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THE JOHN MUIR PROJECT *of* EARTH ISLAND INSTITUTE

May 19, 2014

Tom Quinn
Forest Supervisor
Tahoe National Forest

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

Re: EA comments on Big Hope Fire Salvage and Restoration Project

Dear Mr. Quinn:

On behalf of the John Muir Project of Earth Island Institute (JMP) and the Center for Biological Diversity (CBD), we offer the following comments on the Environmental Assessment (EA) for the proposed Big Hope Fire Salvage and Restoration Project (Project) with the hope that the project will be changed and improved to protect rare wildlife and 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., Leiberg 1902, Beaty and Taylor 2001, Bekker and Taylor 2001, Bekker and Taylor 2008, Miller et al. 2012, Odion and Hanson 2013, Mallek et al. 2013, Hanson and Odion 2014, Odion et al. 2014.) As stated in the EA, "[t]here were no recorded instances of wildfire in the majority of the fire area since 1908." The American Fire was therefore a restorative event because it returned fire to approximately 22,500 acres on the Tahoe National Forest and did so in a mosaic pattern creating areas of low, moderate, and high severity (including both small and large patches of high-severity effects).

In light of this fire deficit, and in light of the available wildlife science showing the high ecological value of burned forest for rare species, there is no ecological reason, and instead only public safety reasons (i.e, hazard trees), to fell the trees killed by the fire (Bond et al. 2009, Burnett et al. 2010, Burnett et al. 2012, Manley et al. 2012, Bond et al. 2013, Buchalski et al. 2013, Siegel et al. 2013 . This is why over 250 scientists sent a letter to Congress on October 30, 2013, pointing out the severe harm caused by salvage logging.

The EA, however, does not even include wildlife conservation as part of its purpose and need. Rather, the EA lists only purposes/needs that are directly *counter* to protecting the rare wildlife that relies on post-fire habitat: "1. To recover the economic value of fire-killed trees; 2. To reduce public safety hazards along portions of roads and trails and at trailheads and recreation sites; 3. To reduce the danger and difficulty of suppressing future wildfires; 4. To re-establish forested conditions and habitats in burned forest stands." (EA at 8-9.) In other words, from the beginning, the EA fails as a pathway for rational decision-making because it elevates objectives that are antithetical to post-fire wildlife habitat above the conservation of such habitat.

As explained below, the EA does not, and cannot, justify the extensive proposed logging, and it is unlawful because, for example, the EA a) contains too narrow of a purpose/need, and fails to fully analyze a reasonable range of alternatives, b) fails to take a hard look at the ecological harm that will be caused by the proposed action, c) fails to properly acknowledge the potential significant and controversial impacts of the project, d) fails to appropriately address the most current, available science, e) fails to ensure species viability, and f) fails to follow the Forest Service's own research and guidance regarding post-fire habitat. Furthermore, because the EA is prepared pursuant to the2004 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. 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 EA that promotes salvage logging. However, since 2006, much more has been learned about post-fire wildlife habitat, and this literature further supports the ecological need to maintain this special habitat in the Sierras.

The very high densities of dead trees created by severe fire – known as "snag forest habitat" – are like the forest's nurseries for native bird species, 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. 2011, 2012, 2013; Burnett et al. 2010, 2011, 2012; Bond et al. 2009, 2012; Buchalski et al 2013; Hanson and North 2008, Hanson 2013, Manley and Tarbill 2012), 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."

Furthermore, some of the best available wildlife science supporting the protection of post-fire habitats comes from the Forest Service itself. For example, Manley and Tarbill (2012) found that woodpeckers play a keystone role that can only be accomplished when post-fire habitat is maintained, lot 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.

Similarly, a document issued by the Forest Service in conjunction with Point Blue, and titled, "Managing Post-Fire Habitat for Birds in the Sierra Nevada" explains:

> Post-fire habitats are not blank slates or catastrophic wastelands, but rather an important part of the ecosystem.
>
> Moderate to high severity post-fire habitat is an important component of the Sierra Nevada for sustaining biodiversity. Many bird species reach their greatest abundance in these habitats, with most sensitive to management actions prescribed following fires, such as salvage logging and shrub abatement.
>
> 1. **Retain large patches with high snag density**. Snags are valuable for nesting and harbor important food resources for birds in post-fire habitat.

2. **Manage for dense and diverse shrub habitats**. Post-fire shrub habitats support a diverse bird community including species that are rare or declining in the Sierra and they provide an abundant food resource for many bird species.

3. **Promote habitat mosaics.** Bird species richness is often highest at the juxtaposition of unlike habitats in the Sierra.

4. **Promote herbaceous understory.** Flowering plants can proliferate after fire and provide a unique and important food resource for many bird species including hummingbirds, sparrows, & finches.

> In the Northern Sierra, Forest Service land that was not salvage logged supported a significantly more diverse and abundant avian community than adjacent private land that was heavily salvaged and replanted. In high severity burn areas, snags and understory vegetation provide some of the only available habitat for decades following fire. Areas where these features have been eliminated and dense stands of young conifers have been planted support far fewer species even a decade after re-planting. Natural regeneration should be among the most important strategies for managing post-fire for birds and other wildlife.
>
> Forests that have burned at moderate to high severity provide a unique opportunity for managers to promote desired future conditions. Creating habitat mosaics by considering patch size and location and maintaining snag patches throughout the fire, including the periphery, will promote current and future habitat for birds. Allowing natural tree regeneration will help promote future forest species and structural diversity.

In sum, post-fire areas that burned at moderate to high intensity are known to be essential for wildlife species in the Sierras and are indispensable, therefore, to maintaining ecological integrity and biological diversity. These areas not only support rare and imperiled species like the black-backed woodpecker, they are very rare themselves due to fire suppression and past post-fire logging. It is therefore imperative that the vast majority of post-fire habitat be maintained as is and allowed to naturally regenerate.

II. The Project's Purposes Are Too Narrow and the Range of Alternatives Inadequate

"An agency cannot define the purpose and need of a project in unreasonably narrow terms." *League of Wilderness Defenders-Blue Mts. Biodiversity Project v. United States Forest Serv.*, 689 F.3d 1060, 1069 (9th Cir. 2012). Similarly, "if the agency constricts the definition of the project's purpose and thereby excludes what truly are reasonable alternatives, [NEPA] cannot fulfill its role." *Simmons v. U.S. Army Corps of Engineers*, 120 F.3d 664, 666 (7th Cir. 1997).

Here, all of the project purposes are directly contrary to the conservation of post-fire wildlife/habitat. As a result, the environmental review is skewed heavily in favor of logging and replanting instead of allowing for natural regeneration. By failing to include conservation of post-fire wildlife and habitat as part of the overall purpose of the project, the result was not only an EA that logs substantial amounts of post-fire habitat, but a failure to even include at all an alternative that would actually promote conservation of this rare and imperiled habitat. Instead, that alternative was eliminated from consideration. Furthermore, and just as importantly, the EA failed to consider any alternative that, while still recovering some economic value from fire damaged trees, would have provided for much more protection of severely burned areas as habitat for species like the black-backed woodpecker, a species that is extremely rare and being considered for ESA protection. In so doing, the EA fails to meet NEPA's core principle of meaningful environmental review. *League of Wilderness Defenders-Blue Mts. Biodiversity Project v. United States Forest Serv.*, 689 F.3d at 1071 ("NEPA regulations require that an EIS '[r]igorously explore and objectively evaluate all reasonable alternatives' to the proposed action, including alternatives 'not within the jurisdiction of the lead agency.' The existence of a viable but unexamined alternative renders an environmental impact statement inadequate.")

At a minimum, fully analyzed action alternatives were required to protect moderate- and high-severity fire areas within the pre-fire boundaries of California spotted owl PACs and HRCAs, as well as to protect suitable Black-backed Woodpecker habitat, rather than including these sensitive areas in proposed salvage logging units. Moreover, the Forest Service could have fully analyzed an alternative that would close roads not maintained for public use (Maintenance Level 1 and 2 roads) rather than including them in roadside hazard tree logging units, as well as including full analysis of an alternative that included no removal of trees with any green foliage (i.e., critical seed source trees—many of which would otherwise survive, and aid in natural forest regeneration, if not logged).

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

One of the project's purposes is to "reduce the danger and difficulty of suppressing future wildfires." But multiples lines of research positively correlate post-fire logging with *increased* fire hazard (Donato et al. 2006, Thompson et al. 2007, Donato et al. 2013).

For example, 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. Thus, the stated purpose of conducting salvage logging ostensibly to reduce fuels and reestablish forested conditions is contrary to the science.

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; 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. Additionally, on October 30, 2013, a letter from hundreds of American scientists opposed post-fire snag removal and subsequent artificial replanting, finding that such activities do not represent the current state of scientific knowledge.

Further, the proposed action 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 the project area 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, Sexton 1994). 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 decades for 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). Extremely dry snags and logs that do ignite can emit burning embers that, if lofted by wind, may ignite spot fires in fine (<10 hour) fuels, but generally will not ignite other large snags or logs. Decayed logs with low moisture content can smolder for long periods, but this does not translate to intense fire behavior. Smoldering combustion of downed logs is spatially localized to the soil underlying and adjacent to the burning log and is not widespread.

The project Fuels Report does not address the best available science. Moreover, it wrongly conflates fuel types when addressing future fire. Finally, while the EA attempts to dismiss the science by asserting that "One of the needs identified for the proposal is to reduce the danger and difficulty of suppressing future wildfires," it fails to explain at all why the salvage logging would need to be so extensive in order to reduce danger/difficulty, and fails to explain why fire would even need to be suppressed in the first instance in the areas being salvage logged.

IV. The Project's Desire "To Re-Establish Forested Conditions" And "Accelerate The Development Of Mature Forest Habitat" In Burned Areas Is Misguided And Unsupported.

The proposed action presented in the EA represents 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 (such regeneration is already abundant throughout high-severity fire patches in the American fire, and averages >1,000/acre in high-severity fire patches, based upon our May 14, 2013 site visit), 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 unnecessary to achieve the stated desire 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 simply 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, the attributes that will ensure a complex forest.

Similarly, it is wrong for the Forest Service to contend that its actions "would be consistent with desired conditions and management intents for the old forest emphasis areas and California spotted owl home range core areas that burned in the American Fire." First, post-fire areas are now known to be 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 home range core areas. Put simply, the journey towards mature forest is 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) necessary to make that mature forest meaningful to wildlife.

Further, 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).

Further, the Forest Service's often asserted assumption that higher-intensity fire areas will not naturally regenerate with conifers is not supported by citation to scientific literature, and 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.

Moreover, 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 finally 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, current science demonstrates that there exists no ecological basis for attempting to override the early seral stage of a forest. "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 (DellaSala et al. (in press), Swanson et al. 2011, Donato et al. 2012, Odion and Hanson 2013). Historically, prior to fire suppression and logging, high-intensity fire in mixed-conifer forests of the Sierra Nevada management region frequently ranged from 15-40% of fire effects, and large patches of high-intensity fire, thousands of acres in size, were a natural part of historic fire regimes (Leiberg 1902, Show and Kotok 1924, USFS 1911, Show and Kotok 1925, Beaty and Taylor 2001, Bekker and Taylor 2001, Hanson 2007). Snag forest habitat is rarer than old-growth forest and 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 fivefold in the past century due to fire suppression (Beaty and Taylor 2001, Bekker and Taylor 2001, Stephens et al. 2007, Miller et al. 2012b, Odion and Hanson 2013).

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).

Finally, our May 14, 2014, site visit to the American fire area consistently found hundreds to thousands of conifer seedlings per acre already naturally regenerating in the high-severity fire patches (see photos, sent separately)—including in the interior portions of the largest patches—in the American fire, and this natural post-fire conifer regeneration would be directly killed by ground-based logging (which is mostly what is proposed by the EA). The EA fails to adequately analyze the impacts of killing natural conifer regeneration that is already occurring, and fails to adequately acknowledge and address the fact that substantial natural post-fire conifer regeneration is occurring in high-severity fire patches in the American fire, choosing instead to erroneously suggest the opposite.

V. The EA Fails to Adequately Analyze Impacts to the Black-backed Woodpecker and the Forest Service Wrongly Ignored Its Own Guidance Regarding Black-backed Woodpecker Conservation

The EA and maps indicate that nearly half of the moderate/high-quality suitable Black-backed Woodpecker habitat in the fire area on the national forest would be logged under the Proposed Action. This newly created habitat is especially important given that the American fire comprises the majority of the only currently suitable black-backed woodpecker habitat on the Tahoe National Forest – previous fires, such as the nearby American River Complex fire, Star fire, and Angora fire, have either been largely salvage logged (Angora), are too old to provide suitable habitat (Star fire), or are mostly too low in elevation to provide suitable habitat (most of the American River Complex), thus creating the potential for a substantial gap in black-backed woodpecker population distribution if so much of the project is logged (see, e.g., Siegel et al. 2011 [Table 2, Table 6, Figure 15A], Siegel et al. 2012 [Table 2, Figure 4]). Further, the Stanislaus and Sierra National Forests have issued proposals to salvage log substantial portions of the higher-severity fire areas in conifer forest on those national forests as well.

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."

The EA's supplemental document regarding the woodpecker states that "black-backed woodpeckers were detected at approximately 20% of unsalvaged stations (265 of 1314 stations) and 25% of salvaged stations (36 or 144 stations), suggesting that black-backed woodpecker occurrence might not be negatively associated with salvage logging (Siegel et al. 2011)." This is inaccurate and misleading for several reasons, however. First, Siegel et al. (2011) was not designed to examine the association between salvage logging and woodpecker use – for example, the stations were not precisely associated with salvage logging. Second, subsequent research by Siegel et al, such as Siegel et al. (2013), which could and did address this issue (via telemetry), found that the woodpeckers did in fact significantly avoid salvaged areas (almost total avoidance). Indeed, the supplemental document refers to Siegel et al. (2013) and shows the very map demonstrating the avoidance, and the figure states: "Note the general absence of foraging locations within the post-fire harvest areas." Third, as noted elsewhere in the supplemental document, the best available science shows that "the published literature from the Rocky Mountains and the Sierra Nevada indicates that black-backed woodpecker foraging activity and nesting density are reduced in burned forests which are salvage logged compared to similar stands which are not salvage logged (Saab and Dudley 1998, Hutto and Gallo 2006, Saab et al. 2007, Hanson and North 2008, Cahall and Hayes 2009, Saab et al. 2009, Siegel et al. 2010)." Fourth, the recent modeling from Tingley et al. (2014) further demonstrates that what is most important to the woodpeckers is high snag density, which of course does not exist in stands that have been salvaged for economic gain.

The supplemental document also states that "Another recent study from California seems to indicate that salvage logging does not preclude the use of an area by black-backed woodpeckers. Siegel et al. (2013) obtained radio tracking data from 20 black-backed woodpeckers across three recent fires on National Forests in California. Figure 4 displays home range data for six birds monitored in the Petersen Fire area (home range data from Siegel et al. 2013). It is interesting to note that four of the six birds nested and foraged adjacent to large blocks of salvage harvest (gray shaded areas) in their home ranges, while the other two birds foraged almost exclusively in unburned green forest adjacent to the fire." This statement is incorrect and misleading. Again, as just discussed above, Siegel et al. (2013) found that woodpeckers avoided the salvaged areas. Siegel et al. (2013) even states: "Note the general absence of foraging locations within the post-fire harvest areas." Moreover, the fact that woodpeckers used areas adjacent to logging simply reinforces that what matters is high snag density.

The supplemental document also asserts that available data "indicate a stable population distribution in the Sierra Nevada in which black-backed woodpeckers continue to be distributed across the 10 National Forests in the study area (ranging from the Modoc National Forest in the north to the Sequoia National Forest to the south)." This is a misleading statement from a conservation perspective because 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 very minimal (just over 168,000 acres [Howell et al. 2014][1]).

The EA notes that "the proposed action would retain sufficient habitat to support 18 pairs of black-backed woodpeckers predicted to occupy NFS lands in the American Fire area (Figures 11 and 12)." Left unlogged, the Fire would have supported 38 pairs, and therefore the project contributes to the loss of over half the expected numbers. Yet the EA nowhere properly explains why such an extreme outcome is acceptable from a viability point of view, especially given that this is a species being considered for ESA listing. 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), and the EA fails to adequately analyze the impacts of ignoring the black-backed woodpecker conservation recommendations from its own scientists. The Forest Service is obligated to maintain viability and has not explained here how such a drastic loss of habitat and numbers would do so. The Forest Service is likewise obligated to follow its own guidance and here did not.

Further, we fully incorporate by reference into these comments the scoping comments of Monica Bond with regard to impacts to black-backed woodpeckers from this project.

VI. The EA Fails to Adequately Analyze the Science Addressing California Spotted Owls and Post-fire Habitat

The EA and Wildlife Biological Evaluation (BE) fail to adequately analyze or incorporate the most recent science regarding California spotted owls in the Sierras (see, e.g., attached Bond EA comments, which we fully incorporate by reference into these comments). The Forest Service instead continues to rely on an outdated, and scientifically invalid, approach to California spotted owl habitat. This approach assumes that intensely burned forest is by definition, not suitable as owl habitat. In fact, however, what is unsuitable as habitat is post-fire areas *that have been salvage logged*. Intensely burned forest, if left intact, can be of great benefit to owls (e.g., Bond et al. 2009).

[1] We are still awaiting from the Forest service the data for this finding and will submit supplemental comments once we do.

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. As already noted, owl scientist Monica Bond has submitted comments on spotted owl use of burned forests (Bond comments, attached).

Post-fire logging in the project area is a major threat because PACs and home range core areas (HRCAs) contain salvage logging units. Rather than re-drawing PACs or HRCAs to exclude high intensity burns, as proposed in the EA, the Forest Service must conduct surveys to protocol to confirm non-occupancy, as discussed in Monica Bond's comments.

In addition to the proposed units, roadside salvage is proposed that will further reduce the levels of snags and large wood that contribute to habitat quality, including roadside logging on roads that are not needed or maintained for public use. These are habitat areas intended to provide foraging and roosting for spotted owls. Many of these PACs occur along creeks and waterways; logging in these sensitive areas poses an even greater environmental impact and is inconsistent with Forest Service direction for sensitive species and the restoration goals of the project.

The Forest Service should seek to leave undisturbed the burned forest, especially in spotted owl PACs and HRCAs, and the EA and BE fail to adequately address current science, or adequately analyze impacts to spotted owls.

Moreover, the EA exaggerates fire severity in the fire area by using inflated percent basal area mortality categories to justify re-drawing or eliminating PACs and HRCAs and salvage logging the eliminated portions. For example, page 6 the EA provides a map showing areas ostensibly of 75-100% basal area mortality. However, this is based upon the categories in the Forest Service's satellite imagery system of "rapid assessment" of vegetation severity (www.fs.fed.us/postfirevegcondition/), which uses an RdNBR value of approximately 574 ostensibly to describe 75% basal area mortality (Miller and Safford 2008, p. 58; Miller et al. 2009, Fig. 4D). Hanson et al. (2010, Table 1) analyzed the actual field validation plots used by the Forest Service (i.e., the actual on-the-ground basal area mortality values associated with the RdNBR values) and found that an RdNBR value of 574 equates to only 61% basal area mortality of all trees, and only 51% basal area mortality of trees over 12 inches in diameter. The Forest Service's "rapid assessment" system also claims that an RdNBR value of 641 equates to about 90% basal area mortality but, based upon the Forest Service's actual field validation plots, even an RdNBR value of 800 equates to only 83% basal area mortality of all trees, and only 76% basal area mortality of trees over 12 inches in diameter (Hanson et al. 2010, Table 1). Thus, not only does the EA wrongly allow salvage logging in PACs and HRCAs by improperly redrawing the PACs/HRCAs, it does so based in erroneous data.

In addition, the EA does not adequately analyze impacts to spotted owls in light of the fact that the 2014 survey data show numerous spotted owl detections in moderate/high intensity fire areas proposed for salvage logging, including in PACs and HRCAs and portions of PACs and HRCAs that have been dropped.

VII. An EIS Must be Prepared Due to Significant or Potentially Significant Impacts to Imperiled Wildlife Species and Ecologically Critical Areas, Highly Uncertain and/or Highly Controversial Impacts, and Cumulative Effects.

Due to the potential impacts and cumulative effects to Black-backed Woodpeckers, California spotted owls, sensitive bat species, and other imperiled wildlife, an EIS is required for this project. As explained in *Western Watersheds Project v. Abbey*, 719 F.3d 1035, 1045 (9th Cir. 2013):

> Under NEPA, federal agencies must prepare an EIS before taking major Federal actions significantly affecting the quality of the environment. . . . An agency may prepare an environmental assessment to determine whether an EIS is needed. 40 C.F.R. § 1501.4(b). If the environmental assessment shows that the agency action may significantly affect the environment, then the agency must prepare an EIS.

Here, as discussed above, as well as below, in light of the failure thus far to implement the woodpecker Conservation Strategy, and the failure to protect burned owl habitat, there undoubtedly may be significant impacts to these two very rare species.

Furthermore, it is necessary to examine the implications of salvage logging as to myriad species that rely upon or use post-fire habitat such as bats (e.g., Buchalski et al. 2013), olive-sided flycatchers, sooty grouse, mule deer, mountain bluebirds, fringed myotis bats, Pallid bats, western wood pewees, hairy woodpeckers, white-headed woodpeckers, fox sparrows and mountain quail. (Burnett et al. 2010, 2011, 2012; Siegel et al. 2011; Buchalski et al. 2013; DellaSala et al. (in press)).

Finally, it is essential to keep in mind that these species do not operate in isolation from one another. For example, protecting woodpecker habitat early on helps ensure that there will be cavities later on for other species. (e.g., Siegel et al. 2011, Manley and Tarbill 2012, Burnett et al. 2010).

A. Significant Impacts to California Spotted Owls

We fully incorporate by reference the scoping and EA comments of Monica Bond into this section.

Post-fire logging is harming spotted owls, and spotted owls are declining as a result of such logging, while mixed-severity fire alone (without post-fire logging) is not reducing spotted owl occupancy, based upon new scientific evidence, much of which was not addressed in the EA:

- 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 8 California spotted owl sites occupied (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 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 one of these PACs that remained occupied 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.

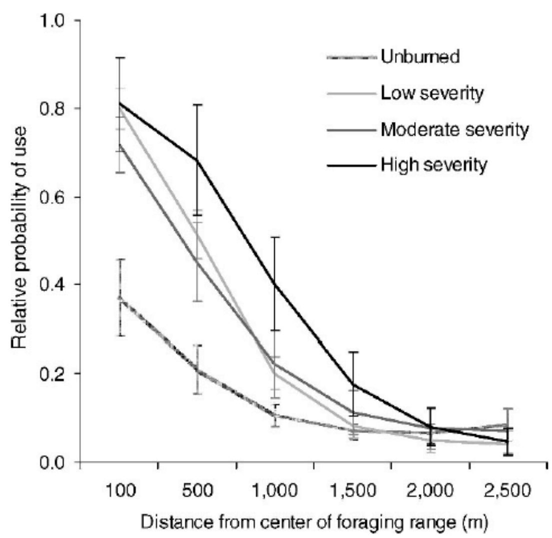

Figure 1. Relative probability of use of a site for 7 California spotted owls foraging at different distances from the center of the breeding range in forest burned at different intensities in the McNally Fire, Sequoia National Forest, 2006. From Bond et al. 2009; Figure 1 on page 1,121.

- 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 Rim fire on the Stanislaus National Forest, by March of 2014—before post-fire California spotted owl surveys had even been conducted (and regardless of the results of any post-fire occupancy surveys)—the Forest Service had already used the provisions of the 2004 Sierra Nevada Forest Plan Amendment to declare 10 California spotted owl PACs lost ("rendered unsuitable") to fire, eliminating these PACs (USDA 2014a, p. 62), and proposing a massive post-fire salvage logging project in the PACs and their associated HRCAs (USDA 2014b). An additional 8 spotted owl PACs and associated HRCAs were "re-mapped" (USDA 2014a, p. 66), facilitating salvage logging in the dropped portions of these PACs (USDA 2014b).

- And now, 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 short, in light of the current science, it is clearly a potentially significant impact to salvage log PACs and HRCAs in the manner described.

B. <u>Significant Impacts to Black-backed Woodpeckers</u>

The project would have significant, or potentially significant, impacts on Black-backed Woodpeckers, requiring an EIS, in light of the above and the following: a) on April 9, 2013, the US Fish and Wildlife Service determined that, due to Forest Service management activities, including fire suppression and post-fire logging, listing the Black-backed Woodpecker in the Sierra Nevada under the federal Endangered Species Act "may be warranted"; b) the best available science indicates that there are likely fewer than 700 Black-backed Woodpecker pairs remaining in California; c) the best available science indicates 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 (this proportion is less than the proportion of suitable Black-backed Woodpecker habitat that would be removed in this Project) (Odion and Hanson 2013); e) the Forest Service's own Conservation Strategy (Bond et al. 2012) recommends that, in order to mitigate threats to Black-backed Woodpecker population viability, 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 ignored in the Proposed Action; 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.

C. Post-fire Logging and Artificial Conifer Planting are Highly Controversial

The Project proposes to artificially plant conifers on 7,295 acres that experienced moderate- to high-severity fire, and would potentially masticate or otherwise reduce or eliminate shrub cover on 4,956 acres (EA, p. 14), and would salvage log 3,443 acres (EA, p. 13), ostensibly in order to reduce fuels and future fire severity and facilitate re-establishment of mature conifer forest (EA, p. 8). However, these actions are contrary to current science and the overwhelming consensus of scientific opinion, and are highly controversial:

- Our May 14, 2014, site visit to the American fire area consistently found hundreds to thousands of conifer seedlings per acre already naturally regenerating in the high-severity fire patches—including in the interior portions of the largest patches—in the American fire, and this natural post-fire conifer regeneration would be directly killed by ground-based logging (which is mostly what is proposed by the EA).

- 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 operations2. 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."

- Several scientific studies have investigated the Forest Service's claim that post-fire logging will reduce future fire effects and facilitate mature conifer forest return, and every one of these studies has found this claim to be erroneous. Rather, the science indicates that post-fire salvage logging and artificial replanting tend to create *higher* potential for high-severity fire, not lower potential (Donato et al. 2006, Thompson et al. 2007, Donato et al. 2013). Thus, the stated purpose of conducting salvage logging ostensibly to reduce fuels and reestablish forested conditions is contrary to the science. 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; 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.

- The EA's claim that natural post-fire conifer regeneration will not effectively occur in moderate- or high-severity fire patches is strongly contradicted by the current science. Data from southwestern Oregon and northwestern California indicate substantial natural post-fire conifer regeneration following high-severity fire, and even following high-severity fire reburns, with generally hundreds of conifer seedlings/saplings per acre (Shatford et al. 2007; Donato et al. 2009), and that shrub cover does not impede natural conifer regeneration (Shatford et al. 2007). 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). Another recent study in the Sierra Nevada reported relatively little natural regeneration of conifers, especially pines, following high-severity fire in mixed-conifer forests of the Sierra Nevada (Collins and Roller 2013). However, there are several major problems with this study: a) plots were small (9 m^2) for conifers that comprised >94% of conifer regeneration (those <1.37 m tall), and high-severity fire patches averaged >12 ha, but most had 4-10 plots, or fewer, per patch (Collins et al. 2011; Collins and Roller 2013), thus, from a probabilistic standpoint, much of extant natural conifer regeneration would have been missed by sampling; b) the authors did not gather data on pre-fire forest composition, so no conclusion can be drawn that the proportion of pine in post-fire regeneration is less than in pre-fire stands; and c) perhaps most importantly, using Google Earth we investigated the pre-fire condition of plots in Collins and Roller (2013) that had not been salvage logged and artificially planted and found that the great majority had been clearcut prior to the fires, and some were nearly pure black oak (with little or no pre-fire conifer cover) (see **Appendix D**, with high-severity fire patch boundaries shown in red boundaries, and Collins and Roller 2013 plots shown in black boundaries).

D. Cumulatively Significant Impacts

The Forest Service has yet to analyze the cumulative threat of current post-fire salvage logging proposals, including Aspen, American, and Rim post-fire salvage logging proposals, among others, to the population viability of the Black-backed Woodpecker in California. In addition, as discussed above, the proposed action contains no limited operating period to avoid directly killing Black-backed Woodpecker chicks in the nest before they can fly, contrary to the strong recommendations of the agency's own scientific reports (Bond et al. 2012, Burnett et al. 2012). Without determining whether at least the minimum quantity and quality of habitat necessary to sustain viable populations over time in the Sierra Nevada is being maintained, the Forest Service has no basis to assume or conclude that current proposed salvage logging will not push this subspecies below a critical threshold, ultimately over time resulting in its extirpation from California, or the extinction of the entire subspecies.

Further, the Forest Service's frequent assertion that the distribution of Black-backed Woodpecker populations in the Sierra Nevada is stable is not meaningful. Specifically, the assertion is outdated due to the new information about the inherent risk of extinction for very small populations (Traill et al. 2007, USFWS 2013), described above, and it is meaningless because the Forest Service does not explain what it means by "stable" "distribution". Stating that Black-backed Woodpeckers continue to be distributed across the 10 Sierra Nevada NFs, does not provide any basis for a conclusion about the current trajectory, or trend, of Black-backed Woodpecker population distribution. What the Forest Service appears to be saying is that there are still *some* Black-backed Woodpeckers in each Sierra Nevada national forest and, therefore, they are technically distributed across the range (and, by extension, since some would remain in the project/analysis area post-logging, the "distribution", so defined, would not technically change—a statement that would be equally true if there were only one pair remaining in each Sierra Nevada national forest). If this is indeed what the agency is saying, then it is a meaningless tautology that is not germane to any coherent assessment of the threat of proposed post-fire logging to the continued persistence of Black-backed Woodpecker populations in the Sierra Nevada in the coming years and decades. If the agency is attempting to say more than this, then it provides no substantive basis for such a statement, rendering it arbitrary, as well as misleading, given that the average reader might tend to misconstrue the statements as a pronouncement that there is no significant potential threat to the continued persistence of Black-backed Woodpecker populations in the Sierra Nevada currently (which is contradicted by the U.S. Fish and Wildlife Service [USFWS 2013], the available literature, and the Forest Service's own Black-backed Woodpecker Conservation Strategy [Bond et al. 2012]), or that the proposed removal of a substantial portion of the current suitable habitat—in the middle of nesting season, contrary to the Forest Service's own Conservation Strategy—would not create the potential for a significant impact/threat to Black-backed Woodpecker populations. In either case, the Forest Service improperly misleads, and ignores the significant potential risks and uncertainties that threaten Black-backed Woodpecker populations with a trend towards extinction.

VIII. The EA Fails to Take the Required "Hard Look"

The EA fails to analyze adverse impacts to Black-backed Woodpeckers from logging nest sites (and potential nest trees, with chicks in the nest that cannot yet fly) during nesting season, contrary to the conservation recommendations of the Black-backed Woodpecker Conservation Strategy (Bond et al. 2012) – impacts that JMP and CBD, and Monica Bond, discussed in detail in our scoping comments, incorporated by reference herein. This failure to analyze the compounded adverse impacts of not only habitat loss, but also the ecological trap effect of killing chicks in nesting season, renders the EA inadequate under NEPA for failure to take a hard look at adverse impacts that, if analyzed, would otherwise indicate that significant or potentially significant impacts would occur.

Further, the EA and Wildlife BE do not adequately analyze adverse impacts to California spotted owls from a) re-drawing and eliminating PACs in ways not supported by the best available science, and b) logging within the pre-fire PACs as a result, especially during nesting season, and before all Spotted Owl occupancy surveys have been completed. Again, we fully incorporate by reference the EA comments from Monica Bond on this point (as well as her scoping comments).

The EA also does not adequately analyze or disclose the impacts of ground-based logging on mortality of natural post-fire conifer regeneration that is already occurring vigorously in the high-severity fire patches of the American fire.

Moreover, the EA does not adequately analyze impacts to live trees from hazard tree logging that occurs before "flushing" of pines. However, as found by Hanson and North (2009), ponderosa and Jeffrey pines with 0% green foliage after fire often "flush", producing new green foliage from surviving terminal buds in the upper crowns, even when all of the needles on the trees have been killed—and about half of the larger trees with 0% initial green foliage, and that later flush, survive long-term (Hanson and North 2009). In other words, many of the pines that appear to currently be dead are actually not dead, and it will not be possible to know which trees will flush until at least June at the middle elevations and July or later at the higher elevations (Hanson and North 2009). Hanson and North (2009) recommended waiting until at least mid- or late-summer to see which trees will flush in order to avoid cutting down live, viable trees. The EA does not adequately analyze the impacts of cutting down such trees, and does not adequately address the extent to which trees that currently meet the EA's post-fire logging guidelines for removal of trees with some remaining green foliage would not meet those guidelines once flushing begins, and what this means for areas with trees already marked for removal prior to flushing.

As already discussed above, the project as proposed violates the scientific research as to wildlife impacts and forest impacts. Likewise, cumulative impacts are glossed over and there is hardly any look at all, let alone a "hard look" as to the project's implications for ecological integrity and biological diversity in the Tahoe National Forest and larger Sierra Nevada ecosystem. This violates NEPA.

IX. The American 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 outright avoid. Largely ignored thus far by the Forest Service is the fact that fire is as important as rain or snow to the Sierra Nevada ecosystem. 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 EA, however, does little to provide the public with an understanding of the ecological benefits of the American Fire and instead portrays it almost exclusively in a negative way so as to justify the narrow purposes. This is not scientifically valid, and just as importantly, wrongly deprives the public of an adequate understanding of the situation.

Further, while some media accounts have pointed to 2013 Sierra Nevada fires as being part of a trend towards larger, high-intensity fires, a very recent study published in September 2013 in the *International Journal of Wildland Fire* 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.

X. 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 Before Further Logging Projects May Proceed

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 EA; thus, the cumulative effects analysis in the EA cannot adequately analyze the impacts and cumulative effects of these issues, and a Sierra Nevada-wide EIS must be prepared to address this information and its implications for wildlife species that range throughout the Sierra Nevada mountains.

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

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:

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

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

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

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

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

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

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

Below is a more detailed discussion of these studies:

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

1)

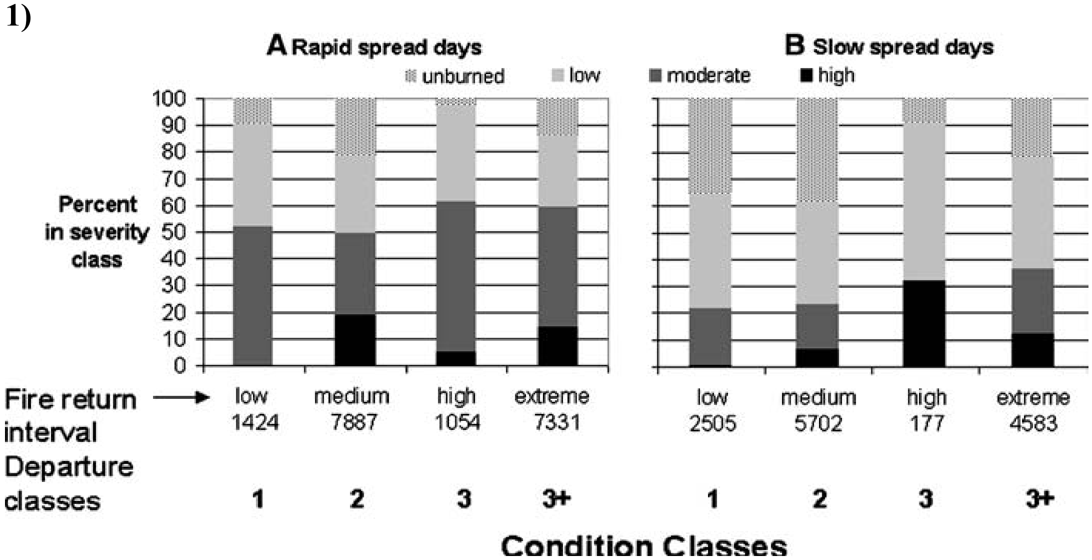

Figure 5 from Odion and Hanson (2006) (*Ecosystems*), based upon the three largest fires 1999-2005, which comprised most of the total acres of wildland fire in the Sierra Nevada during that time period (using fire severity data from Burned Area Emergency Rehabilitation (BAER) aerial overflight mapping),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

2)

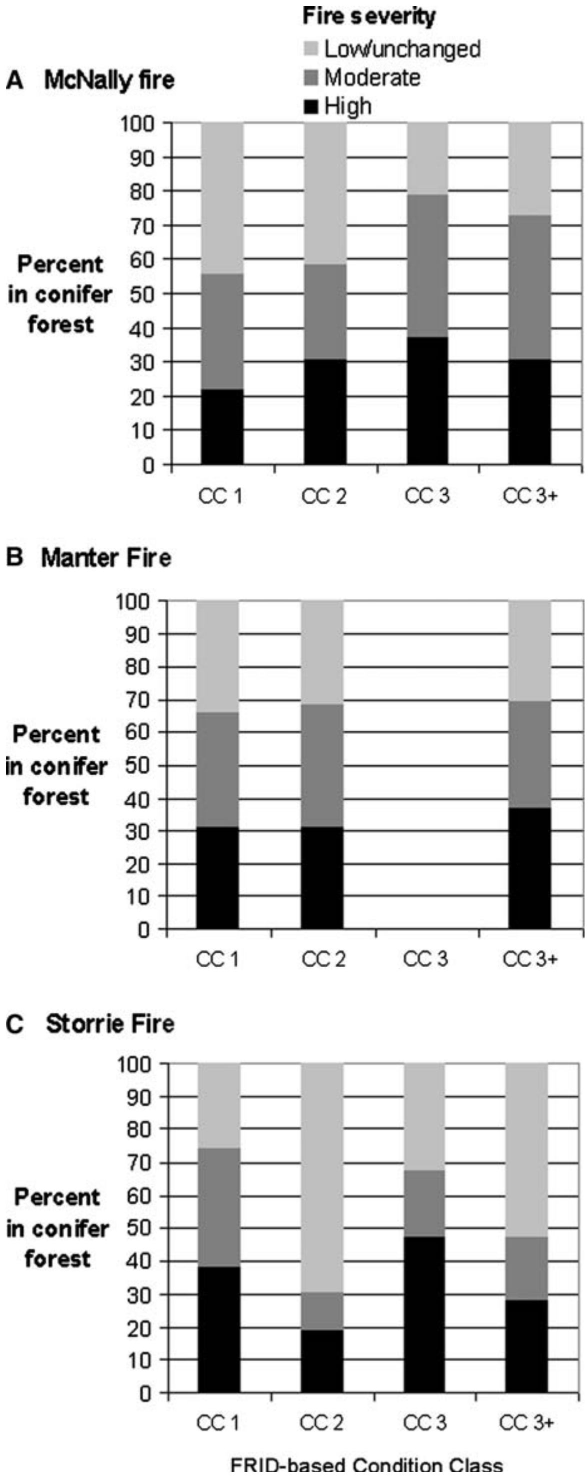

Figure 1 from Odion and Hanson (2008) (*Ecosystems*) (using fire severity data from satellite imagery for the same three fires analyzed in Odion and Hanson 2006), showing that the most long-unburned, fire-suppressed forests (no fire for a century or more) burned mostly at low/moderate-severity, and had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

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

> "The proportion burned in each fire severity class was not significantly associated with fire return interval departure class…[L]ow severity made up the greatest proportion within all three departure classes, while high severity was the least in each departure class (Figure 4)."
>
> The most long-unburned, fire-suppressed forests—those that had missed 4 or more fire return intervals (in most cases, areas that had not burned since at least 1930)—had only about 10% high-severity fire (Fig. 4 of van Wagtendonk e al. 2012).

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

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

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

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

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

2004 Framework Assumptions/Conclusions:

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

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

> significantly altered due to multiple missing fire return intervals. These lands 'verge on the greatest *risk of ecological collapse*.'"

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

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 (*** $\hat{\bar{\lambda}}t$ ***= 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.)***

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).)***

<u>Issue #6—Pacific Fishers, Fire, and Forest Structure</u>

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

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.

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

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.)***

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

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

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

<u>New Scientific Information</u>:

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

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

Sincerely,

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