spotted Owls and Their Burned Forest Habitat And Fails to Appropriately Protect Owls and Owl Habitat

The DEIS and Wildlife Biological Evaluation (BE) fail to adequately analyze or incorporate the most recent science regarding California spotted owls ("CSO") in the Sierras (see, e.g., attached Bond comments, which we fully incorporate by reference into these comments). The Forest Service instead continues to rely on outdated information as to the current status of the CSO in the Sierras as well as to what constitutes suitable habitat. Moreover, the DEIS fails to address the impacts, especially the cumulative impacts, of the extensive salvage logging proposed (in all action alternatives) in, adjacent to, or very near to PACs and HRCAs. Merely protecting a PAC from salvage logging, which the DEIS does not even accomplish, is grossly insufficient given the fact that PACs are just a small portion of an owl's overall home range. As it currently stands, the DEIS is the equivalent of protecting one's bedroom from attack but allowing the rest of the house to be destroyed. You may still have somewhere to sleep but nothing else.

A. California Spotted Owl Status and Trend

The DEIS (p. 301) states that "[p]ost-fire salvage logging may adversely affect rates of owl occupancy (Lee et al. 2012)" and the DEIS (p. 316) admits that 26 CSO Protected Activity Centers (PACs) are within 0.25 miles of proposed logging and 5 are within logging units, yet the DEIS (pp. 315-317) then inexplicably concludes that the action alternatives would not adversely affect the viability of the spotted owl or result in a trend toward listing under the Endangered Species Act. Not only is this conclusion at odds with the facts found, but also the DEIS fails to disclose the fact that the current demographic data clearly concludes that California spotted owls are declining in population; thus the analysis of impacts and cumulative effects is fundamentally flawed.

The recent literature on California spotted owl demographics on the Sierra National Forest and throughout the range (Connor et al. 2013, Tempel and Gutierrez 2013, and Temple 2014) show a serious problem—i.e., a clear population decline—one that the DEIS is ignoring in its analysis and conclusions by failing to address these studies at all. The DEIS and BE must therefore be redone. The cumulative effects analysis is uneqivocally incomplete without considering the best available science on the status of the species in the study area and throughout its range. This is especially so given that Conner et al. (2013) found declining California spotted owl populations in all of the study areas that are primarily on national forest lands, which have been and continue to be impacted by mechanical thinning and post-fire logging, while the one study area in protected forest (no logging) on the Sequoia/Kings-Canyon National Park, was the only area with stable or slightly increasing populations, indicating that Forest Service forest management is contributing to a downward population trend. This was ignored in the DEIS and as a result, the DEIS's conclusions as to impacts to owls are erroneous.

B. Suitable California Spotted Owl Habitat and Salvage Logging

Spotted owls evolved with fire and biologists have repeatedly documented that spotted owls use burned landscapes (including high-intensity burns). Snag perches used by spotted owls during foraging, and prey habitat itself abounds after fire. Intensely burned forest, if left intact, can be of benefit to owls (e.g., Bond et al. 2009) – what is unsuitable as habitat is post-fire areas *that have been salvage logged*.

The best available science indicates that burned forest is suitable owl habitat and that salvage logging adversely affects spotted owl occupancy and reproduction:

- 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.

- In the Moonlight fire of 2007 on the Plumas National Forest, while a larger number of spotted owl PACs remained in the system due to historical occupancy, at the time of the Moonlight fire there were only 9 California spotted owl sites occupied by pairs (much of the area had been logged in previous years/decades), based upon occupancy data provided by the Plumas National Forest, and all of them lost occupancy by the pairs following extensive post-fire logging on adjacent private timberlands (and, later, on national forest lands), which began in the summer of 2007, just days and weeks after the fire occurred, indicating that post-fire logging, not fire, was the cause of lost occupancy (DellaSala et al. 2010 [The Wildlife Professional]) (**Appendix A** shows nearly all Moonlight fire PACs immediately adjacent to private industrial timberlands, which were clearcut in 2007 and 2008), contrary to the implication in the Wildlife BE (p. 34). Indeed, the only PAC that was occupied by a pair at one year post-fire (after the salvage logging on private lands immediately adjacent to the other PACs had already occurred) was PL107 (in the southern/central portion of the fire area), which is the only one of them that was not adjacent to post-fire clearcutting on private industrial timberlands (see **Appendix A**; see also Keane et al. 2012, Fig. 16) (this PAC also had predominantly high-severity fire effects—see Keane et al. 2012, Fig. 12a). This also demonstrates that PACs alone are nowhere near sufficient to sustain spotted owls (which have home ranges many times larger than mere ~120 ha PACs. The is broadly consistent with findings of Clark et al. (2013), who found that post-fire salvage logging in high-severity fire areas significantly increased territory extinction of northern spotted owls in southwestern Oregon. Unlike Lee et al. (2012), who were able to analyze the relationship between high-severity fire and California spotted owl occupancy where most sites had not been salvage logged (finding slightly higher owl occupancy in mixed-severity fire areas than in unburned mature forest), salvage logging of varying degrees was pervasive in the Clark et al. (2013) study sites. The available scientific data indicate that post-fire logging on both public and private lands is a major threat to California spotted owl occupancy and populations.

- Bond et al. (2009) quantified habitat selection, which is how much owls used forest that burned at a particular severity compared with the availability of that burn severity. The authors banded and radio-marked 7 California spotted owls occupying the McNally Fire in the Sequoia National Forest four years after fire, and radio tracked them throughout the breeding season. Very little (<3%) of the foraging ranges of these owls was salvage logged, so there were essentially no confounding effects of logging with high-intensity fire. Furthermore, all owls had unburned, low, moderate and highly burned patches of forest in their home ranges from which to choose, so the authors could quantify whether owls selected or avoided any of these burn intensities. This is the first study to examine

foraging habitat selection by spotted owls in burned forests that were not subjected to substantial post-fire logging. The probability of an owl using a site for foraging was significantly greater in burned—especially severely burned—forests than unburned forest, after accounting for distance from nest (see Figure 1 below). Selection for a particular burn class occurred within 1.5 km from the nest. Bond et al. (2009) also measured vegetation and found that high-intensity burned sites had the greatest herb and shrub cover and basal area of snags. This result suggests that snags, herb, and shrub cover are important components of a post-fire forest that supports foraging habitat for spotted owls, as these features provide excellent habitat for the owl's small mammal prey base.

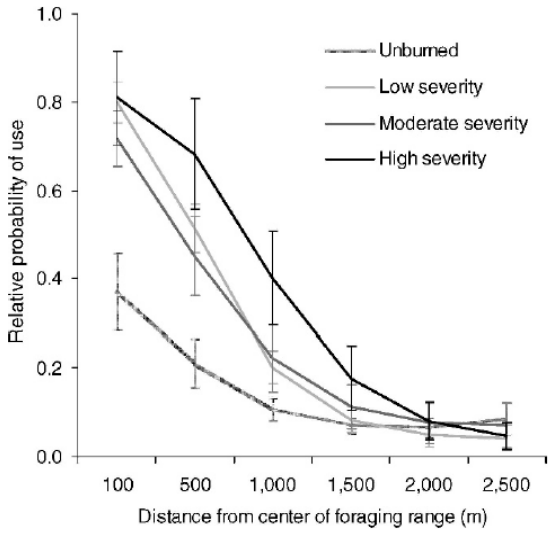

Figure 1. Relative probability of use of a site for 7 California spotted owls foraging at different distances from the center of the breeding range in forest burned at different intensities in the McNally Fire, Sequoia National Forest, 2006. From Bond et al. 2009; Figure 1 on page 1,121.

- In her dissertation examining reproduction of banded owls in mixed-severity burned, and unburned, forests in unmanaged forests in Yosemite National Park, Roberts (2008) (at p. 18) found "60% greater reproductive output at the burned sites". As with occupancy, reproduction was influenced by habitat variables, where basal area of all (live and dead) trees >10 cm was associated with increased occupancy and reproduction. Roberts stated (on page 22) that "[w]hen characterizing the reproductive output as number of fledglings produced per territorial owl pair (i.e., excluding no-response survey sites), more fledglings were produced in burned than unburned forests. These results indicated that pristine mixed-conifer forests in the Sierra Nevada have inherent robustness and resiliency in maintaining breeding habitat for spotted owls after fire." Bond et al. (2002) also found that productivity of burned California spotted owl territories was higher than overall annual rates of reproduction for unburned territories.

- In the only study examining home-range size of California spotted owls in burned forests, Bond et al. (2013) compared home ranges in a burned landscape of the southern Sierra Nevada (2002 McNally Fire, Sequoia National Forest) with home ranges in three of the unburned demography study areas (Eldorado Study Area, Sierra Study Area, San Bernardino Study Area). The size of the home range of a spotted owl in the McNally Fire area averaged 402.5 ha (SE = 88.7, range 129.8–718.0 ha). Home-range sizes in unburned forests (calculated using the same methodology and time period) averaged 487.0 ha (SE = 63.9 ha) in the Tahoe National Forest, 529.0 ha (SE = 72.9 ha) in the Sierra National Forest, and 370.4 ha (SE = 58.7 ha) in the San Bernardino National Forest; Table 4. Thus, the mean home-range size of spotted owls in burned areas are similar to unburned areas, as evidenced by overlapping standard errors. The mean home range in the burned area was 24% smaller than the nearest unburned area of similar elevation (Sierra), indicating high territory fitness in unlogged mixed-severity fire areas. Owls in the Sierra were foraging mainly on flying squirrels, while owls in the burned forests were foraging heavily on pocket gophers (Bond et al. 2013). The authors noted that spotted owls occupying burned forests do not need to range more widely than owls in unburned landscapes.

- The 2004 Sierra Nevada Forest Plan Amendment allows the Forest Service to eliminate protections for spotted owl PACs, or eliminate protections for portions of PACs, to facilitate post-fire logging, even when the PACs remain occupied by owls (USDA 2004, pp. 37, 52). This policy leads to highly misleading Forest Service reports and environmental impact statements or environmental assessments claiming numerous California spotted owl PACs as being "lost" or rendered unsuitable simply by virtue of having experienced a significant proportion of moderate- or high-severity fire effects, and regardless of whether the PACs are occupied by owls post-fire. As discussed in detail below, this policy under the 2004 Sierra Nevada Forest Plan Amendment facilitates massive amounts of post-fire salvage logging in California spotted owl Protected Activity Centers (PACs) and Home Range Core Areas (HRCAs), while allowing the Forest Service to categorize moderate- and high-severity fire areas as "unsuitable", and then misleadingly claim that no suitable spotted owl habitat would be salvage logged. This policy is resulting in a loss of spotted owl occupancy in post-fire areas that otherwise would remain occupied but for salvage logging.

- Spotted owl scientist Monica Bond analyzed the Freds fire of 2004 on the Eldorado National Forest, and post-fire logging under the 2004 Sierra Nevada Forest Plan Amendment in the Freds fire, on California spotted owl occupancy, using data obtained from the U.S. Forest Service. There were three spotted owl PACs (ED083, ED103, and ED139) in the fire area. Bond (2011, p. 23) found that none of these three PACs were occupied before the fire, based upon the most recent pre-fire USFS surveys, but all three were occupied in 2005—one year after the Freds fire, but before the Forest Service's

post-fire salvage logging project was implemented. After the salvage logging within and immediately adjacent to these PACs, spotted owls were extirpated in all of them, indicating that PACs alone are nowhere near sufficient to sustain spotted owls (Bond 2011, p. 23). The Forest Service administratively categorized spotted owl Home Range Core Areas (HRCAs) as lost to fire under the 2004 Sierra Nevada Forest Plan Amendment to facilitate salvage logging, designating "replacement" HRCA area "outside the fire perimeter", despite the fact that all three PACs/HRCAs within the fire area were occupied by spotted owls after the fire, but before salvage logging (USDA 2005a [p. 226]; Bond 2011, p. 23). In the PACs in the Freds fire, the 2004 Sierra Nevada Forest Plan Amendment allows the Forest Service to treat any higher-severity fire areas within the pre-fire PAC boundaries as being lost/unsuitable, which not only opens the PACs up to salvage logging, but also allows the Forest Service to misleadingly claim that "0" acres of "suitable habitat" within the PACs is being salvage logged (USDA 2005a [p. 226]; Bond 2011). Out of the 38 California spotted owl PACs that experienced mixed-severity fire, including the three in the Freds fire, Bond (2011, p. 23) also documented four other California spotted owl PACs, in other fire areas, that were unoccupied before the fires, but were occupied after mixed-severity fire.

- Similar to the post-fire salvage logging in the Freds fire, in the 2004 Power fire area on the Eldorado National Forest, the Forest Service, using the 2004 Sierra Nevada Forest Plan Amendment prescriptions, administratively categorized higher-severity acres within 8 PACs and HRCAs as being lost/unsuitable, which allowed the agency to salvage log the PACs and HRCAs, despite acknowledgement of occupancy by California spotted owls after the Power fire but before the salvage logging (USDA 2005b, pp. 201-202).

- Similar to the post-fire salvage logging in the Freds and Power fires, in the 2002 McNally fire area on the Sequoia National Forest, the Forest Service, using the 2004 Sierra Nevada Forest Plan Amendment prescriptions, administratively categorized both moderate- and higher-severity acres within 10 PACs (totaling 55% of all cumulative PAC acreage in the post-fire analysis area) and HRCAs as being lost/unsuitable, which allowed the agency to salvage log the PACs and HRCAs, regardless of post-fire (and pre-salvage-logging) occupancy status, which was not divulged (USDA 2004b, pp. 54-55). In the course of determining areas to be salvage logged, some PACs were "re-delineated" and moved into an entirely different area—again, regardless of actual post-fire owl occupancy (USDA 2004b, p. 54).

- In the 2012 Chips fire area, the Forest Service "re-mapped" 11 California spotted owl PACs and 16 HRCAs to exclude from protection areas with over 50% basal area mortality, regardless of post-fire occupancy (which had not even been determined at the time of the re-mapping of PACs and HRCAs in April of 2013), facilitating salvage logging of these areas (USDA 2013, pp. 46-49). This, despite confirmed post-fire (and

pre-salvage-logging) occupancy of all of the California spotted owl PACs that were surveyed by the Forest Service after the Chips fire (see **Appendix B**).

- In the 2013 American fire, on the Tahoe National Forest, by mid-April of 2014—before post-fire California spotted owl surveys had been conducted (and regardless of the results of any post-fire occupancy surveys)—the Forest Service has again used the 2004 Sierra Nevada Forest Plan Amendment to declare all areas with over 50% basal area mortality as "unsuitable" to spotted owls, contrary to the scientific evidence, allowing the agency to delete two spotted owl PACs and HRCAs from the spotted owl territory network, and "re-map[]" an additional 7 PACs and 8 HRCAs, in order to facilitate salvage logging thousands of acres in these areas, while misleadingly claiming that "suitable" spotted owl habitat would be minimally impacted by salvage logging (i.e., by erroneously defining areas of >50% basal area mortality as unsuitable, and PACs with >50% high-severity fire as lost to fire) (USDA 2014c, pp. 90-92). What's more, the Tahoe National Forest decided to categorize an additional 1,487 acres with less than 50% basal area mortality as "unsuitable" for spotted owls, opening up even more acres to intensive post-fire logging (USDA 2014c, p. 90).

- In the 2013 Aspen fire in the Sierra National Forest, by mid-April of 2014—before post-fire California spotted owl surveys had been conducted (and before the results of any post-fire occupancy surveys)—the Forest Service had again used the 2004 Sierra Nevada Forest Plan Amendment to propose post-fire logging in 1,580 acres of moderate/high-severity fire areas occurring within mature/old forest, and an additional 1,847 acres of post-fire logging in areas within the "Low/Very Low Mortality Category" (i.e., areas that remain suitable spotted owl nesting or roosting habitat after the fire) (USDA 2014d, pp. 169-170). One-third of acreage of the California spotted owl PACs and HRCAs in the Aspen fire would be subjected to post-fire logging under the Proposed Action, and the Forest Service has proposed to "reconfigure" four PACs, facilitating post-fire logging (USDA 2014d, pp. 170-171).

In short, in light of the current science, salvage logging owl habitat/pre-fire PACs and HRCAs clearly has an adverse impact and cumulative effect on California spotted owl viability and pushes the owls toward listing under the ESA.

The DEIS violates NEPA for several reasons, in addition to the problems described above. First, the DEIS (p. 308) admits that "a growing body of evidence indicates that spotted owls persist within fire affected landscapes (Bond et al. 2002, Roberts et al. 2011, and Lee et al. 2012)", and that (p. 301) California spotted owls *preferentially select* high-severity fire areas for foraging because of the abundant small mammal prey base in such habitat, yet the DEIS then states that PACs and HRCAs must be dropped or re-drawn to eliminate higher-severity fire areas (pp. 297-298), allowing them to be logged, despite the fact that the science shows that such areas are

indeed suitable habitat. There is no rational connection between the facts found and the proposal here and, therefore, the analysis of impacts and cumulative effects is inherently flawed.

Second, the DEIS (p. 296) fails to take a hard look at impacts and cumulative effects by improperly minimizing adverse impacts—specifically, by citing Clark (2007) for the following proposition: "Clark (2007) found that while spotted owls did roost and forage within high severity burn areas, the use was very low suggesting that this cover type was poor habitat for California spotted owls." However, that is not what Clark (2007) found. Clark (2007), at pp. 41-43, repeatedly stated that the reduction in occupancy in the post-fire areas was associated not with higher-severity fire but, rather, with higher-severity fire areas in which significant post-fire logging had occurred. This finding is reiterated in Clark et al. (2013). Moreover, Clark (2007) also used radiotelemetry to determine specific areas of use and avoidance, which allowed Clark (2007) to investigate use of high-severity fire areas that were subjected to post-fire logging versus unlogged high-severity areas. Clark (2007) found that the owls used unlogged high-severity fire areas *more* than expected based upon availability, and used post-fire logged areas less than expected based upon availability, noting also that the few areas of use in post-fire logging units were in retention areas (e.g., streamside areas) that had not been logged. Figure 6.2 from Clark (2007) illustrates this point.

Third, the DEIS claims that the action alternatives would not further a trend toward listing of the California spotted owl under the ESA, and would not threaten the viability of the population (DEIS, pp. 315-317). However, the DEIS failed to first determine the quantity and quality of habitat necessary to sustain viable populations of California spotted owls on the Stanislaus National Forest and the Sierra Nevada, and failed to determine whether the proposed actions would push the owl population below a critical threshold that would push the species from Sensitive to Threatened (under the ESA), in violation of NEPA. *Ecology Center v. Austin*, 430 F.3d 1057, 1067-1068 (9th Cir. 2006). This is especially egregious in light of the DEIS's failure to disclose that the current science shows that California spotted owls are declining (Connor et al. 2013, Tempel and Gutierrez 2013, and Temple 2014).

Fourth, the DEIS makes a key error by failing to actually analyze the impacts of salvage logging that is near to or adjacent (and sometimes even *in*) PACs. The DEIS simply does not address or analyze the impacts, especially cumulative impacts, of allowing the following extensive salvage logging that would occur in, adjacent, or very near to, owl PACs, even using the Alternative 4 proposal:

Relationship Between Pre-fire CSO PACs and Alt 4 Salvage Units

MPA0019—adjacent to AA03
TUO0010—adjacent to R12X, R15, R17X, R19DX
TUO0011—adjacent to R22, R31, R31X, R33X, R25X, R23, R24A
TUO0012
TUO0024—adjacent to X15, X16, X17, X18, X19, X25, X22, X23
TUO0025—overlapped by V14B, V15, V14C, V14A, V10
TUO0026—adjacent to R19D, R20, R19F, R32, R19E, R04A
TUO0027—overlapped by T22, T23X, T25, T25X, T27AX, ; adjacent to T27A, T23, U01DX

TUO0028—overlapped by T04A, T04B, T27B; adjacent to U03
TUO0029—overlapped by N01D, N01E, N01I, N01J, N01H, ; adjacent to M12, M20, N01C
TUO0030—overlapped by O03; adjacent to O201B
TUO0031—overlapped by F12, F13, F20; adjacent to F11, F14
TUO0032—adjacent to 04B, 4A
TUO0034—overlapped by F02A; adjacent to F01
TUO0039—adjacent to S04
TUO0040—overlapped by Q14A; adjacent to Q14B, Q15
TUO0053—adjacent to A15
TUO0054
TUO0059—adjacent to G06, G09, G08, G25, G26
TUO0061—overlapped by H11X, H13AX, H13A, H11; adjacent to H13B, H13BX
TUO0065—adjacent to B24X, B25X. D03, B22X
TUO0071
TUO0072—overlapped by L02BX, L05AX, L05BX, L02CX, L02B, L02F; adjacent to L02A, L02AX
TUO0078—overlapped by R40A, R40B
TUO0085—overlapped by X110, X112, X111X, X118X, X119X, X114X, X117, X116
TUO0095—overlapped by L02F, L02C, L02D
TUO0129—adjacent to C04X
TUO0130
TUO0145
TUO0146
TUO0148—adjacent to G08X, G08
TUO0149—adjacent to G01, G01X, G02X, G03A, G03B, G04
TUO0151—adjacent to G09, G11A, G11B, G11C, G12, G13A, G14A, G14B, TUO0176
TUO0177—overlapped by T04B, T27C, T27BX
TUO0187
TUO0188
TUO0205
TUO0210
TUO0218—overlapped by 04A, 02C, ; adjacent to 13, 09, 01, 02A,
TUO0219—adjacent to D09
TUO0255—adjacent to C02
TUO0256—adjacent to A05C
TUO0257
TUO0258—adjacent to A08A, A09, A08C
TUO0261—adjacent to A14

Likewise, the DEIS also fails to address the impacts of the following logging inside or adjacent/near to the so-called post-fire PACs:

Post-fire CSO PACs and Alt 3 Units (Alt 4 if italicized; Alt 3 was primarily used because that is what the maps in the DEIS documents used)

MPA0019—adjacent to AA03
TUO0010—adjacent to R12X, R15, R17X, R19DX
TUO0011—adjacent to R22, R31, R31X, R33X, R25X, R23, R24A
TUO0012—extensive salvage (Alt 3) adjacent to PAC
TUO0024—extensive salvage (Alt 3) adjacent to PAC
TUO0025—retired
TUO0026—extensive salvage (Alt 3) adjacent to PAC
TUO0027—extensive salvage (Alt 3) adjacent to PAC
TUO0028—retired
TUO0029—retired
TUO0030—retired
TUO0031—retired
TUO0032—extensive salvage (Alt 3) adjacent to PAC
TUO0034—extensive salvage (Alt 3) adjacent to PAC
TUO0039—extensive salvage (Alt 3) adjacent to PAC
TUO0040—extensive salvage (Alt 3) in and adjacent to PAC
TUO0053
TUO0054—extensive salvage (Alt 3) near to PAC
TUO0059—extensive salvage (Alt 3) adjacent or near to PAC
TUO0061—extensive salvage (Alt 3) adjacent to PAC
TUO0065—extensive salvage (Alt 3) adjacent or near to PAC
TUO0071—retired
TUO0072—retired
TUO0078—extensive salvage (Alt 3) adjacent to PAC and salvage occurs adjacent to YNP
TUO0085—extensive salvage (Alt 3) in and adjacent to PAC
TUO0095—retired
TUO0129—extensive salvage (Alt 3) adjacent or near to PAC
TUO0130—extensive salvage (Alt 3) adjacent to PAC
TUO0145—retired
TUO0146—extensive salvage (Alt 3) in PAC
TUO0148—extensive salvage (Alt 3) adjacent or near to PAC
TUO0149—extensive salvage (Alt 3) adjacent or near to PAC
TUO0151—extensive salvage (Alt 3) adjacent to PAC
TUO0176—extensive salvage (Alt 3) near to PAC
TUO0177—retired
TUO0187—extensive salvage (Alt 3) near to PAC
TUO0188—extensive salvage (Alt 3) near to PAC
TUO0205—extensive salvage (Alt 3) near to PAC
TUO0210
TUO0218—extensive salvage (Alt 3) adjacent to PAC
TUO0219--
TUO0255—extensive salvage (Alt 3) adjacent or near to PAC

TUO0256—extensive salvage (Alt 3) adjacent or near to PAC
TUO0257—extensive salvage (Alt 3) adjacent to PAC
TUO0258—extensive salvage (Alt 3) adjacent or near to PAC
TUO0261—extensive salvage (Alt 3) near to PAC

Nowhere does the DEIS explain why the extensive salvage logging near PACs (whether one considers pre-fire or post-fire PACs) will not significantly harm the owls. It is well established that PACs alone are insufficient to support owls and therefore owls must use habitat outside their PACs (i.e., home ranges are many times larger than ~120 ha PACs), and this has long since been acknowledged by the Forest Service, such as in the 1993 California Spotted Owl Interim Guidelines Environmental Assessment, and in Verner et al. (1992) (the CASPO Technical Report).

Salvage logged areas do not provide habitat for owls, whereas burned forest does (Bond et al. 2009; Lee et al. 2012). Therefore, there is a vast difference between a burned forest and a salvage logged forest in terms of what it offers to spotted owls and this must be accounted for, especially given how extensive and widespread the salvage logging is in relation to the PACs and HRCAs (see attached maps showing relationship between pre-fire PACs/HRCAs and Alt 4 salvage logging units; see also appendices to BE showing relationship between post-fire PACs and Alt 3 salvage logging units).

Finally, while the retirement and remapping of PACs/HRCAs should not have occurred in the manner it did (see below), the bigger issue is the fact that the retirement and remapping of PACs/HRCAs directly facilitated the extensive salvage logging identified above. But for the retirement or remapping of PACs, salvage logging would generally be prohibited: "**Outside of WUI defense zones, salvage harvests are prohibited in PACs** . . . (Sierra Nevada Forest Plan 2004 Record of Decision, Standard and Guide #16, page 53). Thus, the DEIS was required to actually analyze how the Forest Service's actions – here, both the retirement/remapping of PACs/HRCAs and the extensive salvage logging proposed in, adjacent, or near to both pre-fire and post-fire PACs – would impact spotted owls, and it does not. Avoiding logging inside post-fire PACs does not actually avoid significant impacts to spotted owls because it does not address logging near or adjacent to the PACs and does not address how the retirement and redrawing of PACs facilitated salvage logging,

In addition, what is put forward in the DEIS as "mitigation" is not actually what it purports to be. By adding acreage to a PAC or HRCA, one does not actually add habitat to the landscape—the areas being added would have continued to exist as well—so the logged area is still a net loss, especially where logging would occur within the biological home ranges of 2014 owl detections.

Further, HRCA "protection" is woefully inadequate. The DEIS only requires the following in HRCAs:

> Snag retention in OFEA, HRCA and FCCC units: the intent is to retain legacy structure where it exists for long-term resource recovery needs (i.e., the development of future old forest habitat with higher than average levels of large conifer snags and down woody material). Retain all hardwood snags greater than or equal to 12 inches diameter at breast height (dbh). Retain an average of 30 square feet of basal area of conifer snags across

> each unit by starting at the largest snag and working down, with a minimum of four and a maximum of 6 per acre.

But even the woefully inadequate 2004 Sierra Nevada Forest Plan Amendment says:

> The desired condition for HRCA is for large habitat blocks that have: 1) at least two tree canopy layers; 2) at least 24 inches dbh in dominant and co-dominant trees; 3) a number of very large (greater than 45 inches dbh) old trees; 4) at least 50 to 70 percent canopy cover; and 5) ***higher than average levels of snags and down woody material.***

Moreover, the 2004 Amendment (p. 31 of ROD) states that management direction under the Plan requires the Forest Service to maintain viable, well-distributed populations of old forest species, including Spotted Owls, across the Sierra Nevada, and it is well established in the science that the PACs alone are wholly insufficient to maintain viable populations, as discussed above. Further, the 2004 Amendment (p. 49) requires the Forest Service to "[a]void PACs to the greatest extent possible", which the Forest Service would violate if HRCAs are logged (i.e., logging immediately adjacent to PACs, and creating isolated islands of habitat, would not be avoiding PACs to the greatest extent possible).

The 2004 Amendment (p. 54) also requires the following: Conduct surveys in compliance with the Pacific Southwest Region's survey protocols during the planning process **when proposed vegetation treatments are likely to reduce habitat quality in suitable California spotted owl habitat with unknown occupancy**. Designate California spotted owl protected activity centers (PACs) where appropriate based on survey results." The Forest Service is violating the plan's provisions regarding both surveying for owl occupancy (by not conducting full surveys to protocol, by not surveying habitat with unknown occupancy, and by not surveying within the broader area surrounding pre-fire PACs, in light of the fact that owls often shift somewhat after fire to best take advantage of the new heterogeneity) and the requirements on designating PACs and HRCAs (by taking an unsupportably narrow approach on the level of detection that triggers the requirement to establish PACs/HRCAs).

C. Violations of the Forest Plan Regarding PACs and HRCAs

In the Rim fire hazard tree EA and Decision Notice (DN)—long before post-fire California spotted owl surveys had even been concluded (and regardless of the results of any post-fire occupancy surveys)—the Forest Service mis-applied the provisions of the 2004 Sierra Nevada Forest Plan Amendment to declare a) 10 California spotted owl PACs lost ("rendered unsuitable") to fire, eliminating these PACs (USDA 2014a, p. 62), and b) 8 spotted owl PACs and associated HRCAs were "re-mapped" (USDA 2014a, p. 66), allowing the dropped PACs or portions of PACs to be logged.

As of June 5, 2014, however, several weeks before the 2014 (one year post-fire) surveys for California spotted owls were complete, surveys that have been completed to date confirm post-fire, and pre-logging, occupancy of California spotted owl in the Rim fire in 32 out of 46 (70%) of the pre-fire PACs, which is higher than typical occupancy rates in PACs in unburned

mature/old forest in the central Sierra Nevada, as discussed above (Tempel and Gutiérrez 2013, Fig. 1). Most of the occupied PACs (24 out of 32, or 75%) are occupied by pairs. Of the PACs that the Forest Service eliminated entirely from the PAC network, 60% are occupied—half of them pairs. The following are the data supplied by the Forest Service regarding the results of 2014 Rim fire occupancy by spotted owls as of June 5, 2014:

PAC#	2014 Preliminary survey results to date
TUO0010	Pair occupancy, non-nesting inferred
TUO0011	Pair occupancy, non-nesting inferred
TUO0012	Single
MPA0019	Pair occupancy
TUO0024	No detections
TUO0025	Single
TUO0026	Pair occupancy, non-nesting inferred
TUO0027	Single
TUO0028	No detections
TUO0029	No detections
TUO0030	No detections
TUO0031	Single
TUO0032	Pair occupancy, nesting confirmed
TUO0034	Pair occupancy
TUO0039	Pair occupancy
TUO0040	Pair occupancy, non-nesting inferred
TUO0053	No detections
TUO0054	Single
TUO0059	Pair occupancy
TUO0061	Pair occupancy, non-nesting inferred
TUO0065	No detections
TUO0071	No detections
TUO0072	Pair occupancy, non-nesting inferred
TUO0078	Pair occupancy, nesting confirmed (in YNP)
TUO0085	No detections
TUO0095	Pair occupancy
TUO0129	Pair occupancy, non-nesting inferred
TUO0130	No detections
TUO0145	Pair occupancy
TUO0146	No detections
TUO0148	Pair occupancy, non-nesting inferred
TUO0149	Single
TUO0151	Pair occupancy
TUO0176	Pair occupancy, non-nesting inferred
TUO0177	Single
TUO0187	Pair occupancy

TUO0188	Pair occupancy, nesting confirmed
TUO0205	Pair occupancy
TUO0210	No detections
TUO0218	No detections
TUO0219	No detections
TUO0255	Pair occupancy, nesting confirmed
TUO0256	Pair occupancy, non-nesting inferred
TUO0257	No detections
TUO0258	Single
TUO0261	Pair occupancy, non-nesting inferred

In light of the current 2014 owl detections (and any subsequent detections in 2014 during the remainder of the survey season), the Forest Service is required to delineate a PAC and HRCA corresponding with each individual owl or pair of owls in all areas which no longer have PACs/HRCAs due to the Rim fire hazard tree EA dropping all (in the case of 10 PACs) or part of PACs – i.e., where detections fall outside of the boundaries of the PACs created by the EA and Decision Notice for the Rim fire hazard tree project, a PAC and HRCA must be established [and if a detection falls inside a PAC, but that PAC exists for a different owl, then another PAC/HRCA must still be created]):

> California spotted owl protected activity centers (PACs) are delineated surrounding each territorial owl activity center detected on National Forest System lands since 1986. Owl activity centers are designated for all territorial owls based on: (1) the most recent documented nest site, (2) the most recent known roost site when a nest location remains unknown, and (3) a central point based on repeated daytime detections when neither nest or roost locations are known (2004 SNPFA ROD p. 37).
>
> A home range core area is established surrounding each territorial spotted owl activity center detected after 1986. The core area amounts to 20 percent of the area described by the sum of the average breeding pair home range plus one standard error. Home range core area sizes are as follows: 2,400 acres on the Hat Creek and Eagle Lake Ranger Districts of the Lassen National Forest, 1,000 acres on the Modoc, Inyo, Humboldt-Toiyabe, Plumas, Tahoe, Eldorado, Lake Tahoe Basin Management Unit and Stanislaus National Forests and on the Almanor Ranger District of Lassen National Forest, and 600 acres of the Sequoia and Sierra National Forests (2004 SNFPA ROD, p. 39).

In short, while the Forest Service should not have retired any PACs in the first place, regardless, the Forest Service must now establish PACs as to detected owls found outside a PAC. Once established, as required, the new PACs cannot be logged, except if located in the WUI Defense Zone. From the 2004 Sierra Nevada Forest Plan Amendment:

- Mechanical treatments may be conducted to meet fuels objectives in protected activity centers (PACs) located in WUI defense zones. In PACs located in WUI threat zones, mechanical treatments are allowed where prescribed fire is not feasible and where

avoiding PACs would significantly compromise the overall effectiveness of the landscape fire and fuels strategy. Mechanical treatments should be designed to maintain habitat structure and function of the PAC.

- While mechanical treatments may be conducted in protected activity centers (PACs) located in WUI defense zones and, in some cases, threat zones, they are prohibited within a 500-foot radius buffer around a spotted owl activity center within the designated PAC. Prescribed burning is allowed within the 500-foot radius buffer. Hand treatments, including handline construction, tree pruning, and cutting of small trees (less than 6 inches dbh), may be conducted prior to burning as needed to protect important elements of owl habitat. Treatments in the remainder of the PAC use the forest-wide standards and guidelines for mechanical thinning.
- In PACs located outside the WUI, limit stand-altering activities to reducing surface and ladder fuels through prescribed fire treatments. In forested stands with overstory trees 11 inches dbh and greater, design prescribed fire treatments to have an average flame length of 4 feet or less. Hand treatments, including handline construction, tree pruning, and cutting of small trees (less than 6 inches dbh), may be conducted prior to burning as needed to protect important elements of owl habitat.
- For California spotted owl PACs: Conduct vegetation treatments in no more than 5 percent per year and 10 percent per decade of the acres in California spotted owl PACs in the 11 Sierra Nevada national forests. Monitor the number of PACs treated at a bioregional scale.
- For all mechanical thinning treatments, design projects to retain all live conifers 30 inches dbh or larger. Exceptions are allowed to meet needs for equipment operability.

It is also important to keep in mind that Standard and Guideline #16 does not mandate redrawing or retirement of PACs. In light of the survey findings, it makes no sense at all to retire those particular PACs – the owls themselves are there and need protection. Therefore, in light of the available data, the retired PACs proposal should be rescinded. Further, even as to the 4 PACs slated for retirement that have not yet had detections, there is no reason to assume that that is so because of the fire. Rather, it could be many other reasons that those PACs are unoccupied—thus, those PACs should also be protected to allow them the opportunity to support owls. This is especially so given that the best available science does not find that severely burned PACs are unsuitable habitat.

The DEIS action alternatives would all violate the forest plan by failing to establish PACs/HRCAs around 2014 detection locations that are not currently within PACs, by logging in these occupied areas that are required to be protected by the forest plan, and by logging in PACs and HRCAs. Moreover, the phrase “rendered unsuitable” on p. 53 of the above-quoted passage from the 2004 SNFPA ROD (2004 Sierra Nevada Forest Plan Amendment Record of Decision) must be interpreted in the context of (a) the fact that these areas are occupied by spotted owls (and, thus, suitability is most strongly indicated by the owls themselves)—and (b) the fact that current science establishes that unlogged high-severity fire areas in mature conifer forest comprise suitable California spotted owl habitat (Bond et al. 2009).

XV. The DEIS Violates NFMA by Failing to Ensure Viable Populations of California Spotted Owls

The U.S. Forest Service's Forest Service Manual (FSM), Amendment 2600-2005-1 (effective date: September 23, 2005), Section 2670.12, states: "Departmental Regulation 9500-4. This regulation directs the Forest Service to: 1. Manage 'habitats for all existing native and desired nonnative plants, fish, and wildlife species in order to maintain at least viable populations of such species.'" This requirement pertains with special force to Forest Service Sensitive Species, and Section 2670.22 states that following requirement for Sensitive Species: "Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands." The Forest Service also must not take actions that would contribute to a trend towards federal listing under the Endangered Species Act. FSM Section 2670.32. The Stanislaus National Forest Land and Resource Management Plan (Stanislaus Forest Plan) and the 2004 Sierra Nevada Forest Plan Amendment likewise require the Forest Service to maintain viable populations of spotted owls and other Sensitive Species.

However, the DEIS fails to divulge that California spotted owl populations are declining, as discussed above, and fail to determine the quantity and quality of habitat necessary to maintain viable populations of the owl, or whether the Project would push owl populations below a critical viability threshold and, therefore, violated the Forest Service's own forest plans, regulations, and NFMA.

XVI. Soils and Watersheds Are Not Appropriately Described or Analyzed

The DEIS fails to meaningfully address or analyze the detailed scientific comments of hydrologist Jon Rhodes (scoping comments) and Chris Frissell (scoping comments) with regard to adverse impacts and cumulative effects of proposed logging and road/landing construction/reconstruction on soils, watersheds, and aquatic systems, including soil compaction, chronic sedimentation/erosion, and reduction in potential for delivery of large logs to stream systems. As such, the DEIS fails to take a hard look under NEPA. We fully incorporate by reference the scoping comments of Jon Rhodes of Chris Frissell into these comments.

The DEIS also proposes helicopter logging on many units but fails to discuss the serious impacts such logging can have due to its occurrence on steep slopes.

XVII. Level 1 and 2 Roads Are Not Properly Analyzed

The roads maintained for public use were addressed with regard to hazard trees in the separate EA. The remaining roads are not maintained for public use, and are not essential for access. As such, logging along these roads is unnecessary, and amounts simply to additional acreage of post-fire logging, given that such roads could simply be closed, rather than logged. This too, is a range-of-alternatives failure in the DEIS (i.e., the failure to fully consider an action alternative that would not log these roadways, and would instead allow these areas to provide habitat for California Spotted Owls, Black-backed Woodpeckers, Goshawks, and Great Gray Owls.)

No basis is provided for the need to log all of these roads given that many, or all, are not essential to human transportation and could be closed or at least closed temporarily. Moreover, the urgency for treating the roads has not been established – for example, the roads (in part or in whole) could be closed temporarily until after flushing issues or wildlife issues are addressed. Maintenance Level 1 and 2 roads – i.e., roads not maintained for public use – could be closed – and therefore do not require hazard tree felling. Finally, trees that are felled should be retained in the forest to provide large downed log habitat for small mammals, reptiles/amphibians, and invertebrates.

XVIII. The Rim Fire Must Be Appropriately Described

It is essential to provide the public and decision-makers with adequate and accurate information about forest fires. The Forest Service, however, continues to present a one-sided view that intense fire is ecologically harmful and something to be outright avoided. For example, as described above, the complex early seral forest (CESF) created by high-intensity fire is extremely important for biodiversity. CESFs are rich in post-disturbance legacies (e.g., very high snag levels) and post-fire vegetation (e.g., native fire-following shrubs, flowers, natural conifer regeneration) that provide important habitat for numerous species.

Furthermore, while the habitat created by high-intensity fire is of immediate value to species like the woodpecker, it also provides important structure as time goes by. As explained in one recent report (Siegel et al. 2011): "Many . . . [bird] species occur at high burn severity sites starting several years post-fire . . . 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."

The DEIS, however, does almost nothing to provide the public with an understanding of the ecological benefits of the Rim Fire and instead portrays it only in an unenlightened, negative way so as to justify logging and other actions. This is not scientifically valid, and just as importantly, wrongly deprives the public of an adequate understanding of the situation.

In addition, because high-intensity fire is essential for a healthy forest ecosystem, we investigated some aspects of the Rim Fire by conducting a GIS analysis of the Forest Service's data. We wanted to examine the following questions: 1) how much of the Rim Fire was in conifer forest; 2) of that conifer forest, how much of it burned at high intensity; 3) of the conifer forest that burned at high-intensity, how much of it was on private land versus public land; and 4) of the conifer forest that burned at high-intensity, how much of it had burned recently. We also examined the size of high-intensity fire patches within conifer forest as well as the distance to seed source.

The first question is essential to answer because fire in non-conifer areas (i.e., the lower elevation foothill and shrub vegetation types) generally results in the death of the vast majority

of above-ground vegetation. (e.g., Odion et al. 2010, Keeley 2000). In conifer forest, on the other hand, fire has wide ranging effects – from 0 percent to 100 percent tree mortality in any given area. It is therefore necessary to differentiate between conifer and non-conifer areas to meaningfully describe a fire's overall impacts.

The second question is important for ecological context. For example, one of the most significant aspects of high-intensity fire in conifer forest areas is the immediate habitat it creates for rare species like the Black-backed Woodpecker. By identifying the amount of conifer forest that burned at high-intensity, one can begin to determine how much wildlife habitat has been created for species that rely on post-fire landscapes. This is especially crucial in light of the ongoing fire deficit in the Sierras e.g., (Stephens et al. 2007, Miller et al. 2012b, Hanson and Odion 2013, Odion and Hanson 2013) – as a result, there likewise exists a severe deficit of post-fire habitat in the Sierras.

The third question provides insight in regard to the sometimes made claim that public lands should be logged more intensively – i.e., like private lands – in order to reduce the chance of high-intensity fire occurring. By examining the amount of private land that burned at high-intensity, as compared to public land, that assertion can be examined.

The fourth question is important to investigate in order to address the assertion from the Forest Service that areas that have not burned recently are more likely to burn at high intensity. This assertion is routinely used by the Forest Service to argue for more logging in Sierra Nevada National Forests.

Furthermore, in light of recent claims about the size of the high-intensity fire patches within the Rim Fire, we examined the ten largest patches of high-intensity burn in conifer forest to determine their actual size, as well as distance to seed source.

Using fire intensity data provided by the Forest Service (www.fs.fed.us/postfirevegcondition/)[1], and using the Forest Service's methods to define high-intensity fire (Miller and Thode 2007) and conifer forest types (www.dfg.ca.gov/biogeodata/cwhr/), we determined the following:

1. Out of a total of approximately 257,000 acres within the perimeter of the 2013 Rim Fire, 153,000 acres (60%) were in conifer forest types. The remaining area consisted of unforested areas (e.g., rock outcroppings) or non-conifer forest. Non-conifer forest includes the foothill vegetation types, mostly chaparral (which naturally burn almost exclusively at high-intensity fire levels) and grassland, as well as oak woodlands dominated by black oak (black oaks are not killed by fire—even high-intensity fire; they sprout a new tree from the base when crown fire occurs, and flourish after such fire). Foothill shrub habitat, such as Ceanothus and manzanita, generally *require* stand-replacing fire to germinate and reproduce most effectively. In other words, this shrubland vegetation commonly burns by crown fire, leaving shrub skeletons, and

[1] This "rapid assessment" system can overestimate high-intensity fire proportions, relative to the more reliable, final assessment, which compares pre-fire satellite imagery to images from one year post-fire (www.mtbs.gov).

therefore such an outcome is ecologically appropriate as opposed to being a "moonscape."

2. Within the conifer forest area (and including all land ownerships, both public and private), high-intensity fire comprised 33 percent of the effects. Furthermore, high-intensity fire areas are not all 100% tree mortality but, rather, range from about 70-100% mortality, and often have some large surviving trees. (e.g., Hanson et al. 2010).

3. The forests with the least environmental protections from logging – i.e., private timberlands – had the highest levels of high-intensity fire: 39 percent. On public land, conifer forest in national forest (Stanislaus National Forest) had 34 percent high-intensity fire, and in national park (Yosemite National Park) had 29 percent high-intensity fire.

4. On federal lands, the forest areas that had not burned recently prior to the Rim Fire (i.e., between 1987 and 2012) did *not* have higher levels of high-intensity fire. Instead, only 31 percent of these long-unburned forest areas burned at high-intensity (see attached map; map also shows numbers comparing treated and untreated areas). This is contrary to the widely-held assumption that long-unburned forests, when they do burn, will burn almost exclusively at high-intensity. The Rim Fire behavior – wherein 31 percent of long-unburned conifer forest areas burned at high intensity – is consistent with the empirical studies of how fire behaves in California forests (e.g., Odion and Hanson 2006, Odion and Hanson 2008, van Wagtendonk et al. 2012). These studies have repeatedly found that forests where fire has been excluded for the longest do not burn at a significantly higher intensity.

5. The ten largest patches of high-intensity fire in conifer forest [measured using a one pixel, as well as two pixel approach], as well as distance to seed source are illustrated in three attached maps. The high-intensity fire patches that occurred as part of the Rim Fire will provide essential habitat for many wildlife species, including very rare species like the Black-backed woodpecker. Thus, not only are these areas of the Rim Fire that experienced high-intensity fire not "nuked" or a "moonscape" (as reported in the media, per the Forest Service), they are actually just the opposite – an important, and needed, component of the ecosystem. Fortunately, the Rim Fire created about 26,000 acres of complex early seral forest on the Stanislaus National Forest. If left unlogged, this habitat will provide homes for many species.

Further, while some media accounts have pointed to the Rim Fire as being part of a trend towards larger, high-intensity fires, a very recent study published online in September 2013 in the *International Journal of Wildland Fire* (and in the journal in 2014) found that there is not a trend toward increased fire intensity in the Sierra Nevada (Hanson and Odion 2014.) The study is the first to include all of the available fire data for the Sierra Nevada, and recommends shifting Sierra fire management away from a focus on reducing extent or severity of fire in wildlands, and to instead focus on protecting human communities from fire.

XIX. The DEIS Fails to Take the Required "Hard Look"

For all of the above describe reasons, the DEIS fails to meet NEPA's "hard look" standard. This is especially true as to impacts to black-backed woodpeckers, spotted owls, and other wildlife that relies on post-fire forest. Moreover, due to the 2014 California spotted owl occupancy, as well as the natural post-fire conifer regeneration deep within large high-severity fire patches, described above, the DEIS is invalid and must be supplemented under NEPA, as it does not include any analysis of impacts or cumulative effects of many thousands of acres of mostly ground-based logging on current spotted owl occupancy or existing natural conifer seedlings in large high-severity fire patches. This is especially true given that 2014 California spotted owl detections in the Rim fire area pre-date the mid-May release of the DEIS, and natural post-fire conifer regeneration deep in the large high-severity fire patches also pre-dates the release of the DEIS (our site visit, described above, was on May 1, 2014).

XX. The DEIS Violates NFMA by Failing to Consider the Best Available Science

The NFMA interim rule also requires the Forest Service to "consider" the "best available science" in environmental analysis documents for site-specific projects. 36 C.F.R. § 219.35(a). For the reasons described above, especially as to owls, woodpeckers, and shrub habitat specialists, as well as fire/fuels analysis and analysis of effects of ground-based logging on existing natural conifer regeneration, the DEIS failed to comply with this requirement and, therefore, violated NFMA.

XXI. The DEIS Fails to Ensure Scientific Accuracy and Integrity

For the foregoing reasons, the DEIS also fails to ensure scientific accuracy and integrity, in violation of NEPA. 40 C.F.R. 1502.24.

XXII. The DEIS Is Invalid, and Must Be Supplemented, Due to Significant New Information and Changed Circumstances

Due to the significant new information and changed circumstances described above with regard to 2014 California spotted owl and Goshawk and Great Gray Owl occupancy, and natural post-fire conifer regeneration deep within large high-severity fire patches, the DEIS is invalid and must be supplemented under NEPA, as it does not include any analysis of impacts or cumulative effects of many thousands of acres of mostly ground-based logging on current Spotted Owl, Goshawk, or Great Gray Owl occupancy or existing natural conifer seedlings in large high-severity fire patches. This is especially true given that 2014 California spotted owl detections in the Rim fire area pre-date the mid-May release of the DEIS, and natural post-fire conifer regeneration deep in the large high-severity fire patches also pre-dates the release of the DEIS (our site visit, described above, was on May 1, 2014).

XXIII. The Project's Range of Alternatives Is Inadequate

During scoping, scientists urged the Forest Service to retain, unlogged, the pre-fire California spotted owl PACs/HRCAs, especially if they remain occupied by spotted owls after the fire (see,

e.g., scoping comments of spotted owl scientist Monica Bond, and the comment letter signed by approximately 150 scientists). Indeed, the request was very modest – to simply make sure, by doing surveys for at least two years, that the PACs were actually not being utilized, before declaring them retired or remapped. However, the Forest Service has not incorporated this, or even fully considered it, in any action alternative, stating that this scientific recommendation "does not meet the purpose and need to capture the economic value since most of this habitat includes the largest and most dense stands of dead trees within the burn." (DEIS, p. 46).

The DEIS (p. 384) acknowledges that the Black-backed woodpecker Conservation Strategy (Bond et al. 2012), commissioned and co-authored by the Forest Service itself, recommended that no post-fire logging be allowed in suitable Black-backed woodpecker habitat during nesting season (May 1st through July 31st), yet there are no provisions in the Proposed Action to apply this recommendation (DEIS, pp. 25-27, and 43). This means that, even if logging begins after nesting season in 2014, in the nesting seasons of 2015 and 2016, Black-backed woodpecker chicks could be directly killed by logging before they are developed enough to fly away, and chicks not directly killed may be killed by starvation due to nest abandonment caused by post-fire logging adjacent to nest sites in the middle of nesting season.

Moreover, the DEIS (p. 46) acknowledges that a group of scientists was asked by the Forest Service to produce a consensus recommendation on minimum conservation measures for Black-backed woodpeckers in the Rim fire area on the Stanislaus National Forest, and that these scientists recommended that a *minimum* of 75% of the Black-backed woodpecker pairs *on the Stanislaus National Forest portion of the Rim fire* be retained, with their home ranges unlogged (Tingley et al. 2014). However, the Forest Service refused to fully consider this as an action alternative, stating that this scientific recommendation "does not meet the purpose and need to capture the economic value since most of this habitat includes the largest and most dense stands of dead trees within the burn" (DEIS, p. 46). This contradicts the conservation recommendations of the Forest Service's own Black-backed woodpecker Conservation Strategy, which states: "Black-backed Woodpeckers will likely benefit most from large patches of burned forest being retained in unharvested condition…[P]atches retained to support Black-backed Woodpeckers should incorporate areas with the highest densities of the largest snags to provide foraging opportunities…"

The Forest Service's refusal to implement, or even fully consider, the Black-backed woodpecker conservation recommendations will likely further jeopardize Black-backed woodpecker populations, making listing under the ESA more likely, especially given that the Rim fire is currently likely the most important source population for this species, as the other fires in the central Sierra Nevada are now getting too old to provide high quality Black-backed woodpecker habitat. Indeed, the U.S. Fish and Wildlife Service, on April 9, 2013, already determined that such listing "may be warranted," largely due to the Forest Service's refusal to provide adequate, and scientifically sound protections for Black-backed woodpeckers and their habitat.

The DEIS's failure to a) fully consider action alternatives that would protect pre-fire PACs and HRCAs occupied post-fire by California spotted owls, and to fully consider the impacts of substantial logging in, adjacent or near to PACs/HRCAs, and b) to protect substantially more Black-backed Woodpecker habitat overall, and all suitable Black-backed habitat during nesting

season, as recommended by the Forest Service's own scientists and other scientists (see scoping comment letter from about 150 scientists), is a violation of NEPA's requirement to fully consider all reasonable action alternatives. The Forest Service failed to do this, and also improperly narrowed the purpose and need, in practice, to fully consider only those action alternatives that view snags as "fuel" and emphasize their removal. The result is action alternatives that vary relatively little in terms of the total acreage of logging that would occur. Indeed, Alts 3 and 4 are almost identical to the proposed action in regard to the needs of rare wildlife like the owl, and woodpecker, due simply to the fact that the Forest Service treats forests as fuel rather than what it is – wildlife habitat.

XXIV. ESA Section 7 Consultation is Required Due to Effects to ESA Listed Species

Section 7 consultation with the U.S. Fish and Wildlife Service is necessary as to the ESA listed frogs: the California red-legged frog, the Sierra Nevada yellow-legged frog, and the Foothill yellow-legged frog, given that the DEIS's Aquatic Wildlife section acknowledges that these species may be present in the project area, the analysis of impacts in the DEIS assumes presence, and the DEIS admits that the action alternatives would adversely affect these species. The "may affect" threshold is a low one and even if the Forest Service believes the effects of the action would be discountable (i.e., extremely unlikely to occur), the appropriate determination for the proposed action would be "is not likely to adversely affect", a determination that requires the Forest Service to initiate section 7 consultation. *Karuk Tribe of Cal. v. United States Forest Serv.*, 681 F.3d 1006, 1027 (9th Cir. 2012) ("We have previously explained that 'may affect' is a 'relatively low' threshold for triggering consultation. Any possible effect, whether beneficial, benign, adverse or of an undetermined character, triggers the requirement. The Secretaries of Commerce and the Interior have explained that '[t]he threshold for formal consultation must be set sufficiently low to allow Federal agencies to satisfy their duty to 'insure' that their actions do not jeopardize listed species or adversely modify critical habitat.'").

XXV. The Proposal Is Not Logistically Explained

The DEIS acknowledges that the project would be beneficial to the timber industry but would have an "adverse economic" impact on taxpayers due to the massive amount of timber that would be logged. Yet this is not meaningfully addressed. Further, there is no analysis of the economic fact that there are already substantial amounts of post-fire logging occurring on private land within the Rim Fire as well as from the Hazard Tree EA sale. Furthermore, the proposal fails to disclose address the amount mills will pay for logs; the costs of logging and transporting logs to mills; Forest Service Receipts; Stanislaus NF costs to prepare and administer timber sales; Timber related overhead costs at regional and Washington offices; Stanislaus NF costs for planting activities related to logging; or Payments to counties.

XXVI. The 2004 Framework Is Obsolete Due To Significant New Information, and a Supplemental Environmental Impact Statement (SEIS), or a Sierra Nevada-wide Cumulative Effects EIS, Must Be Prepared

The 2004 Framework 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 DEIS; thus, the cumulative effects analysis in the DEIS 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.

Issue #1—Fire/Fuel Condition Class

2004 Framework Assumptions/Conclusions:

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.

New Scientific Information:

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.

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:

1)

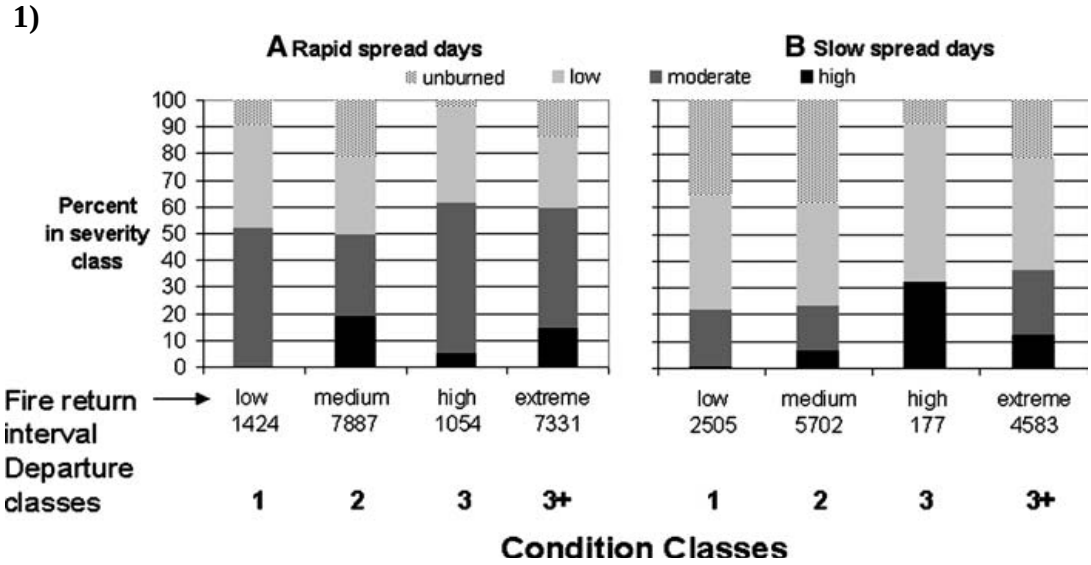

Figure 5 from Odion and Hanson (2006) (*Ecosystems*), based upon the three largest fires 1999-2005, which comprised most of the total acres of wildland fire in the Sierra Nevada during that time period (using fire severity data from Burned Area Emergency Rehabilitation (BAER) aerial overflight mapping), 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)

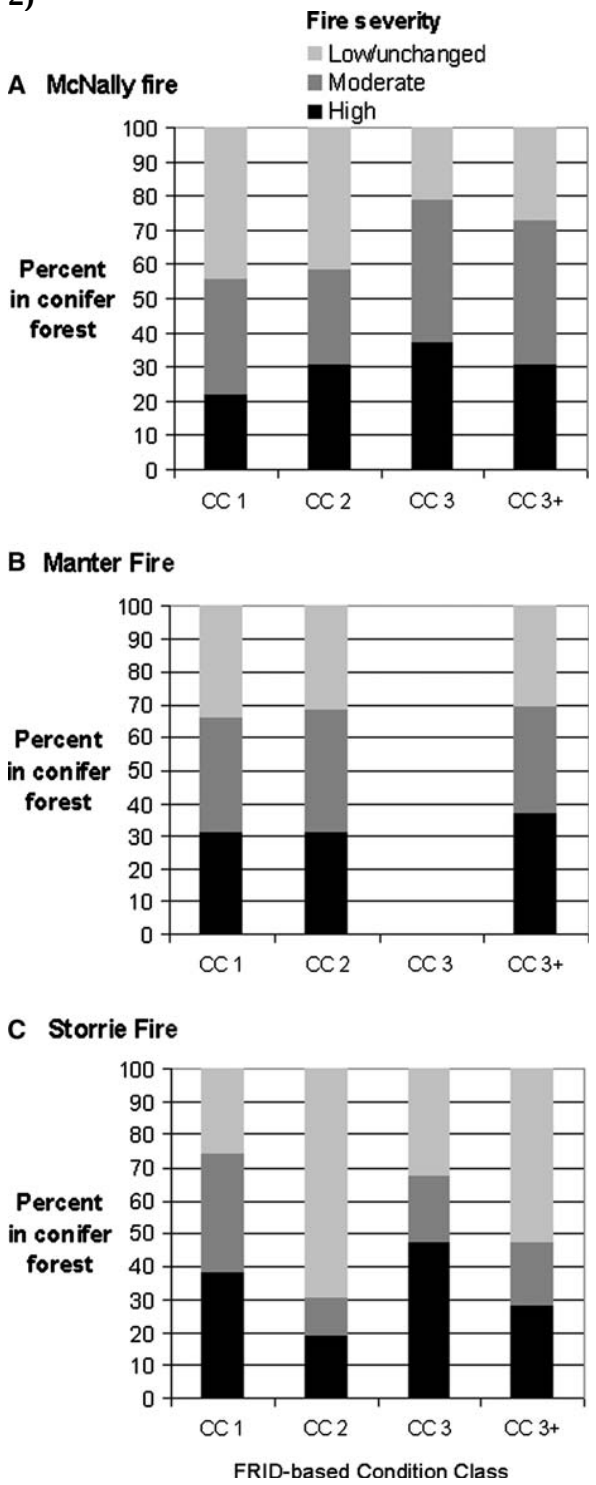

Figure 1 from Odion and Hanson (2008) (*Ecosystems*) (using fire severity data from satellite imagery for the same three fires analyzed in Odion and Hanson 2006), showing that the most long-unburned, fire-suppressed forests (no fire for a century or more) burned mostly at low/moderate-severity, and had 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.

New Scientific Information:

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). Historical mixed-conifer forests were frequently dominated by white fir and incense-cedar, and often had dense understories.

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.")***

Cocking MI, Varner JM, Knapp EE. 2014. Long-term effects of fire severity on oak-conifer dynamics in the southern Cascades. Ecological Applications 24: 94-107. ***(High-intensity fire areas are vitally important to maintain and restore black oaks in mixed-conifer forests.)***

Crotteau JS, Varner JM, Ritchie M. 2013. Post-fire regeneration across a fire severity gradient in the southern Cascades. Forest Ecology and Management 287: 103-112. ***(The authors found 710 conifer seedlings/saplings per hectare naturally regenerating in large high-severity fire patches. And, while Collins and Roller (2013) reported relatively little natural conifer regeneration in many high-severity fire areas, this is misleading in light of the fact that nearly half of the area surveyed had been subjected to intensive post-fire logging, which damages soils and removes or destroys natural seed sources, and most of the other areas had been clearcut prior to the fires (which we discovered using pre-fire remote sensing data), or were naturally non-conifer forest, e.g., black oak. The results of Collins et al. (2010 [Table 5]), who found and reported substantial natural conifer regeneration—especially ponderosa/Jeffrey pine and sugar pine—in high-intensity fire patches, excluded salvage logged areas, unlike Collins and Roller (2013). Collins et al. (2010) state that "some areas within each of these fires experienced post-fire management, ranging from post fire salvage logging, tree release and weed management. These areas were removed from analysis." (emphasis added). Specifically, Collins et al. (2010 [Table 5]) found 158 ponderosa pine and sugar pine conifers per acre regenerating in high-intensity fire patches in the Storrie fire—68% of the total natural conifer regeneration by species. Extensive natural conifer regeneration surveys deeper into the Storrie fire, at seven years post-fire, revealed abundant natural conifer regeneration, especially pine (Hanson 2007b [Tables 1 through 4, and Appendix A]). In addition, over 95% of the conifer regeneration in Collins et al. (2010) and Collins and Roller (2013) was under 0.1 cm in diameter at breast height (Collins et al. 2010); the plots used to determine the density of conifers of this size covered only 9 square meters of area per plot, and many high-intensity fire patches in the study only had 3-5 plots for an entire high-intensity fire patch (Collins and Roller 2013). This means that, even if 200-300 naturally-regenerating conifers per hectare actually existed in a given high-intensity fire patch, the methods used by Collins and Roller (2013) would be very unlikely to detect conifers, as a matter of basic math and probability.)***

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.)***

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.) (This report constitutes new information under NEPA because it was not re-discovered until recently).***

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.)***

Odion D.C., Hanson C.T., Arsenault A., Baker W.L., DellaSala D.A., Hutto R.L., Klenner W., Moritz M.A., Sherriff R.L., Veblen T.T., Williams M.A. 2014. Examining historical and current mixed-severity fire regimes in ponderosa pine and mixed-conifer forests of western North America. PLoS ONE 9: e87852. ***(In the largest and most comprehensive analysis ever conducted regarding the historical occurrence of high-intensity fire, the authors found that ponderosa pine and mixed-conifer forests in every region of western North America had mixed-intensity fire regimes, which included substantial occurrence of high-intensity fire. The authors also found, using multiple lines of evidence, including over a hundred historical sources and fire history reconstructions, and an extensive forest age-class analysis, that we now have unnaturally low levels of high-intensity fire in these forest types in all regions, since the beginning of fire suppression policies in the early 20th century.)***

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.

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. ***("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.")***

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.)***

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).

Issue #3—Spotted Owl PACs "Lost" Due to High-Intensity Fire

2004 Framework Assumptions/Conclusions:

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."

New Scientific Information:

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) (**see App. C**). 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, indicating high territory fitness in post-fire habitat; 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:

Conner, M.M., J.J. Keane, C.V. Gallagher, G. Jehle, T.E. Munton, P.A. Shaklee, and R.A. Gerrard. 2013. Realized population change for long-term monitoring: California spotted owl case study. Journal of Wildlife Management 77: 1449-1458. ***(Using a more robust statistical analysis approach than the methods used previously, the authors found that California spotted owl populations are, and have been, declining in the Sierra Nevada, based upon results from the Lassen, Sierra, and Sequoia/Kings-Canyon study areas. The Sequoia/Kings-Canyon study area was the only one with an upward population trajectory, and is the only study area in protected forests, with an active mixed-intensity fire regime, and no mechanical thinning or post-fire salvage logging. The USFS study areas (Lassen and Sierra) have had extensive fire suppression, mechanical thinning, and post-fire logging.)***

Tempel, D.J., and R.J. Gutiérrez. 2013. Relation between occupancy and abundance for a territorial species, the California spotted owl. Conservation Biology 27: 1087-1095. ***(In the***

remaining Sierra Nevada study area for the California spotted owl—the Eldorado study area—the authors found that spotted owl territories have been, and are, declining significantly. This study area is characterized by extensive fire suppression, mechanical thinning, and post-fire logging.)

Tempel, DJ. 2014. California spotted owl population dynamics in the central Sierra Nevada: an assessment using multiple types of data. PhD Dissertation, University of Minnesota, St. Paul, MN. ***(Tempel 2014 used an Integrated Population Model (IPM), incorporating count, reproductive, and mark-recapture data, to determine population change 1990-2012, and found a significant population decline in this study area ($\hat{\bar{\lambda}}$ = 0.969, 95% CI = 0.957-0.980). Overall, Tempel (2014, p. 51) found that "the population declined by 50% from 1990-2012" (95% CI = 0.384-0.642 for proportional population decline since 1990), and noting (p. 51) that the population has "clearly declined" since 1990).***

<u>Issue #5—Black-backed Woodpecker Habitat Needs and Population Threats</u>

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

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).

<u>New Scientific Information</u>:

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 be warranted for 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 <u>pre</u>-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. ***(High-severity fire, which creates primary habitat for Black-backed Woodpeckers, has declined >fourfold 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.)

Odion D.C., Hanson C.T., Arsenault A., Baker W.L., DellaSala D.A., Hutto R.L., Klenner W., Moritz M.A., Sherriff R.L., Veblen T.T., Williams M.A. 2014. Examining historical and current mixed-severity fire regimes in ponderosa pine and mixed-conifer forests of western North America. PLoS ONE 9: e87852. ***(High-severity fire has declined fourfold in the Sierra Nevada since the early 20th century, due to fire suppression.)***

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.)*** (published versions of dissertation also attached)

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 at about the same levels as they are using unburned mature/old forest. 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.)***

<u>Issue #7: Fire Severity Trend</u>

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. 2014. Is fire severity increasing in the Sierra Nevada mountains, California, USA? International Journal of Wildland Fire 23: 1-8. ***(Hanson and Odion (2014) 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 (2014) 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 (2014) also checked the approach of Miller et al. (2009), Miller and Safford (2012), and Mallek et al. (2013) for bias, due to the use of vegetation layers that post-date the fires being analyzed in those studies. Hanson and Odion (2014) 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 (2014) 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 (2014) 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.)***

Issue #8: Home Protection from Wildland Fire

2004 Framework Assumptions/Conclusions:

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.

New Scientific Information:

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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