May 28, 2014

Aspen Recovery and Reforestation Project Interdisciplinary Team
High Sierra Range District
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Sent via email to: comments-pacificsouthwest-sierra@fs.fed.us

Re: Comment on the Proposed Aspen Recovery and Reforestation Project

To the IDT:

These comments are submitted on behalf of Sierra Forest Legacy and Sierra Club. We have reviewed the draft Environmental Assessment (EA) and various specialist reports. We found that these documents suffer from a number of violations to the National Environmental Policy Act (NEPA) and National Forest Management Act (NFMA). We are concerned that an environmentally positive alternative, one that focuses on public safety, was not developed. We provide details of our review below, but more generally we find:

- Project design criteria fail to protect and maintain critical wildlife habitat and ignore the best available science related to sensitive wildlife, resulting in an analysis that underestimates the effects of the project;
- The proposed action alternatives fail to honor the pre-disturbance management objectives for the project area as they relate to sensitive wildlife species;
- The likely significant impact on sensitive resources, e.g., proposed species and species that are at risk and declining, requires the preparation of an environmental impact statement (EIS) for the project;
- The purpose and need for the action alternatives are not economically or ecologically justified;
- The analyses lack scientific rigor and objectivity; and
- The proposed actions includes the removal of living trees greater than 30 inches dbh.

I. Overview of the Project

According to the EA, the Aspen Recovery and Reforestation Project area is approximately 22,350 acres on the Sierra National Forest and includes the following:

- Hazard tree removal on 393 acres of dead tree groups resulting from high and moderate severity outside of salvage areas;
- Hazard tree removal on 732 acres of dead trees, individually scattered, resulting from very low and low severity outside of salvage areas;
- Salvage timber harvest on 1,835 acres of high and moderate vegetation fire severity, with secondary salvage harvest on approximately 30% of an additional 3,239 acres;

- Site preparation, planting, and release of native conifer seedlings on 1,955 acres in areas of high and moderate severity burn and young plantations killed by fire;
- Reopen or construct 15 miles of temporary roads and associated landings; and
- Noxious weed eradication (chemical and manual) on 66 acres.

II. Issues related to Compliance with National Environmental Quality Act (NEPA)

A. Purpose and Need are Not Ecologically or Economically Justified in the EA or Supporting Documents and Lack Scientific Rigor and Objectivity

1. <u>Reestablish Forested Conditions</u>

The EA contends that one of the primary needs for the proposed project is to reestablish forest conditions in areas that have been "deforested", and "Action alternatives change secondary succession to increase the pace and scale of conifer regeneration; whereas the no action alternative allows unplanned events to result in conifer regeneration (secondary succession) and achieve the desired "old forest" conditions. The EA also states that, "Without reforestation efforts (i.e., site preparation, planting, thinning of naturally regenerated seedlings, and release of planted seedlings) conifer recovery would be very slow and much of the area could stay in the brush field/grassland stage for a century or more." In contrast, Shatford et al. (2007) found that a major component of ecosystem recovery after high-severity fire on relatively xeric sites in northern California and southern Oregon consisted of shrubs and resprouting hardwood trees (25–95% aerial cover; 47 species) and that conifer seedlings, including Douglas-fir (*Pseudotsuga menziesii*), ponderosa pine (*Pinus ponderosa*), knobcone pine (*Pinus attenuate*), incense cedar (*Calocedrus decurrens*), sugar pine (*Pinus lambertiana*), western white pine (*Pinus monticola*), and white fir (*Abies concolor*), were frequently overtopped by shrubs and hardwoods; yet there was no evidence of recent conifer mortality or suppression leading to death 9 to 19 years post-fire. In fact, the authors state that it was quite likely that height growth of shrubs had slowed after 9 –19 years (Brown and Smith 2000) while tree height growth continued to slowly increase and that conifer mortality would remain low and height growth would accelerate as individuals continued to emerge above the shrub layer (Conard and Radosevich 1982).

In a 2-year study of conifer survival with and without salvage logging in southwest Oregon, Donato et al. (2006) concluded that post-fire management activities 2 years after a fire killed most natural tree regeneration, which included a similar species composition as the pre-fire over-story composition (including a pine component), and may be counterproductive to forest recovery. Although Crotteau et al. (2013) did not observe *Pinus* spp. densities in the same magnitude as those of *Abies* spp. post fire, analysis of the pine index confirmed that low-, medium-, and high-severity burns had more positive effects on the proportion of pine regeneration than the unburned strata in the low-elevation fir and mixed conifer forest types on the Lassen National Forest. Donato et al. (2009) provided several reasons to explain the high post-fire seedling survival they observed: (1) post-fire environments are likely ideal for seedling establishment given the evolutionary history of local conifers as a result of increased light, nutrients, and mineral soil seedbeds, and a period of reduced hardwood-shrub leaf area, and mycorrhizal associations between conifer seedlings and resprouting hardwoods (Borchers and Perry 1990); (2) post-fire sites contain abundant snags leading to "dead shade", which reduces direct solar insolation and evaporative stress, increasing seedling survival (Minore 1971); and (3) naturally regenerating conifers allocate much of their initial growth below-ground, which provides for deep roots and access to soil layers in which summer moisture levels are less severe. We also note that natural regeneration in the Cleveland Fire (1992) has been quite prolific, even within the high severity burned portions of the fire. The photo below was taken on May 27, 2014 in an area of the fire that burned with high severity, with portions that were lightly salvaged or not salvaged. These areas were not planted with conifer nor were they treated with herbicides. After 20 years, the area has a well-developed shrub and hardwood layer and small conifers are beginning to emerge through this layer.

These findings and examples contradict the idea that burned areas will develop into unproductive shrub fields that persist for "a century or more" and that post-fire salvage logging and tree planting would speed the recovery of complex conifer forests and provide revenue from timber extraction (Sessions et al. 2004).

The EA purports that, "Most of the trees in the moderate to high severity burned areas that would provide a conifer seed source were killed," and "The Aspen fire created large openings with distances between surviving conifers up to 1500 feet (330 meters). These large openings are beyond the reach of most pine seeds dispersed by wind or animals." While it is true that "most" of the trees that would provide a seed source in some of the moderate-severity burned areas were killed; according to the EA and Vegetation and Silviculture Report for the Aspen Fire (Vegetation Report) the moderate severity burned areas in the Aspen Fire maintain 47 percent and 26 percent their pre-fire green-tree component, which provides a seed source for natural regeneration. Even at sites that experienced high-severity fire, on average, 15 percent of the pre-fire green-tree component remains to provide a seed source for regeneration. In fact, Crotteau et al. (2013) determined that it was likely that the reason they observed greatest conifer regeneration densities in the low- and medium-severity burned areas was due to nearby remnant mature, seed-bearing trees. In puzzling contrast to the claims that moderate severity burned areas require reforestation, the Biological Assessment and Evaluation for Terrestrial Wildlife for the Aspen Fire Recovery and Reforestation Project (BE) state, "USFS policy recognizes the ecological importance of low/moderate severity fire regimes in the Sierran mixed conifer forests in that they provide regeneration and habitat for numerous species."

While it is true that conventional wisdom and seed dispersal graphs suggest that the majority of seed fall occurs near the seed source with seed rain trailing off to very low seed densities by 200 meters from a seed source, exact dispersal patterns vary with species, wind patterns, topography, and other factors (Isaac 1940, Minore and Laacke 1992, Greene and Johnson 1996); Shatford et al. (2007) observed as many as 84 to 1,100 trees per acre, including Douglas-fir, ponderosa pine, knobcone pine, incense cedar, sugar pine, western white pine, and white fir, greater than 300 meters from a seed source on study sites 9 to 19 years post-fire and there was no significant effect of distance from seed source on tree density, suggesting that at this scale, forest recovery is not a simple function of distance to surviving trees that act as seed sources (Nathan and Muller-Landau 2000). One possible explanation for this that is relevant to the post-Aspen Fire landscape is the presence of isolated remnant trees throughout stand-replacement areas that may serve as local seed sources (Greene and Johnson 2000, Issac and Meagher 1936).

In mixed-severity fires, such as the Aspen Fire, the spatial arrangement of residual trees reflects the complex nature of the fire behavior and effects, resulting in highly intermixed patches and convoluted edges (Donato et al. 2009). With respect to conifer regeneration, large mixed-severity fires can often be described as a collection of smaller stand-replacement patches in a matrix of surviving canopy, rather than vice versa (Lenile et al. 2005, Turner et al. 1998). Variation in burn patch size may be a key mechanism underlying heterogeneity in regeneration, successional pathway, and forest structure, thereby contributing to biodiversity (Donato et al. 2009). Crotteau et al. (2013) noted that the stark contrast between the prolific low- and medium-severity burns and the sometimes sparsely regenerating high-severity burns highlights the landscape structural heterogeneity created by wildfire and that distinct landscape heterogeneity is often valuable for wildlife habitat and beta-level biodiversity, though it is perhaps at the expense of optimal timber production. The type of heterogeneity characterized by Crotteau et al. (2013) and found in the Aspen Project area is also similar to that described by North et al. (2010) and North (2012) as the desired condition in mixed-conifer forests of the Sierra Nevada. Artificially regenerating the affected landscape has the potentially to shorten the duration of the early successional stage and reduce forest diversity. Reducing the quality and quantity of early seral vegetation, through conifer planting and use of herbicides, in this landscape is contrary to estimates of natural range of variability (Safford 2013) that indicate a low amount and decreasing trend of early seral vegetation throughout the Sierra Nevada and on the Sierra National Forest[1] in particular.

The EA does not define under what conditions it may be necessary to replant and/or control brush. There is rarely either an ecological or economic necessity to replant trees after fire, and natural regeneration after fire is preferable from an ecological standpoint (Franklin and Agee 2003, Government Accountability Office 2005, Lindenmayer et al. 2008). Natural tree regeneration can be abundant after fire, and post-fire logging may actually reduce regeneration as much as 71 percent by crushing young trees and compacting soil (Shatford et al. 2007). Given the uncertainty surrounding the effectiveness of current silvicultural treatments in providing or protecting structural diversity (USDA Forest Service 2001, Volume 4, p. E-48), it is critical to not perpetuate the simplification of habitat through the post-fire removal of legacy trees and the replanting of homogeneous tree plantations. In addition, herbicide treatment directed at shrubs after salvage logging was found to result in significantly greater alien species richness and significantly greater alien grass and forb cover at four post-fire locations in the central Sierra

[1] http://livingassessment.wikispaces.com/Chapter+1+Sierra#Trends

Nevada, (McGinnis et al. 2010), which runs counter to the EA's desired condition of having native vegetative communities free of noxious weeds.

Complex early seral forest is a natural stage in forest development following disturbances such as fire and whether it will or will not take longer to obtain mature forest conditions without active management is site-specific. The findings of Shatford et al (2007) and Donato et al. (2006, 2009) contrast some of the studies cited in the EA and Vegetation Report to support the need for active reforestation and suggest that numerous successional pathways are possible and natural regeneration can lead to adequate stocking and species compositions. Because of these uncertainties and the unknown successional pathway a site within the project area may follow, it is imperative that adaptive reforestation criteria are developed that indicate when, where, how, and under what conditions in the post-Aspen Fire landscape to allow natural regeneration.

The EA and supporting documents frequently contend that areas that suffered moderate to high severity fire were "deforested" and therefore require reforestation. However, the Forest Service's Region 5 website (http://www.fs.fed.us/r5/rsl/projects/postfirecondition/info/Glossary.shtml) defines deforested to mean, "The fire burned at high severity and not enough trees are left alive for the forest to function normally. Most of the area has less than 20 % canopy cover. It is different than professional definition of the term deforestation, which connotes a more permanent change in land use." Considering the moderate severity category in the EA includes all areas with between 25 and 75 mortality, it seems highly unlikely that all areas that burned at moderate severity meet the Forest Service's definition of deforested. Please update the EA and supporting documents to reflect the definition of "deforested" used by the Region.

2. <u>Recovering Economic Value of Fire-affected Trees</u>

None of the proposed action alternatives considered are cost efficient. The need for active reforestation and herbicide suppression of shrubs within the project area is debatable; therefore, it stands to reason that a project deficit of $3,287,000-plus under any of the action alternatives, which include significant costs associated with road construction, reforestation, and herbicide application, may not be justified and does not meet the purpose an need of recovering economic value of fire-affected trees ***<u>cost efficiently</u>***. It also stands to reason that if it is determined that salvage logging necessitates the need for reforestation, the costs associated with reforestation should be weighed against the revenue created by salvage logging ($259,000) in determining the economic value of the fire-affected trees recovered from the proposed project. To determine if a stand should be replanted, an adaptive reforestation plan that relies on monitoring natural regeneration and pre-defined criteria to trigger active reforestation must be created and all stands must first be allowed to naturally regenerate prior to any management activity. According to a Government Accountability Office (GAO) report commissioned by Congress confirmed that U.S. Forest Service in Regions 5 and 6 (California and Oregon) failed to move beyond outdated management standards for reforestation (Government Accounting Office 2005). According to one regional official, the Forest Service's history of timber production permeates current thinking, and many procedures do not reflect the current management emphasis on ecosystem health. The GAO reported that regional culture emphasized planting – the most expensive approach – to reforestation projects. For instance, the reestablishment of plantations in the project area will necessitate a pre-commercial thin 10 to 15 years post-planting. Pre-commercial thinning is expensive and often does not occur due to the expense. The proposed action alternatives appear to be the perpetuation of outdated management standards for reforestation at a significant cost to the American public. As a cost-saving and ecologically responsible measure, areas regenerating naturally should be identified and protected prior to all mechanical operations. Areas with desirable shrub and oak components should also be identified as achieving successful regeneration and should also be protected from mechanical operations so that ecologically desirable vegetation is not run over and destroyed during logging operations. It is unconscionable to expect the taxpayer to pay for unnecessary reforestation and the subsidization of private timber company salvage logging.

3. <u>Minimize High-intensity, Large-scale Fires</u>

The "need" statements 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. However, several studies on the effects of reburn on areas within the Biscuit Fire (2002, Cascades Region) indicated that salvage logging significantly increased both fine and coarse downed woody fuel loads (Donato et al. 2006) and areas that were salvaged and replanted burned at higher severity compared to unlogged areas (Thompson et al. 2007). Studies in the Pacific Northwest have shown that small and medium diameter dead woody surface fuels, which actively burn at the fire front and contribute most to fireline intensity, were greater in logged areas than untreated areas in the short term (Donato et al., 2006; McIver and Ottmar, 2007) and were predicted to remain higher in these areas for approximately 20 years (McIver and Ottmar, 2007). As a result, Donato et al. (2006) reported that the lowest fire risk strategy may be to leave dead trees standing as long as possible (where they are less available to surface flames), allowing for aerial decay and slow, episodic input to surface fuel loads over decades. McGinnis et al. (2010) examined fuels and modeled fire effects for four fires that occurred in the Sierra Nevada since 1987. The Stanislaus Complex fire (1987) was among the fires examined. This study found that under two modeled fire weather conditions ("low danger early season" and "extreme") tree mortality was the same in all "treatments"—salvage logged, salvaged logged and herbicide, and unlogged. In addition, surface fire behavior (rate of spread and flame length) was not different between salvage logged and unlogged treatments. The examined landscapes ranged from 4 to 21 years post-fire and indicate that salvage logging did not substantially change fire effects in these stands. The results of McGinnis et al. (2010) are consistent with the modeled result from the Fire and Fuels Specialist Report for the Aspen Recovery and Reforestation Project, which indicate there would be no difference in flame lengths between the no action alternative and the action alternatives for the high or moderate severity burned areas until sometime between 20 and 30 years post fire and an insignificant difference between the no action and action alternatives for the low and extremely low severity burned areas. Despite potential differences in flame lengths 30 or more years post fire, it is our expectation that these areas, as with most of the mixed-conifer and yellow-pine forests on the Sierra National Forest, would not go unmanaged for the next 30 years, regardless of the chosen alternative, and that managed fire would be used to maintain reduced fuels and provide resilience to high severity wildfire.

The number of acres that burned at high severity in the conifer dominated forests of the Aspen Fire was greatly influenced by the large number of pine plantation within the project area that burned at high severity (2,100 acres, approximately 10 percent of the entire project area, and 58 percent of the pine plantations). Despite the large number of plantation acres that burned at high severity, the proposed action includes replanting pine plantations. According to the Vegetation Report, "Reforested high/moderate severity areas would be single storied even-aged stands. Existing 5 to 15 year old plantations would continue to be single storied. Older plantations with fire created openings would receive new planted pine; this would create a second or third age class." According to the Vegetation Report, the plantations are also where the highest losses have occurred from bark beetle activity on the forest. Based on the overwhelmingly deleterious effects of the Aspen Fire to the plantations and their relatively high susceptibility to insect mortality in the absence of fire, the reestablishment of plantations as a post-fire recovery method does not meet the purpose and need and defies logic. It has clearly been demonstrated that plantations are more susceptible to high-intensity and high severity fire than natural stands and contribute to large-scale fires and highly susceptible to insect and disease outbreaks.

4. Secondary Salvage Logging has not been Justified

It is not clear how salvage logging low and very severity burned areas meets the purpose and need. The foundation of the analysis justifying secondary salvage logging "weakened" and insect killed trees is highly assumptive and does not support preemptive secondary salvage logging. While it is true the probability of bark beetle associated mortality increases as a result of fire and drought, the EA and Vegetation Report do not justify the assumption that bark beetle mortality will occur on all 3,239 acres being proposed for secondary salvage logging, including 2,341 acres of low and very low severity burned areas. In fact, the logic being used to justify salvage logging the low and very low severity burn areas could be used to justify salvage logging areas on the High Sierra Ranger District and throughout the Sierra Nevada in which prescribed fire has been used as a management tool to reduce fuel loads. For instance, several studies have found significantly more bark beetle attacked ponderosa pine on prescribed burned sites than on associated unburned sites in California (Schwilk et al. 2006; Fettig et al. 2008, 2010; Maloney et al. 2008). We ask that you justify how the effects of the Aspen Fire in the low and very low severity burn areas differs from areas where prescribed fire has been used as a management tool or avoid these areas to the extent practicable.

The mechanisms driving bark beetle attraction to fire-injured trees is unclear, the specific injuries that contribute to increased susceptibility to attack are unclear, and bark beetle populations that develop in burned areas do not appear to disperse to adjacent unburned areas during endemic years (Davis et al. 2012). Based on this, there is no way of knowing if and when a beetle outbreak will occur and therefore there is not an ecologically justifiable reason to salvage log an area until after mortality has occurred. Even if an outbreak does occur, the extent and intensity of the mortality should be evaluated to determine if it is within or outside the range of natural variability, prior to salvage logging. Because there is not an ecological justification for preemptive secondary salvage logging and bark beetle activity within the project area was low prior to the Aspen fire, the Forest Service should rely on monitoring to determine when a bark beetle outbreak occurs. Once an outbreak has been identified, the Forest Service should determine if the extent and intensity of the outbreak is within the range of natural variability prior to any secondary salvage logging.

B. Effects Analyses are Inadequate

1. California Spotted Owl Status and Trend

The EA and BE ignore the best available science as it pertains to the current status of the California spotted owl and differences in use of burned forests that are salvage logged vs. unlogged.

The EA and BE cite Blakesley et al. (2010) as providing the most robust demographic estimates available and that California spotted owl populations are stable on all sites except the Lassen National Forest. However, Blakesley et al. (2010), which only presents demographic results through 2005, no longer provides the most up to date and robust demographic data available as we go into detail below. It is concerning that the EA and BE do not contain the most up to date information on the status of the California spotted owl, considering we cited the declines documented on the Sierra National Forest (Conner et al. 2013) in our comments to the Sierra National Forest on the draft EA for the Bald Mountain Project on October 21, 2013. We ask that you review the recent literature on California spotted owl demographics on the Sierra National Forest and throughout the range (Conner et al. 2013, Tempel and Gutierrez 2013, and Temple 2014) and update the EA and BE accordingly. The cumulative effects analysis is incomplete without considering the best available science on the status of the species in the study area and throughout its range.

The U.S. Fish and Wildlife's 2006 decision not to list the California spotted owl was not because the Forest Service management activities were not affecting it, it was because the population trend data were inconclusive. Conner et al. (2013) suggest that the method used to estimate the rate of population change in the Blakesley et al. (2010) meta-analysis is confounded by an inherent susceptibility to making a "Type II" error, or an inability to detect a decline or change when one has occurred. Since 2010, new analyses of California spotted owl demographics, also building on the long-term dataset analyzed in the previous meta-analyses, provide conclusive evidence that the species has been declining on all three National Forest monitoring sites since the early 1990s, and are likely to continue on this trajectory (Conner et al. 2013; Tempel and Gutierrez 2013, Tempel 2014).

Results suggest that between 1990 and 2011 the spotted owl population on the Lassen National Forest study area declined by 21 percent and the population on the Sierra National Forest study area declined by 11 percent, while the population on the Sequoia-Kings Canyon National Park study area, where logging activities are minimal, increased by 22 percent. To increase precision, Conner et al. (2013) estimated the probability that the populations on the three study sites were declining, finding that the probabilities of a population decline greater than or equal to 15 percent over 18 years was 0.69 on the Lassen and 0.40 on the Sierra study areas and 0.04 over 17 years on the Sequoia-Kings Canyon study area; while the probabilities the population was stable or increasing were 0.07 on the Lassen, 0.22 on the Sierra, and 0.82 on the Sequoia-Kings Canyon. Tempel and Gutierrez (2013) calculated occupancy and abundance using data from the Eldorado National Forest study area sites from 1993 to 2010. Using occupancy (detection-nondetection) modeling to determine how occupancy changed over the study period, they found that owl occupancy declined by 30 percent, territory extinction increased over time, and colonization rates were insufficient to maintain occupancy at its initial level. Tempel (2014) found a population decline of 50 percent between 1990 and 2012 with 95% credible intervals well below 1.0 for the Eldorado study area.

These recent studies strongly indicate population declines on three of the four study areas: the Lassen, Eldorado, and Sierra study areas. Only the population in the Sequoia and Kings Canyon study area appears to be stable or increasing. Summarizing the status of the owl in his dissertation, Tempel (2014) concludes, “Finally, my results suggested that the U.S. Fish and Wildlife Service may need to reevaluate their recent decision not to list the California spotted owl under the Endangered Species Act because population declines are becoming apparent and it is not clear if USFS management actions are related to this decline.”

2. California Spotted Owl’s Use of Burned Forests

The EA and BE assume that spotted owl use of burned and unburned forests is similar and that canopy cover is the most important habitat attribute in both of these vegetation types. As a result, the EA and BE inappropriately conclude that because salvage logging and herbicide use will have little effect on live tree canopy cover, there will be little effect of treatments to spotted owls. However, because research indicates that California spotted owls selectively foraged in burned forest rather than unburned forests, with the strongest selection for severely burned patches (Bond et al. 2009) and their prey-base appears to shift from primarily woodrats and flying squirrels in unburned forests of the southern Sierra Nevada to a majority of pocket gophers and woodrats in burned forests of the southern Sierra Nevada (Bond et al. 2013), it should not be assumed that spotted owls use burned and unburned forests similarly for foraging and the effects of the action alternatives are limited to canopy closure. Shrubs and herbaceous vegetation provide important habitat for pocket gophers and woodrats (Williams 1992), and these habitats can be abundant in a burned landscape (Bond et al. 2009). Post-fire management involving the use of rodenticides to prevent damage to young trees or herbicides to suppress shrub growth within California spotted owl habitat may impair the spotted owl foraging (Bond et al. 2013).

We are not aware of any studies, and the EA and BE do not cite any studies, that suggest California spotted owls are not adversely affected by salvage logging. Despite this, the EA states:

> “Potential direct effects on spotted owls may result from the modification or loss of habitat or habitat components; however, we do not expect these treatments would have significant adverse effects to spotted owls populations in or near the Project area particularly when considering the salvage operations would occur in a relatively small area of potential suitable habitat and that those salvage operations would most exclusively remove dead or dying trees while retaining the current forest canopy cover.”

On the contrary, best available science indicates that salvage logging, which is by definition the removal of dead or dying trees, adversely affects spotted owl occupancy and reproduction. In a study of California spotted owls in unmanaged mixed-conifer forests of Yosemite National Park, Roberts et al. (2011) found no difference in occupancy between burned and unburned sites across all burned survey areas, the mean (SE) proportion of area burned at unchanged, low, moderate, and high fire severity was 8% (2), 25% (4), 29% (4), and 14% (4), respectively. In a large-scale study in managed forests throughout the Sierra Nevada, Lee et al. (2012) examined 11 years of U.S. Forest Service breeding-season survey data from 41 California spotted owl sites burned in six forest fires and 145 sites in unburned areas and found that mean occupancy from 2001 to 2007 was 0.761 ± 0.045 at unburned sites, 0.802 ± 0.035 at burned sites, despite including owl sites with well over 50 percent high-severity fire in the study. Lee et al. (2012) also noted that salvage logging occurred on eight of the 41 burned sites; seven of the eight sites were occupied immediately after the fire but none were occupied after salvage logging. Clark et al. (2013) examined how fire and subsequent salvage logging affected occupancy dynamics of northern spotted owls in three fires and an unburned area in southwestern Oregon and found that extinction probabilities were greater after post-fire salvage logging. Roberts et al. (2011) note that fire does not reduce the probability of spotted owl occupancy and that fire, particularly fire resulting in low to moderate tree mortality, can retain residual habitat features that are important for roosting and reproducing California spotted owls. Although Clark (2007) showed that northern spotted owl occupancy declined and local extinction increased immediately following fire; their results were confounded by post-fire salvage logging in the study area. Roberts et al. (2011) states that the disparity of the results of Clark (2007) and the results of her study suggests that salvage logging may have detrimental effects on spotted owl occupancy. Clark et al. (2013) suggests that salvage logging within spotted owl home ranges be avoided to limit the negative effects of salvage logging.

Since spotted owls are known to use burned areas of all severities for foraging and nesting, it is unclear how it was determined that the proposed action, which includes salvage logging approximately one quarter (~3,500 acres) of the pre-fire owl habitat (13,456) within the project area, would occur in a relatively small area of potential suitable habitat and therefore have a discountable effect on the species. The area of pre-fire owl habitat (CWHR classes 4M, 4D, 5M, and 5D) identified to be salvage logged in the BE (~3,500) is not consistent with number of pre-fire acres in CWHR classes 4M, 4D, 5M, and 5D identified to be salvage logged in Table 20 of the Vegetation Report (4,259 acres). Regardless, we would consider the removal of 25 to 32 percent of the spotted owl habitat in the project area to have a substantial effect on the species. This is consistent with the results of Lee et al. (2012) where territories that are salvage logged following fire, within an 1128-meter radius around the territory center, strongly tend to lose occupancy (Lee et al. 2012). Roberts (2008) found that basal area of all (live and dead) trees >10 cm was associated with increased occupancy and reproduction; therefore salvage logging, which reduces the basal area of burned forest, will likely negatively affect reproduction and occupancy. Although the study was conducted in unburned forest, Blakesley et al. (2005) found that although owls were nesting and roosting in a variety of forest stand types, site occupancy and apparent survival decreased with decreasing amounts of habitat classes known to be selected by California spotted owls at the landscape scale and reproductive output decreased as the amount of non-habitat within the nest area (502 acre) increased. In an attempt to explain the declines they observed on the Eldorado study area, Temple and Gutierrez (2013) note that abandoned territories may not have been colonized because of habitat alteration. On the Pumas-Lassen study area spotted owl home range sizes were positively correlated with total amount of fuel treatments within the home range (Keane et al. 2010). There is a relative scientific consensus that reductions in spotted owl habitat quality and quantity reduces carrying capacity, colonization, and reproduction and increases dispersal. There is no biologically justifiable reason to believe that the effects of salvage logging as much as a third of the spotted owl habitat within the project area would be negligible.

3. Redrawing Spotted Owl PACs

Based on our current understanding of California spotted owl use of forests that burned from low to high severity for nesting and foraging (Bond et al. 2009, Lee et al. 2012), it is inappropriate to assume, as the EA does, that portions of PACs or HRCAs that burned in high/moderate mortality categories have been rendered unsuitable and should be reconfigured to exclude these areas. In addition, because spotted owls use burned forest of all severities and we are not aware of any studies that indicate spotted owl use of burned forests declines over time for any burn severity, it is baseless to assumed that high and moderate severity burned areas should be salvage logged and replanted so that they may more quickly return to mature forest conditions that support spotted owls. We do acknowledge there is likely a high severity burn patch size threshold at which the probability of occupancy declines, however we are not aware of any studies that indicate what the threshold may be. Although PACs/HRCAs will be surveyed prior to salvage logging, not all PACs in unburned forests are occupied each year, again, Lee et al. (2012) found that mean California spotted owl occupancy from 2001 to 2007 was 0.761 ± 0.045 at unburned sites and 0.802 ± 0.035 at burned sites, so it cannot be assumed that an unoccupied PAC will remain unoccupied as a result of the amount of habitat that burned at high or moderate severity within the PAC/HRCA. Therefore, we recommend that at least 2 years of surveys be completed in all PACs before they are redrawn and that the direction in the forest plan to avoid salvage logging in PACs be followed.

4. Significant Adverse Impacts to California Spotted Owl

Based on the current decline in spotted owl populations range-wide and on the Sierra National Forest and due to the degradation of suitable owl habitat as a result of this salvage logging proposal, we find that the project is likely to result in significant adverse impacts and likely to lead to a trend toward federal listing. We ask that you follow the direction in the forest plan for spotted owl PACs and HRCAs and avoid salvage logging within PACs and HRCAs, except when necessary to protect public safety.

5. Inadequate Effects Analysis for Pacific Fisher

The BE and EA do not accurately describe and apply the scientific literature on fisher’s use of burned forests. As a result, the analysis presented does not reflect the current understanding about fisher’s use of such forests and inappropriately assumes that these areas will be avoided.

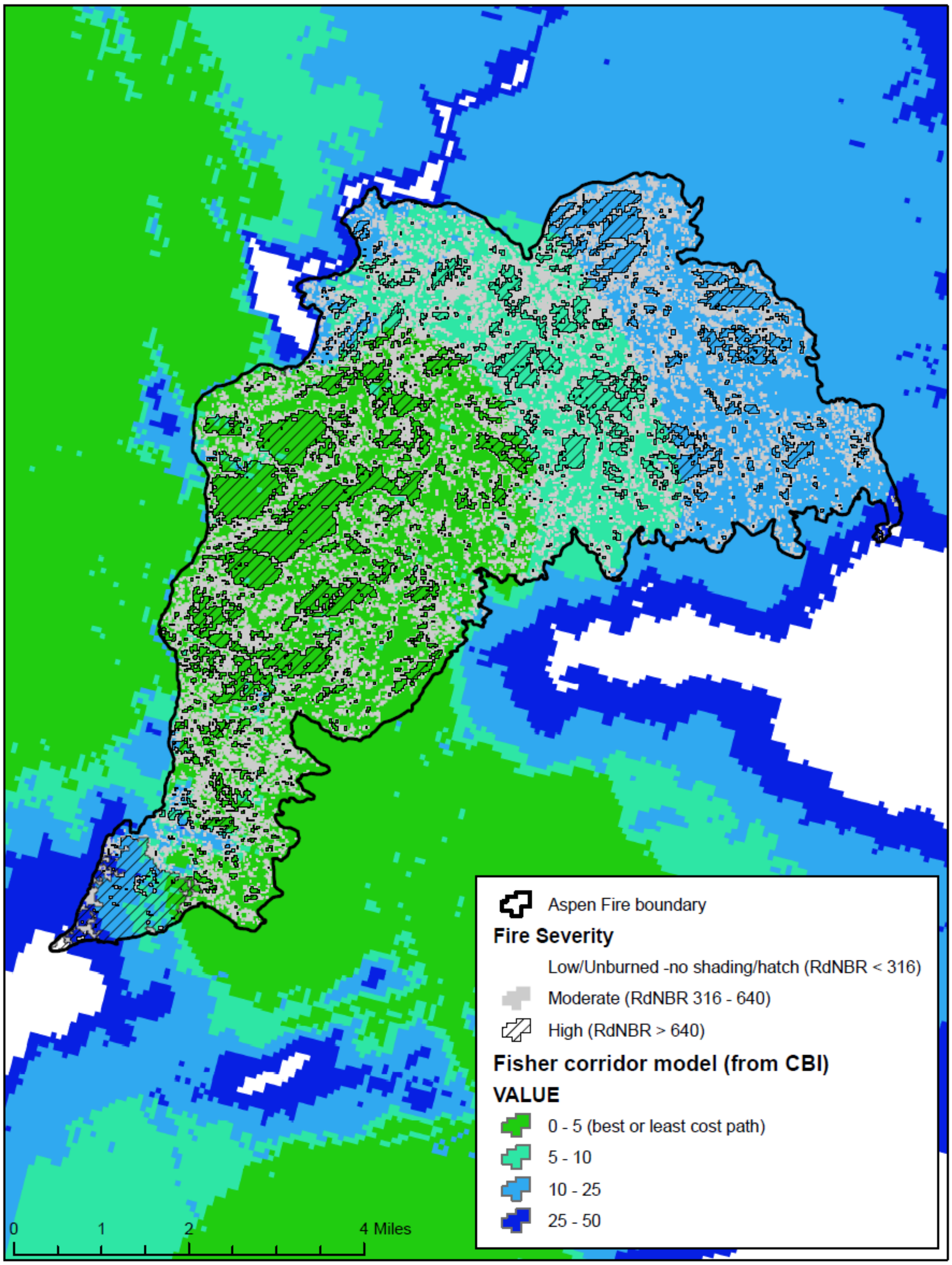
6. Use of Burned Forests By Fishers

The BE and EA contend that portions of the project area are no longer suitable habitat for fisher because they burned at high or moderate severity, despite citing Hanson (2013) and acknowledging that fishers do not avoid high and moderately burned areas and use them for foraging. Further, Zielinski et al. (2013) found that the population of fishers on the Kern Plateau was stable during the period 2002 to 2009 despite the occurrence of a large scale fire in 2002. The BE states that “…the high/moderate areas would not be utilized for resting or denning because the canopy cover and brush/understory component is currently no longer present, which in-turn is not considered fisher habitat, as defined by CWHR classification." However, the EA and supporting documents all contend that the brush/understory component of high and moderate severity burned areas requires herbicide treatment and control. Based on this logic, the control of brush and understory would have a significant adverse effect on fisher foraging and hiding cover in moderate and high severity burn areas. Also, because fishers use burned forests with lower canopy cover than unburned forests for foraging, it is not appropriate to apply the results of studies from unburned forests, namely the unburned habitats defined using the CWHR classification system, to burned forest.

According to the BE, in reference to alternative 2, "Within the low/very low mortality category, proposed treatments would affect a total of 2,350 acres in the first and second entry salvage. This would be 27% of the total suitable habitat currently in the project area, and 15% of the total project area." According to Table 30 in the BE, approximately 43 percent (6,584 acres) of the fisher habitat with the project area burned at high or moderate severity and according to the analysis it no longer supports fishers. Based on Table 30 in the BE, 58 percent of the pre-fire fisher habitat would be severely degraded from the cumulative effects of the fire and salvage logging as a result of alternatives 2 and 3. Given this finding in the BE, we find no support for the inclusion of additional salvage logging in fisher habitat, most of which burned at low and very low severity. These additional areas burned within the range of natural variability, likely increasing the number of snags and coarse woody debris and improving habitat quality for fishers. The proposed action will result in an overall reduction in carrying capacity and habitat quality in the linkage area (see 7. Impacts to Fisher Habitat Connectivity), reducing the likelihood of successful gene flow. While alternative 4 reduces effects within areas identified as having a pre-fire probability occupancy of 80 to 100 percent (675 acres), this alternative by no means goes far enough to protect fisher and fails to avoid much of the least cost path likely to support movement away from the Aspen area and continues to result in cumulative effects of the fire and salvage logging to 53 percent of the fisher habitat, in all occurrence probabilities, in the project area.

7. Impacts to Fisher Habitat Connectivity

In a model of the least cost path for the fishers in the southern Sierra Nevada, the project area has been identified by Conservation Biology Institute (CBI) as a key area providing habitat connectivity north and south:



Alternative 4 includes a fisher "corridor" in which secondary salvage logging operations would be reduced along a narrow strip of habitat, modeled as having a pre-fire fisher probability occurrence greater than 80 percen,t that runs from southwestern portion of the project area to the northeastern portion of the project area. The "corridor" identified in Alternative 4 appears to provide for greater connectivity within the Aspen Project area compared to Alternatives 2 and 3, however, significant salvage logging is still permitted outside of areas with a pre-fire probability of use greater than 80 percent. We are concerned that the "corridor" defined in Alternative 4 does not address the issue of movement away from the Aspen area. Spencer and Rustigian-Romsos (2012) evaluated opportunities for movement north and south within the Southern Sierra Nevada. Their analysis indicated that the areas (generally denoted as green in the map above) is important to fisher movement more generally across the landscape.

Since it has been demonstrated that fishers do not avoid burned areas, there is no reason to believe the Aspen Fire significantly affected the likelihood that fisher would use the least cost path. However, as cited in the BE, "A study implemented by Jones and Garton, in Buskirk et al. 1994, showed that fishers avoided openings and forested areas with 40% or less canopy cover (Jones 1991)." Based on the fact that fishers do not avoid burned areas and do avoid unburned areas with less than 40 percent canopy cover, it is reasonable to assume that fishers will avoid salvage logged areas where canopy cover is below 40 percent and/or where herbicide treatments have reduced shrub and brush cover, as these areas will no longer provide the habitat attributes of a burned forest. For all action alternatives, the salvage logging units occur as two separate strings or bands that run parallel to each other and perpendicular to the fisher least cost path. These units bisect the least cost path at two locations; thereby significantly reducing habitat connectivity and impairing gene flow between fisher populations at the landscape level. Such an outcome is likely to have a significant adverse impact to the entire population of fishers in the southern Sierra Nevada.

Alternative 4 should be revised to include measures to reduce impacts to the important movement area identified by Spencer and Rustigian-Romsos (2012). We also ask that you contact Wayne Spencer (Conservation Biology Institute) or Craig Thompson (Pacific Southwest Research Station) directly to seek feedback on conservation measures to address fisher.

8. <u>Significant Adverse Impacts to Fishers</u>

In summary, alternatives 2 and 3 each result in a cumulative degradation or loss of 58 percent of the fisher habitat in the project area. This includes unjustifiably salvage logging 27 percent of the remaining habitat in the project area, habitat that burned at low and very low severity and that was likely enhanced by the effects of the fire through snag creation and increased coarse woody debris. While alternative 4 minimizes effects within a narrow band of higher quality habitat, there remain significant effects to fisher. In addition, all of the proposed action alternatives affect the species at the landscape scale by degrading a key habitat linkage corridor. As a result of these likely and significant effects to the fisher at all scales as a result of the proposed action, it is likely that the proposed action and alternatives would contribute to a trend to federal listing.

Although we do not believe alternative 4 avoids enough high quality fisher habitat or provides adequate habitat connectivity within the project area or to areas outside of the project area, we do support the need for an alternative that minimizes the effects of the post-fire management activities to fishers. Therefore, we ask that salvage logging be avoided in fisher habitat with probability of occupancy greater than 40 percent, except for those areas where it is determined that tree removal is necessary for public safety reasons. We also ask that all salvage logging proposed within the least cost path be avoided, except those areas where it is determined that tree removal is necessary for public safety reasons.

9. Analysis of Range of Natural Variability is Flawed

Information presented in the EA and the scientific literature support the conclusion that the Aspen Fire burned within the range of natural variability when compared to commonly accepted reference forests. However, the EA and Vegetation Report provide a flawed analysis to support claims that the effects of the Aspen Fire are different from those expected for forests with a functioning fire process (outside the range of natural variability).

The Vegetation Report indicates that the number of high severity patches greater than 125 acres (13) was different from forests with a functioning fire process. As cited in the Vegetation Report, Collins and Stephens (2010) studied fire severity patterns in contemporary reference forests in Yosemite National Park, where fire suppression does not occur or has been relaxed, and where extensive logging did not occur. In their study area, which was less than half the size (10,588 acres) of the area burned by the Aspen Fire (22,351 acres) and for which the RdNBR results were not adjusted based on plot data, they identified 4 high severity patches greater than 125 acres, including a patch greater than 225 acres, and high severity patches accounted for almost half of the total stand-replacing patch area. If one were to scale up the results of Collins and Stephens (2010) to allow for a comparison to the Aspen Fire, we would expect to identify 8 to 9 patches of high severity greater than 125 acres, which is only slightly less than the 13 high severity patches identified in the Aspen Fire (in spite of RdNBR values being adjusted higher in the Vegetation Report and EA). We do not believe it can be rationalized that 4 additional patches greater than 125 acres within a 22,351 acre area project area constitutes a significant difference from the average and is somehow outside the range of natural variability. As is implied in the name of the concept, the natural range of variability includes a spectrum of results, including a full range of ecosystem structures and processes that occurred prior to European settlement. It is mathematically and conceptually inappropriate to conclude that a deviation from a mean is outside of a range without defining the range.

According to the Vegetation Report, within all conifer dominated types combined there was approximately 20 percent high severity and the mixed conifer forest type was at 14 percent (again, these data have been adjusted high based on undisclosed methods involving plot data). Although the Vegetation Report cites several studies that found that pine dominated forest with functioning fire processes have 10 percent high severity acres, the Vegetation Report is comparing the number of acres that burned at high severity in the Aspen Fire to an average, not a range; again, it is mathematically and conceptually inappropriate to conclude that a deviation from a mean is somehow outside of a range without defining the range; and, as is implied in the name of the concept, the range of natural variability includes a spectrum of results. Regardless, the total area of mixed conifer forest that burned at high severity is consistent with the average acres that burned at high severity at reference forests with a functioning fire process, as cited in the Vegetation Report; therefore, this vegetation type should be avoided by all management activities, other than those designed to protect public safety.

As noted earlier, 58 percent (2,100 acres) of the plantations, representing 10 percent of the entire project area, burned at high severity. Since these stands are typically densely stocked and even-aged conifer stands and do not represent natural conditions, they should not be included in an analysis comparing the acres of each burn severity class and patch sizes of burn severity classes to forests with a functioning fire regime. If the plantations were removed from the analysis, the number of acres and the patch sizes of conifer forest in the project area that burned at high severity would be significantly smaller and may actually be less and smaller than the averages defined by Collins and Stephens (2010).

10. Development of Burn Severity Classes Lacks Transparency and Applicability

According to the EA and Vegetation Report, in reference to the RdNBR derived severity classes, "…plot data was used to adjust satellite data in the low severity class (10% to 25%) upwards into the low moderate class (25% to 50%) and moved some moderate areas in to a higher severity class." The Vegetation Report does not provide a statistical analysis comparing the RdNBR data to plot data to show that they are significantly different or describe the methods used to scale the RdNBR up. In addition to the lack of transparency in making the "adjustments", adjusting the results creates methodological issues with comparing RdNRB results from the Vegetation Report and the EA to studies that report unadjusted RdNBR data.

The Vegetation Report should provide the pre-adjustment Aspen Fire RdNBR data for comparison to unadjusted RdNBR data and describe in detail methods and rational as to how and why the RdNBR data were adjusted. Only the unadjusted RdNBR data for the Aspen Fire, including the patch size analysis, should be used for comparisons to reference conditions from Yosemite National Park (Collins and Stephens 2010) and others which use RdNBR as the basis for their analyses.

C. Range of Alternatives have not been Rigorously Explored

The Forest Service is required to "rigorously explore and objectively evaluate all reasonable alternatives." 40 CFR 1502.14(a). The purpose of these requirements is to "provid[e] a clear basis for choice among options for the decisionmaker and the public." 40 CFR 1502.14. The EA, however, does not include an "environmentally friendly", "economically thrifty", or public safety oriented action alternative; all of which we believe can be achieved simultaneously.

The proposed action alternatives result in an extraordinary monetary deficit (greater than $3.2 million) associated with active reforestation and salvage logging (i.e., road construction, road maintenance, chemical herbicides, staff time, etc.), and significant environmental costs associated with active reforestation and salvage logging activities (i.e., increased sedimentation, road construction, soil compaction, loss of habitat for sensitive wildlife species, etc.). There is a lack of scientific consensus regarding the need to actively reforest areas subject to mixed-severity wildfire. As a result of the high environmental and economic costs and scientific uncertainty surrounding the proposed action alternatives, it is puzzling why an alternative was not developed that focuses on the removal of hazard trees, the strategic manipulation of fuels to protect public and firefighter safety, and the use of natural stand regeneration and reforestation when it occurs, a recognition that the vast majority of the effects of the Aspen Fire were within the range of natural variability, and that complex early seral forests provide ecological diversity and integrity. We ask that you develop such an alternative and believe it would satisfy the purpose and need: (1) providing for public and firefighter safety through hazard tree removal; (2) cost-efficiently recovering the economic value of fire-affected trees from hazard tree removal; (3) the minimization of high-intensity, large-scale fires through the strategic manipulation of fuels; (4) providing for wildlife habitat through snag retention and large woody debris; and (5) reestablishing forested conditions through natural regeneration when it occurs.

III. Violations of the National Forest Management Act

A. Inconsistencies with the forest plan

1. Removal of green trees greater than 30" dbh violates the forest plan.

The proposed action and alternatives appear to propose the removal of live trees greater than 30" dbh in any location if they meet the criteria provided in Appendix B (EA, p. 256-257). Criteria presented in the EA that would allow the removal of live trees over 30" dbh include:

> 2. For all species, trees should be marked for removal if any combination of boring dust or frass (in bark crevices, webbing along the bole, or that accumulates at the base of the trees), pitch tubes with pink or reddish boring dust associated with them, pouch fungus conks and/or current woodpecker activity (holes into the sapwood and/or bark flaking, specifically excludes injury caused by sapsucker feeding) is present over at least 1/3 of the bole circumference. This specifically excludes basal attacks by the red turpentine beetle on pines (large pitch tubes associated with coarse boring dust generally restricted to the lower 2 to 3 feet of the bole or woodpecker activity restricted to this area) and when the above indicators are only associated with wounds, old fire scars, etc. The presence or absence of red turpentine beetle pitch tubes will be accounted for in criteria #3.
>
> 3. Any tree that meets or exceeds the following fire-injured conifer mortality guidelines (Table 1) at the Pm = 0.7 level for fire salvage or secondary salvage, Pm =.6 for hazard tree removal, or at the Pm = 0.8 (table 1) level for fire salvage or secondary salvage within PACs . This assessment will be made by visually estimating the percent of the original pre-fire crown length that was killed (yellow and sugar pine, white and red fir), the presence or absence of red turpentine beetle pitch tubes (yellow and sugar pine) and tree diameter (yellow pine and white fir).

As an example, the table referenced above (Table 1) indicates that very large yellow pine (>40" dbh) with "Minimum % Crown Length Killed" of 25% would be targeted for removal" in the salvage logging units. The removal of now living trees is intended to be anticipatory to their death for the purposes of recovery timber volume and economic value. The forest plan does not allow for the removal of live trees over 30" dbh except in situations to address imminent hazards to roads and infrastructure.

The forest plan does not allow such removals of large living trees and their removal is also inconsistent with managing burned landscapes for ecological benefit (USDA Forest Service 2004). These large trees can take more than 100 years to develop and contribute in significant ways to the development of heterogeneity and biological diversity. We note that the Rim Fire draft EIS recognizes the benefit of all trees with some remnant green needles stating that:

> Dead trees have been defined for this project as trees with no visible green needles. Salvage of fire-killed trees would result in the removal of dead trees only, not trees that are declining or may die in the near future.

(Rim Fire DEIS, p. 285). Furthermore, the Rim Fire DEIS clarifies that exceptions are made for green trees when they can legitimately be characterized as imminent hazards:

> Live trees may qualify as hazards if they are expected to fall and hit a target within the next two years. Very few green trees are expected to be removed based on the criteria, and all green trees would be identified and marked by qualified Forest Service personnel.

(Ibid.). We ask that you revise the marking guidelines to reflect those being applied in the Rim fire project and to remove no green trees, including those >30" dbh.

2. Salvage logging in PACs violates the forest plan.

The marking guidelines above established criteria for identifying trees to be salvaged in PACs. Outside of the Defense Zone, salvage logging is not allowed in PACs. The only exception to this would be salvage necessary to address imminent hazards. The criteria in Appendix B should be revised to delete reference to criteria that allow salvage logging in PACs.

B. Significant adverse impacts to California spotted owls and fishers lead to a trend toward federal listing.

Based on our review of the documents and the additional analysis provided above, we find that there will be significant adverse impacts to spotted owls and fisher. We also believe that these project impacts threaten the viability of these species and are likely to lead to a trend toward federal listing for California spotted owl and fisher. Such a trend is a violation of Forest Service direction and the forest plan.

IV. Other Applicable Laws: Section 7 Consultation is Required

We believe a "no effect" determination is not an appropriate determination for any of the proposed action alternatives and section 7 consultation with the U.S. Fish and Wildlife Service is necessary. According to the California Natural Diversity Database (CNDDB; May 2014), there are three extant occurrence records of the recently listed endangered Sierra Nevada yellow-legged frog (*Rana sierrae*) within 2 miles and two extant occurrences records of the threatened Yosemite toad (*Anaxyrus canorus*) within 10 miles of the action area. According the Aquatic Species Biological Evaluation, the Sierra Nevada yellow-legged frog may have potential habitat within some stream channels of the aquatic analysis areas while the Yosemite toad has occupied habitats within the aquatic analysis area. Due to the presence of potential breeding and upland habitat (upland areas up to 0.78 mile from breeding habitat in the case of the Yosemite toad) within the action area, the close proximity of the action area to extant occurrences, and the likely potential adverse effects of the proposed action to these listed amphibians if they occur within the action area, the Forest Service should either initiate formal consultation and obtain incidental take authorization pursuant to section 9 of the Endangered Species Act or seek written concurrence from the U.S. Fish and Wildlife Service that the proposed action is not likely to adversely affect any listed species. Even if the Forest Service believes the effects of the action would be discountable (i.e., extremely unlikely to occur), the appropriate determination for the proposed action would be "is not likely to adversely affect", a determination that requires the Forest Service to initiate informal section 7 consultation (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998).

V. Reforestation Design Criteria are Needed

The EA does not include design criteria defining when and where it is appropriate to implement active reforestation. To accomplish this, the EA should include an adaptive reforestation plan that relies on monitoring result and pre-defined criteria to trigger active reforestation. Such a plan should include and incorporate the design measures and guidelines listed below.

Reforestation in post-wildfire landscapes should include the following design measures summarized from Britting et al. (2012):

- Plant only large seedless landscapes that were previously a conifer forest type;
- Provide sufficient time to allow natural regeneration to occur, prior to planting nursery stock, and develop site-specific criteria for when natural regeneration does not satisfy desired stocking levels or species composition and active reforestation is necessary;
- Avoid planting in poor quality planting sites such as rocky slopes, lava caps, or areas dominated by grey pine, blue oak, or chaparral
- Avoid planting in riparian areas, fens, seeps, springs, and meadows;
- Avoid planting near mature, re-sprouting or young hardwoods, elderberry, or other desired native plants as determined by a wildlife biologist, archaeologist, hydrologist and botanist;
- Use manual removal of competing vegetation immediately around planted conifers and avoid the use of herbicides;
- Allow at least one third to one half of all seedless landscapes to transition naturally through seral stages;
- Group planted conifers in small clusters, not in rows or evenly spaced;
- Use existing roads and skid trails for management purposes;
- Construct temporary roads for reforestation purposes and close these roads following their management use.

We recommend that reforestation plans set tree stocking and maintenance guidelines that meet the following criteria (Britting et al. 2012):

- Consider all vegetation cover in stocking estimates (not just conifers) including grass, shrubs, other herbaceous plants, and all non- conifer tree species;
- Plant conifers only where there is an ecological basis for establishing a forested landscape within 10-15 years;
- Encourage natural regeneration and succession whenever possible;
- Minimize the connectivity of fuels throughout the development of the planted stand;
- Facilitate the application of prescribed fire throughout the development of the planted stand;

VI. Conclusion

We ask that you address the deficiencies we identified above and incorporate our recommendations into the Proposed Action or an alternative, prepare a draft EIS and circulate the DEIS for public comment. We also ask to meet with the IDT to discuss our comments on the draft EA.

Please direct questions about these comments to Ben Solvesky (ben@sierraforestlegacy.org; 928-221-6102).

Thank you for considering our comments.

Sincerely,

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