CENTER *for* BIOLOGICAL DIVERSITY

THE JOHN MUIR PROJECT *of* EARTH ISLAND INSTITUTE

January 6, 2014

Susan Skalski
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Stanislaus National Forest
19777 Greenley Road
Sonora, CA 95370

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

Re: Scoping comments for Rim Fire Recovery (43033) Project

Dear Ms. Skalski:

On behalf of the John Muir Project of Earth Island Institute (JMP) and the Center for Biological Diversity (CBD), we are submitting these comments on the proposed Rim Fire "Recovery" Project (Project).

As we detail below, due to significant adverse impacts to wildlife, including Sensitive Species, ESA Candidate Species, and a species with a positive 90-day determination from USFWS on an ESA listing petition (California spotted owl, pallid bat, fringed myotis bat, Pacific fisher, and the black-backed woodpecker, respectively), the project as proposed should be withdrawn. For example, the Project as proposed would cause significant adverse environmental impacts to the black-backed woodpecker due to the logging of the majority of suitable habitat created by the fire, as well as conducting logging operations during the nesting season (in 2015 potentially).

Areas with very high densities of dead trees – known as "snag forest habitat" and created by high-intensity fire – are like the forest's nurseries for many if not most 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). The severe adverse impacts of salvage logging in these areas cannot be justified ecologically, especially in light of what we now know, but thus far ignored by the Forest Service's Rim Fire scoping notice. In fact, the scoping notice makes no mention of the many species that rely upon or use areas within a fire that have burned at high-intensity. Instead, the notice seeks, for example, to log woodpecker habitat, owl habitat (including PACs and HRCAs), bat habitat, deer habitat, and would damage soil as well as vegetation regeneration in the process.

Furthermore, while the scoping notice does not discuss it, there are plans to issue a third Rim Fire related scoping notice – to cover artificial planting. This segmentation of highly related proposals (hazard tree removal as to level 3, 4, and 5 roads; post-fire logging and additional “hazard” tree removal; and post-fire artificial planting) violates NEPA: “Proposals or parts of proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement.” 40 CFR 1502.4.

Finally, the 2004 Sierra Nevada Forest Plan Amendment (2004 Framework), pursuant to which the Rim Fire project was prepared, has been rendered obsolete and inadequate under NEPA due to significant new information. 40 CFR 1502.9. The project’s purpose and need statement, and proposed prescriptions, reflect those of the 2004 Framework, despite the fact that the Forest Service should be well aware that the Framework is outdated and contradictory to virtually all scientific knowledge regarding fire and wildlife ecology.

We request that the Forest Service withdraw the project as currently proposed and instead pursue a course of action that comports with the available science as to post-fire wildlife habitat as well as fire ecology and forest dynamics.

Below are detailed comments:

I. We Fully Incorporate by Reference the Points from Monica Bond as the First Section of These Comments (see attached letter from Monica Bond).

II. We Fully Incorporate by Reference the Points from Jon Rhodes as the Second Section of These Comments (see attached letter from Jon Rhodes).

III. We Fully Incorporate by Reference the Points from Chris Frissell as the Third Section of These Comments (see attached letter from Chris Frissell).

IV. The Proposed Action Ignores, and is Contrary to, the Best Available Science Regarding Post-Fire Wildlife Habitat

The proposed action presented in the scoping notice represents an outdated and inappropriately narrow view of forests in the Sierra Nevada. The notice asserts, for example, that “[s]alvage logging is the first step in the process of long-term forest recovery.” This is wrong. Rather, just the opposite is true because post-fire logging destroys 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.” 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 (e.g., Odion and Hanson 2013). Thus, there is no ecological justification for the claim the salvage logging is somehow necessary for forest recovery.

Salvage logging is also completely unnecessary to achieve the Forest Service's stated desire to more quickly return to late seral 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. It is also critical to keep in mind that areas that remain as montane chaparral for extended periods are extremely valuable ecologically as well (e.g., Nagel and Taylor 2005). Thus, for some areas of a post-fire landscape to *not* quickly return to closed canopy conditions is ecologically valuable and important, not something to be condemned, as the Forest Service appears to be assuming. In fact, such areas enhance the heterogeneity of the forest, a goal that the Forest Service often agrees is valuable and desired, but which it rarely seeks to achieve other than through logging. This is unfortunate because a bias against shrub habitat misses yet another opportunity to embrace the restorative value of fire.

The Rim Fire logging scoping notice also claims that "[i]n order to provide critical structures within the new forests over time, snags and down logs will be left, but excess trees will be removed." This statement misses a fundamental aspect of post-fire forests – it is the very high snag density that makes these areas that have burned at moderate to high intensity (i.e., > 50% basal area mortality) so valuable to species like the black-backed woodpecker (Siegel et al. 2013). In other words, the very thing the Forest Service refers to as "excess" is actually the very essence of what ought to be protected and maintained. Put simply, there is no "excess" from the wildlife's point of view and any efforts to remove this so-called "excess" will in fact be extremely detrimental to the forest. For example, removing trees greatly harms the snag density of an area thereby rendering it unsuitable to black-backed woodpeckers (Siegel et al 2013; Hanson and North 2008). Thus, there is no basis for the Forest Service to assume that there exists "excess" trees/snags. Instead, the best available science shows that high snag density is *the* very thing that makes post-fire areas so beneficial to wildlife. Moreover, any disturbance to snags or to natural post-fire shrub and vegetation growth (via logging or via herbicide use or via mastication) will harm the ability of the area to support the many species that use such areas, such as the olive-sided flycatcher, sooty grouse, mule deer, mountain bluebird, California spotted owl, fringed myotis, lazuli bunting, western wood pewee, hairy woodpecker, white-headed woodpecker, pallid bat, fox sparrow and mountain quail.

Similarly, the scoping notice claims that "[m]ost of the stands that burned were over stocked due to decades of fire exclusion and now have far more dead trees within them than would have occurred naturally." Again, the science does not support this generic assumption. Instead, the beast available wildlife science shows that wildlife *selects for* both dense unburned areas (especially with high snag levels) as well as dense, intensely burned areas. Spotted owls, fishers, and black-backed woodpeckers, for example, select for both of these type of areas (Bond et al. 2009, Bond et al. 2012, Burnett et al. 2012, Hanson 2013, Lee et al. 2012, Siegel et al. 2013). Thus, once again, the Forest Service's generic assumption that there are "excess" trees in the areas that burned at moderate to high intensity cannot be reconciled with the research showing the importance of such areas in their current state (i.e., with very high post-fire snag densities).

The above assertions regarding "excess" trees also reflect a long-standing Forest Service culture that subordinates wildlife conservation to silvicultural desires. Instead of assessing first what wildlife needs, the Forest Service, as it did here, starts with an assumption that intensely burned areas have little value other than as logged timber. It is remarkable that the scoping notice does not even mention the "Conservation Strategy" for the black-backed woodpecker or the research that the Forest Service has been part of (e.g., Siegel et al. 2013, Burnett et al. 2010), nor the value of intensely burned forest for species like the spotted owl (e.g., Bond et al. 2009). No mention is made either of the findings of Forest Service biologists (Manley and Tarbill 2012):

> Woodpeckers play an important role in post-fire habitats by rapidly colonizing burned areas and creating cavities that are used by many other species that rely upon them for nesting, denning, roosting, and resting…. The results from this research indicate that management plans that incorporate habitat for multiple woodpecker species would maintain the greatest biodiversity.
>
> Species of woodpeckers select habitat based on excavation ability and foraging preferences. Species with weaker excavation ability, like White-headed Woodpeckers, will rely more heavily on more decayed snags and live trees for nuts than species with strong excavation ability, like Black-backed Woodpeckers. By understanding the habitat components that are most important for nest site selection, managers may conserve habitat that is preferable for a particular species of woodpecker that may in turn, increase the biodiversity of secondary cavity users. Management that removes most or all small diameter snags from burned areas will reduce the amount of suitable habitat for all three species of woodpeckers, resulting in a reduced density and availability of excavated cavities. Because woodpeckers may act as keystone species (Lawton and Jones, 1995; Martin and Eadie, 1999; Bonar, 2000; Bednarz et al., 2004), loss or degradation of habitat for woodpeckers may influence the structure and composition of cavity-dependent communities. In areas that have been disturbed, such as burned forests, the presence and abundance of certain keystone species can influence the progression of succession by accelerating colonization of some species or altering species composition. Understanding the relationships between woodpeckers, cavity-dependent communities, and habitat is crucial for forest management and conservation.
>
> All three species of woodpecker supported the cavity-dependent community in the burned area, with White-headed and Black-backed Woodpeckers exerting the strongest influence based on the richness and diversity of secondary cavity users. While cavities of Hairy Woodpeckers supported fewer species and were used in lower proportion compared to the other two woodpeckers, they supported unique and complementary species to the Black-backed Woodpecker in burned habitats. This suggests that while White-headed and Black-backed Woodpeckers are the most important excavators influencing colonization, the complement of all three species of woodpeckers appears to have the greatest influence on colonization of secondary cavity users.
>
> Because population growth of secondary cavity users may depend upon an adequate number of cavities available (Holt and Martin, 1997), successful colonization in

> burned forests will depend on continued presence of woodpeckers to replenish the supply of cavities.
>
> 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.
>
> The removal of most or all small snags within a burned area is likely to render the site unsuitable for Black-backed Woodpecker nesting.
>
> Reduction of all small snags may greatly reduce habitat for Black-backed Woodpeckers, which in turn is likely to impact the recovery of bird and small mammal community recovery in burned areas. Maintaining an abundance of suitable woodpecker nesting habitat in burned areas will result in increases in the abundance and diversity of the cavity-dependent community (Aitken and Martin, 2008). Cavity-dependent communities include seed dispersing birds and mammals, insectivores, and predators, which play important roles in the overall ecosystem (Raphael and White, 1978, 1984; Verner and Boss, 1980). This increases the diversity of species performing a variety of ecosystem services. Diversity has been demonstrated to be an essential ingredient to ecosystem stability and resilience (Hooper et al., 2005). Further, small mammal species observed to utilize woodpecker nests also serve as important prey items for mid and upper-level carnivores in the montane forest animal communities, such as California spotted owls (*Strix occidentalis occidentalis*), coyotes (*Canus latrans*), weasels (*Mustela* spp.), and martens (*Martes americana*). Reductions in the number of important prey items can have cascading effects on higher trophic levels.

The scoping notice's disrespect for wildlife and wildlife science is further enunciated in the "overall purposes of [the Rim Fire] project." None of the purposes reflect any desire by the Forest Service to ensure wildlife viability or conservation. Instead, they reflect the long-standing domination of silvicultural objectives – i.e., a desire to log and achieve short-sighted economic gains. As stated in the notice: "Capture the economic value of hazard trees and dead trees which pays for their removal from the forest and potentially for other future restoration treatments." The purposes also reflect an inherent inability for silviculturalists to see trees as anything other than "fuel" for fire. Time and again, the notice seeks to "[r]educe fuels," and the means to achieve that end is via logging. These "fuel" assertions stem from the belief that burned trees will be the source of high fuel loads to the extent that reburning in such environments would lead to soil damage and "destroy" the recovering forest. The scientific literature does not support these claims (e.g., McGinnis et al. 2010)

The only aspect of the scoping notice that addresses post-fire habitat is the generic statement to "[r]etain burned forest across the landscape to provide sufficient habitat for wildlife species dependent on post-fire environments." But this generic statement is presented as an afterthought that is subordinated to logging – the proposed action seeks to log the vast majority of intensely burned forest, especially the most contiguous patches. In fact, it may be that the only areas not slated for logging are areas too difficult or too expensive to reach. Moreover, the notice makes no mention of the specific needs of species like the black-backed woodpecker, and instead makes unsupported statements that assume that many snags can be removed, when in fact they should not be. Moreover, no basis at all is provided for the assumption that logging is somehow necessary to help mule deer (i.e., "Identify areas within critical winter deer range for salvage and non-merchantable material removal to achieve desired forage/cover ratios.") Mule deer will use the post-fire areas, including the intensely burned areas, if they are allowed to naturally regenerate and thereby provide browse for the deer.

In sum, the scoping notice is entirely inconsistent with recommendations from scientists on the management of post-fire landscapes, violates any claimed commitment to ecological restoration, and contradicts the conservation recommendations prepared by the Forest Service and others for species like the black-backed woodpecker (e.g., Bond et al 2012, Manley and Tarbill 2012, Burnett et al. ["Managing Post-Fire Habitat for Birds']). It is therefore necessary to promulgate a new purpose and need section, one that supports, not undermines, the protection and maintenance of post-fire wildlife habitat. In fact, the Forest Service would do well to look to one of its own documents for guidance, a document issued in conjunction with Point Blue, and titled, "Managing Post-Fire Habitat for Birds in the Sierra Nevada":

> Post-fire habitats are not blank slates or catastrophic wastelands, but rather an important part of the ecosystem.
>
> **Strategies for Managing Post-fire Bird Habitat**
> 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.

Again, and as explained in more detail below, post-fire areas that burned at moderate to high intensity are now known to be essential for wildlife species in the Sierras and are indispensable, therefore, to maintaining ecological integrity and biological diversity. In fact, the Forest Service should explicitly recognize that these intensely burned areas represent ecological restoration *if* they are left alone and allowed to regenerate so as to support woodpeckers, owls, bats, deer, hummingbirds, and many other species.

A. The Scoping Notice Ignores the High Ecological Value of Complex Early Seral Forest Habitat

"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). In addition, high-intensity fire patches – especially large patches – create critical "snag forest habitat", which has the highest levels of native biodiversity and total wildlife abundance of any forest habitat type, including old-growth forest. Snag forest habitat is three times 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).

Forest Service scientists recently concluded that, based upon fire intensity data from 1984-2009, there is too little high-intensity fire on national forests in mixed-conifer/ponderosa-pine forests of the western Sierra Nevada, based upon high-intensity fire rotation intervals of 859 years or more, which they found were unnaturally long (Miller et al. 2012b, Table 3). The authors concluded that "high-severity rotations may be too long in most Cascade-Modoc and westside FS [Forest Service] locations…" (Miller et al. 2012b, p. 15). When the most recent 4 years of data (2010 through 2013) are added, including the Rim fire, Aspen fire, and American fire of 2013 (using fire intensity data provided by the Forest Service, www.fs.fed.us/postfirevegcondition/, and using the Forest Service's own data to define high-intensity fire, Miller and Thode 2007, and conifer forest types, www.dfg.ca.gov/biogeodata/cwhr/), the high-intensity fire rotation interval for this longer time period (30 years) is approximately 805 years in mixed-conifer/ponderosa pine forests on national forests of the western Sierra Nevada—still far too long (indicating far too little high-intensity fire for the ecological health of the forests and the many wildlife species positively associated with high-intensity post-fire habitat). Historically, before fire suppression, natural high-intensity fire rotation intervals in these forests generally ranged from 200 to 400 years (Bekker and Taylor 2001, Hanson 2007, Stephens et al. 2007, Odion and Hanson 2013).

Bekker and Taylor (2001), in a remote unmanaged area of mixed-conifer and upper montane forest in the southern Cascades of California, found that 50-60% of these forests experienced high-intensity fire over a 76-year period prior to effective fire suppression in an unlogged area (a high-intensity fire rotation of about 150 years in that area during that time period). In a modeling study reconstructing historic fire patterns, Stephens et al. (2007) estimated a high-intensity fire rate, prior to 1850, of 5% every 12 to 20 years for ponderosa pine and mixed-conifer forests of the Sierra Nevada (rotation of 240 to 400 years). In another study, Collins and Stephens (2010), an average of 15% high-intensity fire was found in reference mixed-conifer forests with overall fire frequencies that were similar to those used in Stephens et al. (2007), suggesting similar, or slightly shorter, high-intensity fire rotations relative to those modeled in Stephens et al. (2007). In sum, the multiple sources of data strongly indicate that there is substantially less high-intensity fire now than there was historically. Moreover, not only did high-intensity fire areas comprise a substantial proportion of fire effects historically (prior to fire suppression and logging) on the western slope of the southern Cascades in ponderosa pine/fir, mixed-conifer, and true fir forests (Beaty and Taylor 2001, Bekker and Taylor 2001), high-intensity fire often comprises the majority of fire effects, with individual high-intensity fire patches sometimes reaching thousands of acres in size (Bekker and Taylor 2010).

Even the Forest Service's own documents have acknowledged that snag forest habitat, or complex early seral forest (CESF), is a distinct, natural, and highly important forest habitat type, and recommend that Forest Service land managers recognize this fact, in accordance with the current science (Bond et al. 2012 [p. 10, Recommendation 1.7 and p. 15, Recommendation 9.1], Burnett et al. 2012, p. 5; Manley and Tarbill 2012, Burnett et al. ["Managing Post-Fire Habitat for Birds']). Current science also recognizes that this snag forest habitat (a.k.a., natural, or "complex", early-seral forest) is highly diverse, structurally—similar, in fact, to the high structural diversity cherished in old-growth forest (Donato et al. 2012), and is not at all mimicked by clearcutting or post-fire logging, and artificial replanting, which removes or severely reduces that structural complexity and habitat heterogeneity, reducing native biodiversity (Swanson et al. 2011, Burnett et al. 2012).

Figure 1. 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. 2. Post-fire "salvage" logged area, devoid of most important habitat structures. Moonlight Fire of 2007, Plumas National Forest (Photo taken 2009).

Burnett et al. (2010), Fig. 4c, found that total bird abundance in 8-year-old snag forest habitat (i.e., not salvage logged or artificially replanted) in the Storrie fire was higher than in mature unburned forest in the northern Sierra Nevada and western slope of the southern Cascades, and found that nest density of cavity-nesting species peaked in the snag forest habitat patches with the highest tree mortality (Burnett et al. 2010, Fig. 8), leading Burnett et al. (2010, p. 31) to conclude that "areas burned by wildfire, especially those with older high-intensity fire patches, may in some cases support equal or greater landbird diversity and total bird abundance [than unburned forest]". At 11 years post-fire, the highest-intensity fire areas of the Storrie fire (not subjected to salvage logging or artificial replanting) continued to have the highest total bird abundance—about 7.3 birds per point count (Burnett et al. 2012, Fig. 5 [lower right corner]), which is higher than the adjacent mature, unburned forest at 6.9 birds per point count (Burnett et al. 2012, Fig. 4c). Similarly, Donato et al. (2009) found higher plant species diversity in high-intensity fire areas than in old forest.

In a 2008 book on post-fire logging, forest ecologists noted that:

> The notion that salvage logging assists the ecological recovery of naturally disturbed forests is fundamentally incorrect (Lindenmayer et al. 2004). Hence, justifications for salvage logging based on contributions to ecological recovery have little merit. We know of few circumstances where salvage logging has been demonstrated to directly contribute to recovery of ecological processes or biodiversity. [T]here is abundant theoretical and empirical evidence…that salvage logging interferes with natural ecological recovery..."

David B. Lindenmayer, Philip J, Burton, and Jerry F. Franklin, *Salvage Logging and Its Ecological Consequences*, 12-13 (2008).

Here is what America's scientists are finding about snag forest habitat created by higher-intensity fire:

Burnett et al. (2010):

"It is clear from our first year of monitoring three burned areas that post-fire habitat, especially high severity areas, are an important component of the Sierra Nevada ecosystem . . . . [P]ost-fire areas are not blank slates or catastrophic wastelands; they are a unique component of the ecosystem that supports a diverse and abundant avian community . . . ."

"Once the amount of the plot that was high severity was over 60% the density of cavity nests increased substantially."

"[M]ore 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."

"[A]reas burned by wildfire, especially those with older high severity patches, may in some cases support equal or greater landbird diversity and total bird abundance [than unburned forest]."

Noss et al. (2006):

"Overall species diversity, measured as the number of species—at least of higher plants and vertebrates—is often highest following a natural stand-replacement disturbance. . . . [P]ost-fire (salvage) logging does not contribute to ecological recovery; rather, it negatively affects recovery processes . . . ."

"Currently, early-successional forests (naturally disturbed areas with a full array of legacies, ie not subject to post-fire logging) and forests experiencing natural regeneration (ie not seeded or replanted), are among the most scarce habitat conditions in many regions."

Hutto (2006):

"Besides the growing body of evidence that large, infrequent events are ecologically significant and not out of the range of natural variation (Foster et al. 1998, Turner & Dale 1998), an evolutionary perspective also yields some insight into the 'naturalness' of severely burned forests. . . . The dramatic positive response of so many plant and animal species to severe fire and the absence of such responses to low-severity fire in conifer forests throughout the U.S. West argue strongly against the idea that severe fire is unnatural. The biological uniqueness associated with severe fires could emerge only from a long evolutionary history between a severe-fire environment and the organisms that have become relatively restricted in distribution to such fires. The retention of those unique qualities associated with severely burned forest should, therefore, be of highest importance in management circles."

"The ecological cost of salvage logging speaks for itself, and the message is powerful. I am hard pressed to find any other example in wildlife biology where the effect of a particular land-use activity is as close to 100% negative as the typical postfire salvage-logging operation tends to be."

"[S]evere fires are themselves restorative events. . . . [R]ehabilitation occurs naturally as part of plant succession."

Kotliar et al. (2002):

"Many bird species whose abundances were consistently higher in burned compared to unburned forests . . . also appeared to use stand-replacement burns more readily than low-severity and moderate-severity burns."

Hutto (1995):

"Stand-replacement fires should not be viewed as unnatural disasters that can (and should) be prevented."

"Recent full-page ads . . . have, in fact, emphasized the fire-prevention 'benefit' of forest thinning. Such a consequence may be fine at the urban-forest interface. It may be a well-intentioned but misplaced goal, however, for forested wildlands."

"Because the most suitable nest trees for cavity excavation are snags that are themselves old-growth elements, one might even suggest that many of the fire-dependent, cavity-nesting birds depend not only on forests that burn, but on older forests that burn."

Lindenmayer et al. (2004):

"To many ecologists, natural disturbances are key ecosystem processes rather than ecological disasters that require human repair. Recent ecological paradigms emphasize the dynamic, nonequilibrial nature of ecological systems in which disturbance is a normal feature . . . and how natural disturbance regimes and the maintenance of biodiversity and productivity are interrelated."

"[Post-fire] salvage harvesting removes critical habitat for species, such as cavity-nesting mammals, woodpeckers, invertebrates like highly specialized beetle taxa that depend on burned wood, and bryoflora closely associated with recently charred logs."

Letter to Congress from nearly 600 of the nation's top scientists (August 1, 2006):

"When we, as scientists, see policies being developed that run counter to the lessons of science, we feel compelled to speak up. Proposed post-disturbance legislation . . . crafted as a response to recent fires and other disturbances, is misguided because it distorts or ignores recent scientific advances. Under the labels of 'recovery' and 'restoration', these bills would speed up logging and replanting after natural disturbances. . . . [S]uch activity would actually slow the natural recovery of forests and of streams and the creatures within them. . . . [N]o substantive evidence supports the idea that fire-adapted forests might be improved by logging after a fire."

Letter to Congress (November 1, 2013):

"[E]ven in patches where forest fires burned most intensely the resulting post-fire community is one of the most ecologically important and biodiverse habitat types in western conifer forests. Post-fire conditions serve as a refuge for rare and imperiled wildlife that depend upon the unique habitat features created by intense fire. These include an abundance of standing dead trees or 'snags' that provide nesting and foraging habitat for woodpeckers and many other wildlife species, as well as patches of native flowering shrubs that replenish soil nitrogen and attract a diverse bounty of beneficial insects that aid in pollination after fire. Small mammals find excellent habitat in the shrubs and downed logs, deer and elk browse on post-fire shrubs and natural conifer regeneration, bears eat the berries often found in substantial quantities after intense fire, and morel mushrooms, prized by many Americans, spring from the ashes in the most severely burned forest patches. 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 . . . 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 . . . ."

B. The Scoping Notice Fails to Acknowledge the Black-backed Woodpecker and the Science Addressing the Woodpecker's Post-fire Habitat

The scoping notice and maps indicate that approximately two-thirds of the moderate/high-quality suitable Black-backed Woodpecker habitat in the fire area on the national forest (65% in salvage logging units alone—i.e., not including hazard tree removal) would be logged under the Proposed Action. Please see the attached map showing acreages, where suitable habitat is defined as RdNBR 477-640 (50-75% basal area mortality, Miller et al. 2009b), and >640 (>75% basal area mortality, Hanson et al. 2010), in pre-fire CWHR middle- and upper-elevation conifer forest types (not ponderosa pine or Douglas-fir because they are too low in elevation), in pre-fire structural categories 4M, 4D, 5M, 5D, and 6.

This newly created habitat is especially important given that: a) the Rim fire comprises some of the only current suitable black-backed woodpecker habitat in the central Sierra Nevada – previous fires, such as the nearby Mountain, Mud, Kibbie, and Whit fires, will be too old to provide suitable habitat by the time that the Rim post-fire logging project is completed, thus creating the potential for a substantial gap in black-backed woodpecker population distribution if 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]); and b) the Tahoe and Sierra National Forests have issued scoping notices proposing to salvage log substantial portions of the higher-severity fire areas in conifer forest on the Tahoe and Sierras National Forests.

In addition, as discussed in detail on pp. 8-9 of Monica Bond's comments (attached), the rationale used by the Forest Service to dismiss the effects of current post-fire logging projects on black-backed woodpeckers—i.e., the agency's claim that it only salvage logs about 9% of black-backed woodpecker habitat (moderate/high-severity fire in dense, mature/old conifer forest), based upon an un-authored 4-page memo—is false, due to misuse of the Forest Service's FACTS database, the effect of which is that the 4-page memo dramatically understates the proportion of black-backed woodpecker habitat that has been salvage logged on USFS lands. Moreover, the Forest Service's implication, that the suitable black-backed woodpecker habitat that remains unlogged is due to the agency's retention of such habitat, is misleading. Consistently, the Forest Service has proposed to salvage log much higher proportions of black-backed woodpecker habitat in large, recent wildland fires, but has only completed a portion of the initially-proposed logging due to litigation from non-profit conservation groups, and due to logging contractors who occasionally choose to avail themselves of opt-out clauses in timber sales contracts when they believe the logging will not be sufficiently profitable (Hanson et al. 2012 [Black-backed Woodpecker federal ESA listing petition]).

a. The Black-backed Woodpecker Conservation Strategy

In the fall of 2012, the U.S. Forest Service, in conjunction with the Institute for Bird Populations, recognized 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 recommended a number of mitigation measures to reduce the risk of losing population viability of this species in California. Among the conservation measures established are the following: a) identify the areas of the highest densities of the largest snags, and do not salvage log such areas; b) if the Forest Service decides to conduct post-fire logging in a particular area, logging units should not be bigger than 2.5 hectares, or 6.2 acres, in order to reduce fragmentation and maintain some connectivity in logged areas (page 10, Recommendation 1.3); c) maintain dense, mature forest conditions adjacent to fire areas in order to prolong the suitability of fire areas for Black-backed Woodpeckers--by several years post-fire, Black-backeds will sometimes move to fire edges where delayed tree mortality in moderate-severity fire areas, and in adjacent unburned areas due to beetles radiating outward from the fire edge, can create a pulse of more recent snags (page 10, Recommendation 1.4); and d) avoid post-fire logging during nesting season, May 1 through July 31 (page 10, Recommendation 1.5). None of these recommendations are even mentioned in the Rim Fire scoping notice, let alone explicitly incorporated into the proposed action.

b. **The US Fish and Wildlife Service Positive 90-Day ESA Finding**

On May 2, 2012, JMP and CBD, and others, filed a Petition to list the subspecies of Black-backed Woodpeckers in the 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).

Specifically, USFWS (2013) determined the following:

Page 14: "[W]e conclude 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."

Page 19: "[W]e conclude 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, noted that there is high uncertainty about just how small the current Black-backed Woodpecker population is, and there is high uncertainty about the effects of anthropogenic climate change on Black-backed Woodpeckers. 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, and 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).

The Rim Fire scoping notice fails to acknowledge or account for these findings and consequently fails to divulge the proportion of the current Sierra Nevada Black-backed Woodpecker population that would likely be lost individually due to the planned post-fire logging project, and cumulatively due to large-scale post-fire salvage logging planned in other fire areas, including the Aspen fire and the American fire.

c. Siegel et al. (2013) Findings Regarding Snag Density and Post-fire Logging

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.” Black-backed Woodpecker occupancy was adversely affected by post-fire salvage logging (Siegel et al. 2013, p. 47). The Rim Fire scoping notice fails to acknowledge or account for these findings.

C. The Scoping Notice Fails to Acknowledge the Science Addressing California Spotted Owls and Post-fire Habitat

The Proposed Action fails to incorporate the most recent science regarding California spotted owls in the Sierras (see, e.g., attached Bond 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).

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 Rim Recovery project is a major threat because a significant number of PACs and home range core areas (HRCAs) contain salvage logging units. For example, the proposed action would harvest over 4,200 acres within PACs and almost 8,500 acres of HRCA.

We are also opposed to the Forest Service's tendency to redraw PACs to exclude high-intensity burned forests and to re-draw the PACs to exclude salvage-logging areas. This is followed by the declaration that the salvage logging will not occur in the PAC and thus the effect on the PAC is insignificant. As demonstrated by the recent research described above, areas with high intensity effects, along with other types of fire effects, are utilized by owls for foraging and nesting and must be considered to be suitable habitat. The Forest Service should avoid re-drawing PACs or HRCAs to exclude high intensity burns and must not "retire" PACs until and unless at least two years of surveys to protocol confirm non-occupancy.

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. 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.

In sum, the Forest Service should seek to leave undisturbed the burned forest, especially in spotted owl PACs and HRCAs.

D. <u>The Scoping Notice Fails to Appropriately Address Riparian Conservation Areas (RCAs)</u>

Beschta et al. (2004) discuss at length the potential adverse impacts from salvage logging in sensitive riparian and near-stream areas and recommend that:

> Salvage logging generally should be prohibited on sensitive sites . . . including riparian areas, moderately or severely burned areas, fragile soils, steep slopes, roadless areas, watersheds where sedimentation is already a problem, where significant impacts to early successional vegetation may occur, and sites where accelerated surface erosion or accelerated mass soil erosion are likely to occur.

V. <u>The Scoping Notice Fails to Acknowledge the Science Regarding the Impacts of Salvage Logging</u>

Not only does salvage logging cause severe detrimental impacts to wildlife habitat, even the arguments the Forest Service puts forward regarding fuel reduction are not based in reality. 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.

Additionally, on August 1, 2006, and on October 30, 2013, letters 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 and "would actually slow the natural recovery of forests and of streams and the creatures within them…" The scientists concluded that "no substantive evidence supports the idea that fire-adapted forests might be improved by logging after a fire" (see attached scientist sign-on letters; see also Swanson et al 2010).

Patches of higher-intensity fire, wherein most or all trees are killed, do not "remove" the stand of trees, and do not put the area to a nonforest use. On the contrary, higher-intensity fire patches create one of the most ecologically important and biodiverse *forest habitat types* in western U.S. conifer forests: "snag forest habitat" (also known as complex early seral forest).

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

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.

VI. The Scoping Notice Inappropriately Segments the Rim Fire Proposals and Ignores Cumulatively Significant Impacts

While the scoping notice does not discuss it, there are plans to conduct post-fire artificial planting. This segmentation of highly related proposals (hazard tree removal as to level 3, 4, and 5 roads; post-fire logging; and post-fire artificial planting) violates NEPA – "Proposals or parts of proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement." 40 CFR 1502.4. There should be no questions that the hazard tree logging, the salvage logging, and any replanting, are all highly related to each other, especially as to their ecological impacts.

In addition, the scoping notice does not address the cumulative threat of hazard tree logging in conjunction with salvage logging, as to wildlife habitat and other ecological impacts. Moreover, the Forest Service has yet to analyze the cumulative threat of current post-fire salvage logging proposals, including Barry Point, Poker Chip, Chip-munk, Reading, 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. In essence, the Forest Service is managing blindly, and NEPA requires far more.

Finally, the Forest Service's frequent assertion that the distribution of Black-backed Woodpecker populations in the Sierra Nevada is stable (e.g., in the Bioregional Assessment for MIS species) is both outdated and meaningless in light of the above information. 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". The USFS's Bioregional Assessment for MIS states that Black-backed Woodpeckers continues to be distributed across the 10 Sierra Nevada NFs, relying upon five data sources—none of which individually or cumulatively provides 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.

VII. Logging as Proposed Would Be Arbitrary and Capricious Due To, Among Other Issues, the Failure to Address the Best Available Science Regarding Post-fire Wildlife Habitat, the Failure to Address Cumulative Effects, and the Failure to Take a "Hard Look" at the Project's Impacts

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 Stanislaus National Forest and larger Sierra Nevada ecosystem. This violates NEPA. Below we offer additional information as to these important legal issues.

A. Black-backed Woodpeckers

The Proposed Action fails to incorporate key Black-backed Woodpecker conservation recommendations from the Forest Service's own Black-backed Woodpecker Conservation Strategy (Bond et al. 2012), and fails to incorporate the most recent science regarding black-backed woodpeckers in the Sierras (e.g., Siegel et al. 2013). The Forest Service simply has not addressed at all how it is complying with the Conservation Strategy's conservation recommendations designed to reduce the risk of driving this species to extinction; nor does the agency analyze the adverse impacts of failing to comply with these key conservation recommendations and failing to incorporate the most recent science. As such, the agency is failing to take the required hard look at adverse impacts.

Second, as discussed above, the agency's misleading and erroneous statements about a "stable" Black-backed Woodpecker population "distribution", currently and post-project, improperly minimize and ignore adverse impacts and potentially significant risks and impacts.

Third, the Forest Service has not analyzed the impacts of the Proposed Action on suitable Black-backed Woodpecker nesting habitat. Siegel et al. (2013), found that, in sites selected for nesting by Black-backed Woodpeckers in the Sierra Nevada, snag density averaged about 18 snags per 10-meter radius plot, or about 570 snags/hectare (about 232/acre), and has 43.1 square meters/hectare (188 square feet/acre) of snag basal area (Siegel et al. 2013, p. 59, Table 13).

Nowhere does the Forest Service divulge, analyze or estimate the impact of proposed salvage logging on Black-backed Woodpecker nesting habitat.

Fourth, the agency's estimate of high-intensity fire acres from the MIS Bioregional Assessment includes years that are too old to be suitable Black-backed Woodpecker habitat (2000-2003), based upon Siegel et al. (2011, Fig. 15), and excludes the five most recent years, which would correspond to the most suitable habitat (Siegel et al. 2011, Fig. 15), and includes heavily salvage logged areas and areas of high-intensity fire in sparse stands that would not represent Black-backed Woodpecker habitat, contrary to the findings of Siegel et al. (2013), as discussed above. Thus, the analysis is not only misleading and outdated but is also off-base and irrelevant.

Fifth, the Forest Service has not analyzed the cumulative effects, discussed in detail above.

Sixth, it is clear, based on the foregoing, and based upon the Forest Service's own stated purpose and need for this project, that the Forest Service's desire to conduct salvage logging as quickly as possible and generate substantial sums of revenue for the Forest Service's budget and local district and forest staff, creates a financial conflict of interest that has undermined the environmental analysis and prevented an objective evaluation of the scientific evidence here.

In addition, the following are some key studies (with annotated descriptions of findings) regarding Black-backed Woodpeckers:

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, 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].)***

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 by sixfold 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 two decades, 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.)

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, and M.L. Bond. 2012. Assessing home range size and habitat needs of Black-backed Woodpeckers in California: 2011 Interim Report. Institute for Bird Populations. A report in fulfillment of U.S. Forest Service Agreement No. 08-CS-11052005-201, Modification 3; U.S. Forest Service, Pacific Southwest Region, Vallejo, CA. ***(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. 10, showing almost complete avoidance of salvage logged areas].)***

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].)

B. California Spotted Owls and Other Wildlife

As already discussed, the Proposed Action fails to incorporate the most recent science regarding California spotted owls in the Sierras (see, e.g., attached Bond comments). As a result, the proposed action fails to address its implications as to proposed salvage logging in currently existing PACs and HRCAs (as opposed to re-drawn PACs and HRCAs). It is imperative that the Forest Service not continue to make the mistake of wrongfully assuming that intensely burned forest is no longer suitable owl habitat.

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, lazuli buntings, western wood pewees, hairy woodpeckers, white-headed woodpeckers, fox sparrows and mountain quail. (Burnett et al. 2010, 2011, 2012; Siegel et al. 2011; DellaSala et al. (in press)).

Further, 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).

VIII. The Proposal as to "Hazard" Trees is Too Generic to be Ecologically Appropriate

The Project proposes to remove hazard trees on 369 miles of level 2 roads. No basis is provided for the need to log these roads as these roads are not essential to human transportation and could be closed or at least closed temporarily. Moreover, none of the following considerations are discussed either. First, hazard tree felling must not occur during the black-backed woodpecker nesting season, in accordance with the best available science as well as the Forest Service's Conservation Strategy for the species. Second, appropriate measures must be used to determine whether trees are in fact dead (and thus can be deemed a hazard). For example, trees that initially appear dead post-fire may actually not be, and can instead flush and survive (Hanson and North 2009). Consequently, in order to ensure that only dead trees are felled, such assessments must be conducted after flushing is completed following the fire (e.g., April-July of 2014). Trees that flush can be an important seed source for post-fire conifer regeneration and that is yet another reason it is necessary to determine the extent of flushing and survival in order to perform a meaningful analysis of the situation. The scoping notice's statement that "[d]ead trees will be designated for removal based on 'no green needles visible from the ground'" is therefore inadequate and not ecologically appropriate.

Moreover, the urgency for treating the roads has not been established – for example, the roads (in part or in whole) could be closed temporarily until after flushing issues or wildlife issues are addressed. Maintenance Level 1 and 2 roads – i.e., roads not maintained for public use – could especially be closed – and therefore do not require hazard tree felling. Finally, trees that are felled should be retained in the forest to provide large downed log habitat for small mammals, reptiles/amphibians, and invertebrates.

IX. The Rim Fire Must Be Appropriately Described

It is essential to provide the public and decision-makers with adequate and accurate information about forest fires. The Forest Service, however, continues to present a one-sided view that intense fire is ecologically harmful and something to outright avoided. 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 scoping notice, however, does almost nothing to provide the public with an understanding of the ecological benefits of the Rim Fire and instead portrays it only in an unenlightened, negative way so as to justify logging and other actions. This is not scientifically valid, and just as importantly, wrongly deprives the public of an adequate understanding of the situation.

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

The first question is essential to answer because fire in non-conifer areas (i.e., the lower elevation foothill and shrub vegetation types) generally results in the death of the vast majority of above-ground vegetation. (e.g., Odion et al. 2010, Keeley 2000). In conifer forest, on the other hand, fire has wide ranging effects – from 0 percent to 100 percent tree mortality in any given area. It is therefore necessary to differentiate between conifer and non-conifer areas to meaningfully describe a fire's overall impacts.

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

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

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

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

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

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

2. Within the conifer forest[2] area (and including all land ownerships, both public and private), high-intensity fire comprised 33 percent of the effects. Furthermore, high-

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

[2] Conifer forest consists of ponderosa pine, mixed-conifer, white fir, red fir, and lodgepole pine.

intensity fire areas are not all 100% tree mortality but, rather, range from about 70-100% mortality, and often have some large surviving trees. (e.g., Hanson et al. 2010).

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

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

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

Further, while some media accounts have pointed to the Rim Fire as being part of a trend towards larger, high-intensity fires, a very recent study published 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 2013.) 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.

Moreover, the levels of high-intensity fire in the Rim Fire were similar to historic levels. Studies and historic U.S. government reports show that, prior to fire suppression policies, high-intensity fire in mixed-conifer forests of the Sierra Nevada management region ranged, on average, from 15-40% of fire effects, and large patches of high-intensity fire were a natural part of historic fire regimes (e.g., Leiberg 1902, USFS 1911, Show and Kotok 1924, Show and Kotok 1925, Beaty and Taylor 2001, Bekker and Taylor 2001). Other recent large fires have had similar or higher levels of high-intensity fire as compared to the Rim Fire, including: the Cottonwood fire of 1994

(45% high-intensity fire); the Fountain fire of 1992 (60% high-intensity fire); and the Manter, Storrie, and McNally fires of 2000 and 2002, which all had about 30-34% high-intensity fire. It is also important to keep in mind that fires themselves are highly diverse and heterogeneous and therefore have a wide range of effects.

X. The Proposal Does Not Explain Even Its Economic Bases

The scoping notice fails to explain the following as to the economics of its proposal:

1. The amount mills will pay for logs
2. Costs of logging and transporting logs to mills
3. Forest Service Receipts
4. Stanislaus NF costs to prepare and administer timber sales
5. Stanislaus NF costs to facilitate clean up after logging operations
6. Timber related overhead costs at regional and Washington offices
7. Stanislaus NF costs for planting activities related to logging
8. Payments to counties

XI. Alternatives to the Proposed Action Must Include An Alternative that Conserves Post-fire Wildlife Habitat Instead of Logging It

While the proposed action should be withdrawn, and a new one initiated that comports with the available wildlife and forest science, an alternative to the proposed action must at least be presented that incorporates the above points. And, to be clear, the "no action" alternative does not address the above points because the above points include active management, such as road decommissioning, creation of downed logs in instances where "hazard" tree removal is in fact necessary, etc.

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

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

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

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)

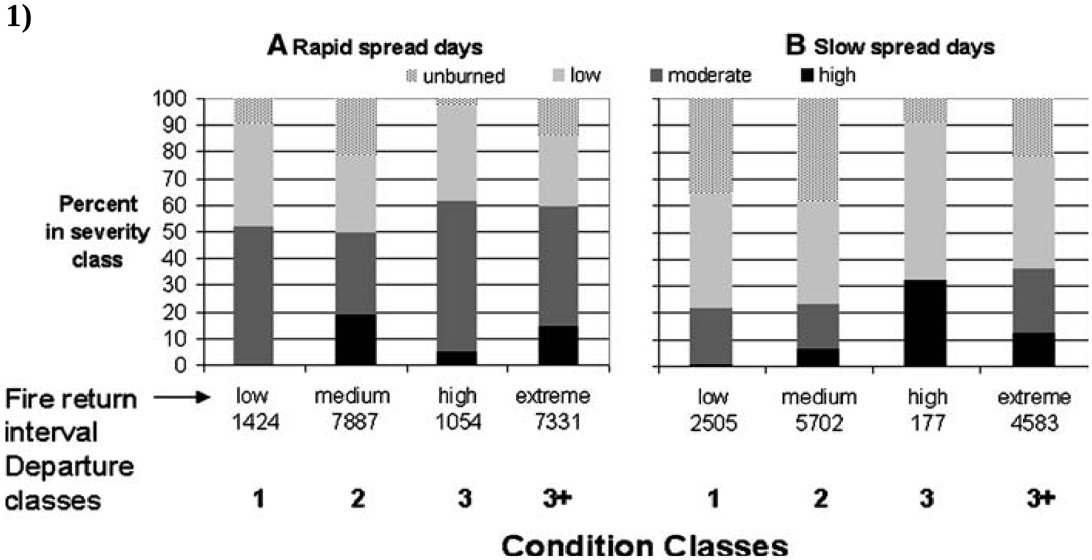

Figure 5 from Odion and Hanson (2006) (*Ecosystems*), based upon the three largest fires 1999-2005, which comprised most of the total acres of wildland fire in the Sierra Nevada during that time period (using fire severity data from Burned Area Emergency Rehabilitation (BAER) aerial overflight mapping),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

[continued on next page]

2)

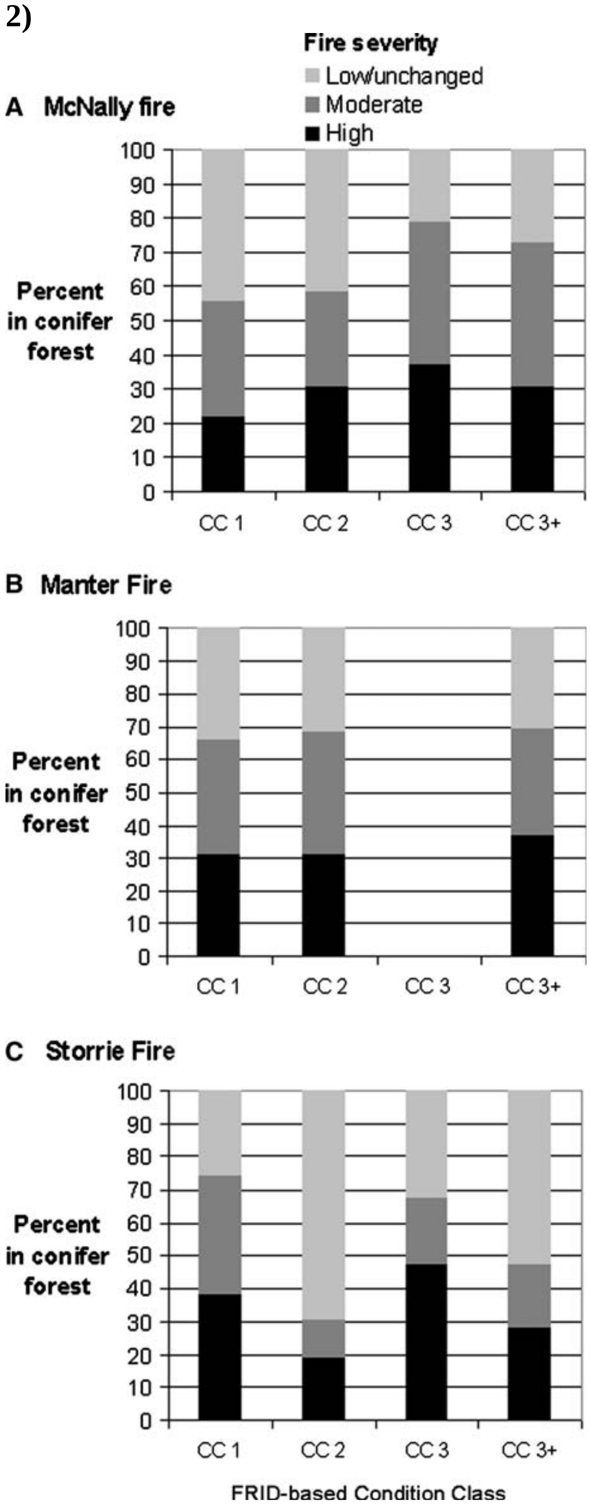

Figure 1 from Odion and Hanson (2008) (*Ecosystems*) (using fire severity data from satellite imagery for the same three fires analyzed in Odion and Hanson 2006), showing that the most long-unburned, fire-suppressed forests (no fire for a century or more) burned mostly at low/moderate-severity, and had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

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 19^th^ 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 19^th^ century due to reduced high-severity fire occurrence. The authors expressed concern about harm to biodiversity due to loss of ecologically rich montane chaparral.)***

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

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

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

USFS (United States Forest Service). 1910-1912. Timber Survey Field Notes, 1910-1912, U.S. Forest Service, Stanislaus National Forest. Record Number 095-93-045, National Archives and Records Administration—Pacific Region, San Bruno, California, USA. ***(Surveys were conducted within unlogged forest to evaluate timber production potential in 16.2-ha (40-acre) plots within each 259.1-ha (640-acre) section in ponderosa pine and mixed-conifer forest on the westside of the Stanislaus National Forest, using one or more 1.62-ha transect per plot. Surveyors noted that surveys for individual tree size, density and species were not conducted in areas that had experienced high-severity fire sufficiently recently such that the regenerating areas did not yet contain significant merchantable sawtimber. Surveyors noted that the dominant vegetation cover across the majority of many 259.1-ha sections was montane chaparral and young conifer regeneration following high-severity fire. For example (from a typical township in the data set): a) T1S, R18E, Section 9 ("Severe fire went through [this section] years ago and killed most of the trees and land was reverted to brush", noting "several large dense sapling stands" and noting that merchantable timber existed on only four of sixteen 16.2-ha plots in the section); b) T1S, R18E, Section 14 ("Fires have killed most of timber and most of section has reverted to brush"); c) T1S, R18E, Section 15 (same); d) T1S, R18E, Section 23 ("Most of timber on section has been killed by fires which occurred many years ago"); T1S, R18E, Section 21 ("Old fires killed most of timber on this section and most of area is now brushland". Moreover, with regard to understory density, the USFS 1911 Stanislaus data set (USFS 1910-1912) recorded average sapling density on 72 ponderosa pine forest sections (and some mixedconifer) (each section one square mile in size), with an average density of 102 saplings per acre (252 per hectare) in sections noted as having no previous logging. This is not consistent with the assumption of very low densities of saplings historically. In addition, the 1911 Stanislaus data set also recorded percent shrub cover on 57 sections (each one square mile) in ponderosa pine forests (and some mixed-conifer), with an average of 28% shrub cover in unlogged sections within forested areas with merchantable timber. In a total of 35 sections, surveyors recorded the proportion of the one-square-mile section comprised by montane chaparral areas (which often included natural conifer regeneration in the seedling, sapling, and/or pole-sized successional stage) with no merchantable timber. These montane chaparral areas represented 12,200 acres out of a total of 22,400 acres, or about 54%. As discussed above, in many of these montane chaparral areas, the visible signs of past high-severity fire were still evident, and surveyors specifically recorded large high-severity fire patches. The total area covered by the surveys was vastly larger than the small subset analyzed in Scholl and Taylor 2010 and Collins et al. 2011.) (This report constitutes new information under NEPA because it was not discovered/revealed until recently).***

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

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

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

<u>New Scientific Information</u>:

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

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

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

Lee, D.E., M.L. Bond, and R.B. Siegel. 2012. Dynamics of breeding-season site occupancy of the California spotted owl in burned forests. The Condor 114: 792-802. ***(Mixed-severity wildland fire, averaging 32% high-severity fire effects, did not decrease California spotted owl territory occupancy, and probability of territory extinction was lower in mixed-severity***

fire areas than in unburned mature/old forest. Post-fire salvage logging largely eliminated occupancy in areas that were occupied by owls after mixed-severity fire, but before salvage logging.)

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

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

Issue #4—Spotted Owl Population Trend

2004 Framework Assumptions/Conclusions:

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

New Scientific Information:

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

Further, the Forest Service's Plumas Lassen Administrative Study Report from the Lassen region found the following: "The estimated mean lambda for the Lassen Demographic Study between 1990-2010 was 0.979 (SE = 0.0097), with 95% confidence limits ranging from 0.959-0.999 (Scherer et al. 2010)…These results suggest a decline in the CSO population within the Lassen study area over the 20-year study period" (Keane et al. 2011, p. 119-120).

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

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

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

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

2004 Framework Assumptions/Conclusions:

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

New Scientific Information:

Black-backed Woodpeckers rely upon large patches (generally at least 200 acres per pair) of recently killed trees (typically less than 8 years post-mortality) with very high densities of medium and large snags (usually at least 80-100 per acre), and any significant level of post-fire salvage logging largely eliminates nesting and foraging potential. Moreover, Hanson et al. (2012) (the Black-backed Woodpecker federal Endangered Species Act listing petition) found that there are likely less than 700 pairs of Black-backed Woodpeckers in the Sierra Nevada, and they are substantially threatened by ongoing fire suppression, post-fire salvage logging, mechanical thinning "fuel reduction" logging projects, and possibly climate change. On April 8, 2013, the U.S. Fish and Wildlife Service determined that the Sierra Nevada and eastern Oregon Cascades population of this species may 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 >fivefold since the early 20th century in the Sierra Nevada and eastern Oregon Cascades due to fire suppression. Further, the current rate of high-severity fire in mature/old forest (which creates primary, or high suitability, habitat for this species) in the Sierra Nevada and eastern Oregon Cascades is so***

low, and recent high-severity fire in mature/old forest comprises such a tiny percentage of the overall forested landscape currently (0.66%, or about 1/150th of the landscape), that even if high-severity fire in mature/old forest was increased by several times, it would only amount to a very small proportional reduction in mature/old forest, while getting Black-backed Woodpecker habitat closer to its historical, natural levels. Conversely, the combined effect of a moderate version of current forest management—prefire thinning of 20% of the mature/old forest (in order to enhance fire suppression) over the next 27 years, combined with post-fire logging of one-third of the primary Black-backed Woodpecker habitat, would reduce primary Black-backed Woodpecker habitat to an alarmingly low 0.20% (1/500th) of the forested landscape, seriously threatening the viability of Black-backed Woodpecker populations.)

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

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

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

Siegel, R.B., M.W. Tingley, R.L. Wilkerson, M.L. Bond, and C.A. Howell. 2013. Assessing home range size and habitat needs of Black-backed Woodpeckers in California: Report for the 2011 and 2012 field seasons. Institute for Bird Populations. ***(Black-backed woodpeckers strongly select large patches of higher-severity fire with high densities of medium and large snags, generally at least 100 to 200 hectares (roughly 250 to 500 acres) per pair, and post-fire salvage logging eliminates Black-backed woodpecker foraging habitat [see Fig. 13, showing almost complete avoidance of salvage logged areas]. Suitable foraging habitat was found to have more than 17-20 square meters per hectare of recent snag basal area [pp. 45, 68-70], and suitable nesting habitat was found to average 43 square meters per hectare of recent snag basal area and range from 18 to 85 square meters to hectare [p. 59, Table 13]. Moreover, Appendix 2, Fig. 2 indicates that the Sierra Nevada population of Black-backed Woodpeckers is genetically distinct from the Oregon Cascades population, though additional work needs to be conducted to determine just how distinct the two populations are. Siegel et al. 2013 also found that the small number of Black-backed Woodpeckers with mostly unburned forest home ranges had home ranges far larger than***

those in burned forest, and that the birds in unburned forest were traveling more than twice as far as those in burned forest in order to obtain lesser food than those in burned forests, indicating that such areas do not represent suitable, viable habitat for this species.)

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

USFWS. 2013. 90-day Finding on a Petition to List Two Populations of Black-backed Woodpecker as Threatened or Endangered. U.S. Fish and Wildlife Service, Washington, D.C., April 9, 2013. ***(USFWS (2013), on page 14, "conclude[d] that the information provided in the petition or in our files present substantial scientific or commercial information indicating that the petitioned action may be warranted for the Oregon Cascades-California and Black Hills populations of the black-backed woodpecker due to the present or threatened destruction, modification, or curtailment of the populations' habitat or range as a result of salvage logging, tree thinning, and fire suppression activities throughout their respective ranges." USFWS (2013), on page 19, also "conclude[d] that the information provided in the petition and available in our files provides substantial scientific or commercial information indicating that the petitioned action may be warranted due to small population sizes for the Oregon Cascades-California and Black Hills populations, and due to climate change for the Oregon Cascades-California population." USFWS (2013), at pages 18-19, concluded that substantial scientific evidence indicates that current populations may be well below the level at which a significant risk of extinction is created based upon Traill et al. (2010), and concluded that, while some climate models predict increasing future fire, others predict decreasing future fire (due to increasing summer precipitation), and, in any event, models predict a shrinking acreage of the middle/upper-elevation conifer forest types upon which Black-backed Woodpecker depend most (range contraction).)***

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

2004 Framework Assumptions/Conclusions:

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

<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.)***

Issue #7: Fire Severity Trend

2004 Framework Assumptions/Conclusions:

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

New Scientific Information:

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

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

Dillon, G.K., et al. 2011. Both topography and climate affected forest and woodland burn severity in two regions of the western US, 1984 to 2006. Ecosphere 2: Article 130. ***(No increase in fire severity was found in most forested regions of the western U.S., including no increasing trend of fire severity in forests of the Pacific Northwest and Inland Northwest, which extended into the northern portion of the Sierra Nevada management region.)***

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

Hanson, C.T., and D.C. Odion. 2013. Is fire severity increasing in the Sierra Nevada mountains, California, USA? International Journal of Wildland Fire: dx.doi.org/10.1071/WF13016 (published online September 10, 2013). ***(Hanson and Odion (2013) conducted the first comprehensive assessment of fire intensity since 1984 in the Sierra Nevada using 100% of available fire intensity data, and, using Mann-Kendall trend tests (a common approach for environmental time series data—one which has similar or greater statistical power than parametric analyses when using non-parametric data sets, such as fire data), found no increasing trend in terms of high-intensity fire proportion, area, mean patch size, or maximum patch size. Hanson and Odion (2013) checked for serial autocorrelation in the data, and found none, and used pre-1984 vegetation data (1977 Cal-Veg) in order to completely include any conifer forest experiencing high-intensity fire in all time periods since 1984 (the accuracy of this data at the forest strata scale used in the analysis was 85-88%). Hanson and Odion (2013) also checked the results of Miller et al. (2009) and Miller and Safford (2012) for bias, due to the use of vegetation layers that post-date the fires being analyzed in those studies. Hanson and Odion (2013) found that there is a statistically significant bias in both studies (p = 0.025 and p = 0.021, respectively), the***

effect of which is to exclude relatively more conifer forest experiencing high-intensity fire in the earlier years of the time series, thus creating the false appearance of an increasing trend in fire severity. Interestingly, Miller et al. (2012a), acknowledged the potential bias that can result from using a vegetation classification data set that post-dates the time series. In that study, conducted in the Klamath region of California, Miller et al. used a vegetation layer that preceded the time series, and found no trend of increasing fire severity. Miller et al. (2009) and Miller and Safford (2012) did not, however, follow this same approach. Hanson and Odion (2013) also found that the regional fire severity data set used by Miller et al. (2009) and Miller and Safford (2012) disproportionately excluded fires in the earlier years of the time series, relative to the standard national fire severity data set (www.mtbs.gov) used in other fire severity trend studies, resulting in an additional bias which created, once again, the inaccurate appearance of relatively less high-severity fire in the earlier years, and relatively more in more recent years. The results of Hanson and Odion (2013) are consistent with all other recent studies of fire intensity trends in California's forests that have used all available fire intensity data, including Collins et al. (2009) in a portion of Yosemite National Park, Schwind (2008) regarding all vegetation in California, Hanson et al. (2009) and Miller et al. (2012a) regarding conifer forests in the Klamath and southern Cascades regions of California, and Dillon et al. (2011) regarding forests of the Pacific (south to the northernmost portion of California) and Northwest.)

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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Burnett, R.D., P. Taillie, and N. Seavy. 2010. Plumas Lassen Study 2009 Annual Report. U.S. Forest Service, Pacific Southwest Region, Vallejo, CA.

Burnett, R.D., P. Taillie, and N. Seavy. 2011. Plumas Lassen Study 2010 Annual Report. U.S. Forest Service, Pacific Southwest Region, Vallejo, CA.

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Cohen, J.D. 2000. Preventing disaster: home ignitability in the Wildland-Urban Interface. Journal of Forestry 98: 15-21.

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.

Collins, B.M., and S.L. Stephens. 2010. Stand-replacing patches within a mixed severity fire regime: quantitative characterization using recent fires in a long-established natural fire area. Landscape Ecology 25: 927939.

Collins, B.M., G. Roller, and S.L. Stephens. 2011. Fire and fuels at the landscape scale. Plumas Lassen Study: 2010 Annual Report. U.S. Forest Service, Pacific Southwest Research Station, Davis, CA.

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Donato, D.C., J. L. Campbell, and J. F. Franklin. 2012. Multiple successional pathways and precocity in forest development: can some forests be born complex? Journal of Vegetation Science 23: 576–584.

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