Wild Nature Institute

Science, Education, and Advocacy
for the Preservation of Wild Nature

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Susan Skalski, Forest Supervisor
Stanislaus National Forest

Dear Supervisors Skalski,

I am a wildlife biologist and principal scientist with the Wild Nature Institute, a non-profit scientific research and advocacy organization. My colleagues and I have conducted and published numerous peer-reviewed studies examining occupancy rates, habitat selection, space use, and diet of California Spotted Owls in post-fire landscapes of the Sierra Nevada. In fact, my research team has published more scientific papers on ecological relationships between Spotted Owls and forest fire than any other scientists in the world. I have also conducted field research and literature reviews of the habitat needs and foraging ecology of the Black-backed Woodpecker in burned forests in the Sierra Nevada. I am submitting these comments on the Rim Fire Recovery draft Terrestrial Wildlife BE on behalf of the John Muir Project and the Center for Biological Diversity. I hope you will address my serious concerns about this project.

The astoundingly damaging Alternative 1 of the Rim Fire Recovery Project proposes to salvage log 28,326 acres, salvage log another 16,315 acres along forest roads, construct 18.6 miles of new roads and reconstruct 319.9 miles of roads, and establish 7 rock quarry sites for road construction, all within the 2013 Rim Fire that occurred on the Stanislaus National Forest in the Sierra Nevada, California (Terrestrial Wildlife BE, page 6). Herein I outline my concerns with this project and strongly recommend the adoption of Alternative 2 (no action). I fully incorporate by reference the entirety of my earlier comments on the Rim Fire Hazard Tree Project Terrestrial Wildlife BE, and my scoping comments on this project, into these comments, and below I offer additional comments specific to impacts of this massive project on California Spotted Owls. In separate comments from several scientists, including myself, I also address impacts to Black-backed Woodpeckers.

Even Alternative 4 is little different than the Proposed Action. It includes salvage logging on up to 27,826 acres including 24,176 acres of ground based, 16 acres of ground based/skyline swing, 2,568 acres of helicopter, and 1,066 acres of skyline treatments. Proposed fuels treatments

include: 7,975 acres of biomass removal, 20,320 acres of machine piling and burning and 3,650 acres of jackpot burning, 1,309 acres of mastication, and 1,798 acres of drop and lop. Alternative 4 involves felling and removing of hazard trees (green and dead) adjacent to 324.6 miles of forest roads, amounting to 15,692 acres, outside of proposed salvage units. Alternative 4 further includes 315.0 miles of road reconstruction and 209.3 miles of maintenance.

As is typical of fires in the Sierra Nevada, the 2013 Rim Fire burned in a mosaic of severities. This mosaic created a complex and rich mixture of habitats, including vitally important "Complex Early Seral Forest" (CESF). In a soon-to-be published manuscript about this forest type in the Sierra Nevada, my colleagues and I defined CESFs as:

> "Complex early seral forests occupy sites that occur in time and space between a stand-replacement disturbance and re-establishment of a closed-forest canopy. Today's young forests, if resulting from purposeful regeneration harvest or from fire salvage harvest, lack some of the features and characteristics of unmanaged forests. CESFs are rich in post-disturbance legacies (e.g., large live and dead trees, downed logs), and post-fire vegetation (e.g., native fire-following shrubs, flowers, natural conifer regeneration), that provide important habitat for countless species and differ from those created by logging (e.g., salvage or pre-fire thinning) that are deficient in biological legacies and many other key ecological attributes (see, e.g., Table 1 in Swanson et al. 2010, Table 1 in Donato et al. 2012). Thus, to distinguish early seral forests from logged early seral, the term "complex" is used in association with early seral produced by natural disturbances."

This Complex Early Seral Forest habitat provides critical foraging and breeding elements for many native Sierra Nevada species. The Rim Fire's standing dead trees comprise a major habitat element for species that have evolved to thrive in severely burned forests. In a peer-reviewed publication in the esteemed scientific journal *Conservation Biology*, ornithologist Dr. Richard Hutto explained that:

> "Everything from the system of fire-regime classification, to a preoccupation with the destructive aspects of fire, to the misapplication of snag-management guidelines, have led us to ignore the obvious: we need to retain the very elements that give rise to much of the biological uniqueness of a burned forest—the standing dead trees." (Hutto 2006)

These standing dead trees are extremely important habitat for fire-following, wood-boring insects (e.g., Siegel et al. 2013 from a study on the Lassen National Forest – and my personal observation during the study, during which we quantified wood-boring beetle abundance on burned trees), as well as for the wildlife species that forage upon those insects, such as woodpeckers. Moreover, the dead trees provide essential substrates for a host of cavity-nesting vertebrates (Hutto 2006, Saab et al. 2007, personal observation during extensive research in burned forests in Lassen National Forest and Sequoia National Forest). Native bark beetles that attack fire-weakened trees continue the important snag-creation process in the forests surrounding the fire area–especially critical for snag-species as time since fire increases (e.g., Black-backed Woodpeckers, Dudley and Saab 2007). The assumption of the Rim Fire Recovery

Project that fire-killed and fire-injured trees need to be removed is a deeply flawed assumption that is unsupported by the best available science, and as such this action would significantly harm snag-dependent species.

The Forest Service proposes to salvage log fire-killed and fire-injured trees in the Rim Fire. However, these severely burned trees support a unique composition of species that is not supported in the forested areas burned in mild, low to moderate severity fires. Many species of vertebrates, invertebrates, and plants have evolved to take advantage of severely burned forest habitat (Hutto 2006, 2008). Using birds as an example, the following studies have documented the ecological value of severely burned forests for a number of species in different regions of the western U.S.:

- Raphael et al. (1987) monitored breeding birds in three periods after the 1960 Donner Fire in the Eastern Sierra Nevada, allowing for long-term effects of severe fire to be examined (fire severity was not specifically quantified but it was noted that the burned plot contained high-severity burn). The authors found that total density of birds was nearly the same on the burned and unburned plots but species richness increased on the burned plot. Thirty-eight species bred on the burned plot while 32 bred on the unburned plot (25 bred on both plots). More breeding species were unique to the burned plot (13) than to the unburned plot (7).

- Smucker et al. (2005) examined effects of fire of different severities and ages on songbirds in point-count transects that had been set up 5 years prior as a part of the Northern Region Landbird Monitoring Program in forests in Montana. The authors found that of the 40 species with adequate sample size to include in statistical analyses, 4 increased significantly in relative abundance after fire and 5 decreased significantly after fire, independent of fire severity. However, placing point count stations into categories that correspond with whether they burned at low, moderate, or high severity, they discovered significant changes in relative abundance from before to after fire at one or more severities for an additional 9 species. The data revealed that 12 species were significantly more abundant and 7 species were significantly less abundant after fire at one or more severities. An additional 4 species (including Black-backed Woodpecker, House Wren, Western Wood Pewee, and Three-toed Woodpecker) were detected more frequently after fire, although sample sizes were too small to include in the statistical analysis. Thus, a total of 16 species responded positively to at least one level of fire severity – underscoring the importance of accounting for fire severity. With respect to time since fire, for both increasers and decreasers the magnitude of change in relative abundance between the first two years after fire was greater at points that burned at high or moderate severity than at points that were unburned or burned at low intensity. This suggests that high and moderate severity fire (in contrast to low-severity fire) creates a unique and important habitat type for many bird species.

- Kotliar et al. (2007) published a similar study comparing bird densities before and after fire and in varying burn severities in New Mexico. Western Bluebirds were uncommon in all but the highest burn-severity level and Hairy Woodpeckers and House Wrens increased with increasing burn severity. The authors were able to analyze pre- and post-fire density patterns for 15 species, and 4 of the species showed significant burn-severity effects. Mourning Doves had higher

densities across all burn severities, American Robins increased significantly after fire in high-severity patches and in comparison with pre-fire densities, and post-fire densities of Broad-tailed Hummingbirds and Western Bluebirds increased with increasing burn severity and were significantly greater in high-severity patches compared to unburned. Furthermore, the pre- and post-fire community was similar in all except high-severity areas. Like results from Smucker et al. (2005) in Montana, this means that forests after high-severity fire support a unique community of bird species.

- Numerous studies on post high-severity fire salvage logging have documented adverse effects on the Black-backed Woodpecker and other cavity nesting bird species (e.g., Hutto and Gallo 2006, Hutto 2006, Hanson and North 2008, Cahall and Hayes 2009, Saab et al. 2007, 2009, 2011). Saab and Dudley (1998) followed 17 Black-backed Woodpecker nests from 1994 to 1996 in forests of western Idaho that burned in 1992 and 1994. Nest densities were more than quadrupled in unlogged stands versus both "standard salvage" and "wildlife salvage" treatments, despite significant snag retention in the treatments. Additional nest monitoring was conducted over subsequent years in the same study site. Saab et al. (2007) reported that nest densities were more than 5 times lower in partially logged burns. Hutto and Gallo (2006) examined nest densities of Black-backed Woodpecker in burned mixed-conifer forest in Montana and documented 10 nests per 148 ha in unlogged burned stands and 0 nests per 275 ha in salvage-logged stands. In the eastern Oregon Cascades, Cahill and Hayes (2009) found that partial salvage logging did not mitigate adverse effects to Black-backed Woodpecker. In the Sierra Nevada, Black-backed Woodpeckers preferentially foraged in severely burned stands with larger snags and higher snag densities (Hanson and North 2008).

These studies indicate a thriving and unique bird community within severely burned forests, one that is damaged by post-fire salvage logging. The Black-backed Woodpecker is likely one of the biggest "winners" in the post-fire forest, but even species thought to occur only in mature and old-growth forests also utilize severely burned forests for foraging—including the California Spotted Owl. Available evidence from existing scientific studies indicates that Spotted Owls may actually be quite resilient to most fires, and even benefit from it, if their territories are not salvage logged:

- California Spotted Owls in fire-adapted forests of the Sierra Nevada have been shown to preferentially select high-severity fire areas (that have not been salvage logged) for foraging (Bond et al. 2009), have equal or even higher reproduction levels in mixed-severity fires than in unburned mature/old forest (Bond et al. 2002, Roberts 2008), and also have slightly higher overall occupancy levels in mixed severity fire areas (averaging 32% high-severity fire) than in unburned mature/old forest (Lee et al. 2012).

- Even in southern California, a very dry region that experienced particularly large high-severity fires due to extreme fire weather, occupancy rates of burned and unburned spotted owl territories was similar when up to half of the forested habitat around nests burned at high severity – the vast majority of fires burned below this threshold (Lee et al. 2013).

- Simply stated, the mosaic pattern of most forest fires of alternating severities (low to high) provides "bedroom" habitat for owls in low/moderate-severity fire areas, and "kitchen" areas that burned more severely but soon contain pyrogenic shrubs and downed logs used by prey species such as woodrats, pocket gophers, and others (Bond et al. 2009, 2013).

- Scientists have found that mixed-severity fire followed by postfire salvage logging reduced occupancy of Northern Spotted Owls in southwestern Oregon (Clark et al. 2013) and California Spotted Owls in southern California (Lee et al. 2013). Similarly, salvage logged areas in the Sierra Nevada have strongly tended to reduce spotted owl occupancy (Lee et al. 2012). Postfire logging also removes vital biological legacies, reducing important habitat structures for regrowing forests.

The Rim Fire burned habitat within 46 spotted owl Protected Activity Centers ("PACs"), at least 34 of which would be adversely affected by logging even under Alternative 4. Unfortunately, in the Rim Fire Recovery BE and in numerous previous biological evaluations of salvage logging projects, the Forest Service has consistently ignored the best available science in its analyses of the impacts of severe fire and post-fire salvage logging on this management indicator species. This has led to the continued logging of ecologically important burned-forest habitat and the continued decline of this subspecies within the Sierra Nevada.

The BE states on page 27 that "Forest Plan direction requires that after a stand-replacing event such as the Rim Fire, specialists evaluate habitat conditions around owl activity centers to determine if there is sufficient suitable habitat remaining after the disturbance event, and if there are opportunities for re-mapping to better encompass suitable habitat. If there is insufficient suitable habitat for a suitable PAC around the activity center, the PAC may be removed from the conservation network (USDA 2010, p. 184)…" Unfortunately, to the detriment of Spotted Owls, this Forest Plan direction is being used in unfounded ways that are not supported by the best available science. Moderate and highly burned forests can be and are used by California Spotted Owls, and owl PACs should not be re-drawn to exclude these burned forests. For more than a decade, I have recommended against eliminating severely burned forests from PACs and against dropping PACs from the network before establishing that they are unoccupied using protocol-level surveys. Below is a small selection of comments from letters and declarations I have written to the Forest Service over the years, wherein I documented that Spotted Owls often remain in PACs with severely burned forests, and often utilize severely burned forests for foraging. Moreover, HRCAs should not be logged either because they are important foraging areas for owls based on the best available science. Alternative 4 nonetheless proposes to log the substantial portions of pre-fire HRCAs in the Rim Fire area, leaving only 4–6 snags per acre in the logged areas, and thus rendering the HRCAs virtually useless for owls.

From my comment letter on the DSEIS for SNFPA, September 2003:

> "…to maintain current and future nesting and roosting habitat in the PACs, HRCAs, and Old Forest Emphasis Areas, and to maintain current and future foraging habitat, ***absolutely no removal of large trees and snags should occur anywhere within these areas.*** Removing these elements from areas within Spotted Owl habitat will render that habitat unsuitable for owls for many years to come, increasing the risk to the viability of this imperiled species and contributing to the need for protection under the Endangered Species Act."

From my expert declaration in support of plaintiff's motion for a temporary restraining order and preliminary injunction on the Freds and Power salvage-logging projects, August 2005:

> "… the Forest Service proposes timber harvest in "non-core" portions of the PACs, defined as unsuitable habitat within the 300-acre PAC that was previously suitable before the fire. Id. These determinations were made prior to the 2005 owl occupancy surveys which confirmed that of the 9 PACs in the Power project area, 7 are occupied, and of the 2 PACs in the Freds project area, one is occupied. In addition, as stated above, ***the determinations and analyses were based on the faulty assumption – against the preponderance of scientific evidence available to the agency – that wildfire renders spotted owl habitat "unsuitable" and such habitat will not benefit or be utilized by this species***."

From my comment letter on the DEIS for the Moonlight and Wheeler Fires salvage-logging projects, July 2008:

> "… the 2001 Sierra Nevada Framework, or Sierra Nevada Forest Plan Amendment, was the result of a decade of research and planning efforts involving a wide array of scientific experts. Based on the 2001 Framework, the Fish and Wildlife Service determined that listing the California spotted owl under the federal Endangered Species Act was not warranted because spotted owl habitat would be sufficiently protected during fuels treatments. ***The 2001 Framework specifically noted that PACs must be determined to be unoccupied before they are removed from the network. However, the 2004 changes to the Framework significantly weakened protections for spotted owls, including*** allowing a drastic increase in the number of large trees (>20 inches) to be harvested and ***eliminating the requirement that PACs be documented as unoccupied before removing them from the network. Thus the 2004 Framework changes are likely to precipitate the need to list the California spotted owl as endangered or threatened, particularly since researchers have documented continuing declines of the subspecies***."

From my comment letter on the RDEIS for the Moonlight and Wheeler Fires salvage-logging projects, April 2009:

> "… the Forest Service's analysis contained numerous unsubstantiated assumptions regarding suitability of severely burned forests for use by foraging spotted owls, and failed to address the comments I provided during scoping regarding this issue. ***These***

unsubstantiated assumptions that such burned forests are not suitable owl habitat resulted in the inappropriate and overly hasty removal of Protected Activity Centers (PAC) from the PAC network – thus opening the door for the proposed project to conduct widespread clearcutting of potentially suitable foraging habitat within known owl activity centers. The DEIS also inappropriately analyzed the impacts on spotted owls before the occupancy status of fire-affected owl territories had been established. …"

"…***the RDEIS categorizes severely burned forests as unsuitable habitat despite overwhelming scientific evidence that spotted owls forage in these habitats, and that many territories with severely burned stands in the Moonlight and Antelope fire complex continue to be occupied by owls***. The RDEIS basis its claim that severely burned forests are unsuitable for owls on an unsupported speculation that these areas might become unsuitable in the long-term (20 or 30 years from now) as dead trees fall over time – even though no data are available about whether or not owls continue to use severely burned forests decades after fire, and in fact modeling based on known rates of snag longevity indicates that large dead trees are likely to be still standing and available to owls in the long-term. In other words, the Forest Service justifies eliminating suitable habitat that currently is occupied by owls because such habitat might hypothetically change 30 years from now and become unsuitable…"

"…the Forest Service is arguing that because moderate and severely burned forests that are currently suitable habitat might hypothetically become unsuitable in the long-term (perhaps 20 or 30 years from now), then it would not harm the owls to eliminate the suitable habitat now. This argument is nonsensical and specious. Forests in the Sierra Nevada are dynamic and naturally experience disturbances such as fire, insect epidemics, and wind storms that alter the succession of a stand. This creates a dynamic, shifting mosaic of age classes (or successional stages) to which spotted owls and other forest-dependent species are adapted. ***We know severely burned forests are used by spotted owls at least 5 years post-fire (Bond et al. in press)***. If it is true that the severely burned habitat slowly becomes unsuitable for use by owls over a longer time frame as snags fall, then individuals can disperse gradually to other areas of more suitable habitat over generations in the manner to which they are adapted. Eliminating this habitat immediately by logging would preclude use of these areas in the short-term (see Clark 2007: spotted owls avoid severely burned logged stands), and logging and replanting would impact the suitability of the forests for owls over the long term by removing the legacy trees discussed by North et al. (1999) as described above. Importantly, however, ***it is likely that owls can continue to utilize these severely burned areas well into the future because some of the snags will remain standing and new trees will grow***…"

From my comment letter on the Environmental Assessment for the Poker Chip salvage-logging project, April 2013:

"***A clear finding from Bond et al. (2009) is that forests burned at all severities, including high-severity, and that forests which are not salvage logged (the habitat type known as 'Complex Early Seral Forests') constitute potential foraging habitat for***

> ***resident California Spotted Owls in the Sierra Nevada***. The elimination of the trees used for perching by foraging owls in the Poker Chip Project would potentially reduce foraging habitat (as acknowledged at one point in the BA/BE on p. 43). ***Yet this habitat type was never actually analyzed as potentially 'suitable' for California Spotted Owls in this BA/BE, rendering the Forest Service's analysis fatally flawed***."
>
> "***A science-based approach for examining the effects of the Poker Chip Project would be to survey to protocol ≥ 2 years post-fire (Lee et al. 2012) to determine occupancy by Spotted Owls.*** Then, estimate and report the amount of habitat proposed for logging within a 1.5 km radius of nest or core roost sites."

Finally, in my comments on the April 2014 draft BE for the Rim Fire's Hazard Tree Project, I voiced the following concerns:

> "My major problem with the Species and Habitat Accounts section of the BE is that the Forest Service provided scientific evidence that high-severity fire areas could be utilized by owls, and that high-severity fire does not necessarily render a site unoccupied: "Spotted owls preferentially roosted and nested in low- to moderate- severity burned areas, whereas they will forage extensively in high-severity forest (Bond et al 2009)…"; "Lee et al (2012) found that when suitable habitat in occupied territories burned at an average of 32%, California spotted owls continued to persist at rates comparable to unburned areas…" Remember my caution above about the interpretation of the 32%—here is where the problem arises, because in the very next sentence, the BE then considers high-severity fire areas as unsuitable: "Many forested areas were rendered unsuitable by the extent and severity of the burn, including the small areas of high quality habitat that burned with high severity in areas near Wilson Meadow, upper Granite Creek, and Corral Creek. " (pages 16 and 17). ***The Forest Service does not know whether those areas were rendered unsuitable for owls by the extent and severity of the burn. This is yet another unproven assumption that is used to justify the re-drawing or retiring of certain PACs from the network. It may seem like areas burned with a large extent of high-severity might be unsuitable for spotted owls, but we once thought any burned forest was unsuitable for this old-forest species—and we were wrong about that.*** The only way to determine whether those severely burned areas are unsuitable or whether PACs should be retired or re-drawn is to survey the sites for at least 2 years and to radio-track the spotted owls in the area to determine habitat use. To assume otherwise it to potentially cause harm to this declining population and hasten the need to list the subspecies as endangered or threatened."

This BE failed to address my concerns that I raised in the Rim Fire Hazard Tree project BE (as well as in my past comments from other logging projects), and the Forest Service proceeded to drop and re-draw PACs in this BE against my recommendations. This BE states: "Category 1 (red): These sites burned primarily at high severity across the 200 ha analysis area, had nearly all pre-fire suitable habitat burn at high severity, and have small amounts of post-fire suitable habitat. <u>It is clear that these sites have very low to no probability of continued occupancy. Thus, we concluded that it is appropriate to remove these sites from the conservation network</u>…

Category 3 (orange): These are sites with intermediate values. Based on the scientific literature, there is some uncertainty as to the probability of occupancy for sites within this range of values. The literature does document that individuals can persist in sites within these ranges of high severity burn, though this is an uncertainty requiring further research to identify where more specific thresholds might exist. Thus, we concluded that in order to reduce uncertainty in occupancy, it is appropriate to re-map the boundaries of these sites to encompass habitat of better quality where possible and to consider the re-mapped sites as suitable."

However, the preponderance of scientific data, including the results from 2014 breeding-season Spotted Owls surveys in the Rim Fire (see below), contradict the Forest Service's assumptions that owls do not use high-severity burned areas, and thus render the agency's approach fatally flawed. It was clear to me that despite the fact that the Species and Habitat Account touched (albeit far too briefly) on the fact that Spotted Owls use high-severity areas, and despite how even territories that burned with a high percentage of high-severity fire but that did not experience post-fire salvage logging potentially could be occupied (including PACs in the Rim Fire with more than 90% high-severity fire, shown in Table 1 below), the Forest Service still deemed high-severity fire areas to be unsuitable habitat and cut these areas out of the PACs and then proposed them for logging.

Over the past decade, additional scientific data have only confirmed what I first stated so long ago. Once again, I am forced to repeat the same assertions—that Spotted Owls often remain in burned territories and forage in severely burned forest stands, and once again I am forced to make the same request—that the Forest Service refrain from assuming severely burned forests are unsuitable and eliminating severely burned forests from PACs.

Table 1 below shows the Forest Service's preliminary results from just the first half of 2014 breeding-season surveys for California Spotted Owls in the 46 territories in the Rim Fire. Survey results indicate that of the 46 territory sites, 31 are occupied, 14 had no detections (as of yet), and 1 has no survey data. These high rates of occupancy are unsurprising given the plethora of scientific studies indicating continued use of post-fire landscapes by Spotted Owls (Bond et al. 2002, Roberts et al. 2011, Lee et al. 2012, 2013). Indeed, of the 10 territories the Forest Service proposes to drop from the network, 6 are occupied (bolded rows, table below). These results demonstrate that dropping PACs from the network and re-drawing PACs is an outdated and flawed notion that is completely unsupported by not only the multitude of scientific studies, but by the Forest Service's own survey data from the Rim Fire.

TABLE 1. Occupancy status and patterns of burn severity in 46 California Spotted Owl PACs within the 2013 Rim Fire, Stanislaus National Forest, California, USA.

Spotted Owl PAC ID	Year	Status	2014	Acres in PAC burned at high sev	Percent PAC burned at high sev
TUO0010-Soldier Creek	2011	Pair Occupancy	Pair occupancy, non-nesting inferred	50.0	16
	2012	Occupied-Reproduction			
TUO0011-Big Creek	2011	No Visits	Pair occupancy, non-nesting inferred	22.8	7
	2012	No Visits			
TUO0012-Ackerson Creek	2011	No Visits	Single	117.1	38
	2012	No Visits			
TUO0019 McCauley Ranch	2011	No Visits	UNKNOWN - no survey data	1.7	1
	2012	Pair Occupancy			
TUO0024-South Fork Tuolumne	2011	No Visits	No detections	16.7	6
	2012	No Visits			
TUO0025-Middle Fork	**2011**	**No Visits**	**Single**	**187.4**	**73**
	2012	No Visits			
TUO0026-Rush Creek	2011	No Visits	Pair occupancy, non-nesting inferred	83.4	26
	2012	No Visits			
TUO0027-North Bear Mountain	2011	No Visits	Single	166.6	53
	2012	No Visits			
TUO0028-Bear Mountain	**2011**	**No Visits**	**No detections**	**240.6**	**78**
	2012	Occupied-Reproduction			
TUO0029-Granite Creek	**2011**	**No Visits**	**No detections**	**298.1**	**98**
	2012	No Visits			
TUO0030-Wilson Meadow	**2011**	**No Visits**	**No detections**	**298.0**	**99**
	2012	No Visits			
TUO0031-Reed Creek	**2011**	**No Visits**	**Single**	**275.4**	**89**
	2012	No Visits			
TUO0032-Reynold's Creek	2011	Pair Occupancy	Pair occupancy, nesting confirmed	14.8	5
	2012	No Visits			
TUO0034-Niagara Creek	2011	No Visits	Pair occupancy	247.3	80

	2012	No Visits			
TUO0039-Ackerson Mountain	2011	No Visits	Pair occupancy	58.8	19
	2012	No Visits			
TUO0040-Middle Fork Tuolumne	2011	No Detection	Pair occupancy, non-nesting inferred	146.8	48
	2012	Pair Occupancy			
TUO0053-Brushy Creek	2011	No Detection	No detections	0	0
	2012	No Visits			
TUO0054-Thompson Peak	2011	No Visits	Single	4.7	2
	2012	No Visits			
TUO0059-Lower 13 Mile Creek	2011	No Visits	Pair occupancy	14.7	5
	2012	No Visits			
TUO0061-Bear Spring Creek	2011	No Detection	Pair occupancy, non-nesting inferred	126.3	42
	2012	Territorial Single			
TUO0065-Lower Reynold's Creek	2011	No Visits	No detections	4.1	1
	2012	No Visits			
TUO0071-North Mountain	**2011**	**No Visits**	**No detections**	**257.6**	**86**
	2012	No Visits			
TUO0072-Femmons Meadow	**2011**	**No Visits**	**Pair occupancy, non-nesting inferred**	**227.3**	**76**
	2012	Occupied-Reproduction			
TUO0078-Crocker	2011	No Visits	Pair occupancy, nesting confirmed (in YNP)	181.4	57
	2012	No Detection			
TUO0085-Harden Flat NW	2011	No Visits	No detections	139.8	45
	2012	No Visits			
TUO0095-Corral Creek	**2011**	**No Visits**	**Pair occupancy**	**305.8**	**100**
	2012	Occupied-Reproduction			
TUO0129-Upper Two Mile Creek	2011	Pair Occupancy	Pair occupancy, non-nesting inferred	2.3	1
	2012	No Visits			
TUO0130-Camp Clavey	2011	No Visits	No detections	56.8	19
	2012	No Visits			
TUO0145-Bear Creek	**2011**	**No Visits**	**Pair occupancy**	**287.5**	**96**
	2012	No Visits			
TUO0146-Hunter Creek	2011	No Visits	No detections	122.5	52

	2012	Territorial Single			
TUO0148 Upper 13 Mile Creek	2011	No Visits	Pair occupancy, non-nesting inferred	5.4	2
	2012	No Visits			
TUO0149 Cottonwood Creek	2011	No Visits	Single	80.3	27
	2012	No Visits			
TUO0151 Lower Cottonwood Creek	2011	No Visits	Pair occupancy	73.0	24
	2012	No Visits			
TUO0176-Clavey-Wolfin	2011	No Visits	Pair occupancy, non-nesting inferred	0.4	0
	2012	No Visits			
TUO0177-Ascension Mountain West	**2011**	**No Visits**	**Single**	**218.1**	**72**
	2012	No Visits			
TUO0187 Thompson Meadow	2011	No Visits	Pair occupancy		0
	2012	No Visits			
TUO0188Loney Creek	2011	No Visits	Pair occupancy, nesting confirmed	9.2	3
	2012	No Visits			
TUO0205-N Niagara	2011	No Visits	Pair occupancy		0
	2012	No Visits			
TUO0210 Buchanan	2011	No Visits	No detections	0.4	0
	2012	Occupied-Reproduction			
TUO0218-Lower Skunk Creek	2011	No Visits	No detections	140.1	46
	2012	No Visits			
TUO0219-Upper Cherry Creek	2011	No Visits	No detections	77.9	25
	2012	No Visits			
TUO0255 Box Spring	2011	No Visits	Pair occupancy, nesting confirmed	53.9	18
	2012	No Visits			
TUO0256-Clavey River	2011	No Visits	Pair occupancy, non-nesting inferred	5.4	2
	2012	No Visits			
TUO0257 Westside East	2011	No Visits	No detections	260.8	87
	2012	No Visits			
TUO0258 Westside West	2011	No Visits	Single	140.6	47
	2012	No Visits			
TUO0261 Upper Camp 25	2011	No Detection	Pair occupancy, non-nesting inferred	2.9	1
	2012	No Visits			

In my Rim Fire Hazard Tree BE comments, I wrote, and re-iterate here: I strongly object to the methodology the Forest Service used to assess project impacts to Spotted Owls, which was to first 'retire' (i.e. eliminate) or re-draw PACs with larger levels of high-severity fire areas, and then to quantify the amount of logging that would occur in the re-mapped owl habitat (which then ignores any analyses of impacts on habitat in the retired PACs or the severely burned areas of the original re-drawn PACs, habitat which may be utilized by spotted owls). This methodology resulted in an estimate that a certain percentage of PAC acres would be affected by the Rim Fire salvage logging, whereas in reality a much greater percentage of actual owl habitat could be affected, because the BE neglected to consider severely burned habitat as potentially suitable. This methodology of re-drawing or retiring PACs and then conducting analyses on the newly drawn remaining PACs is contrary to the best available science and therefore seriously flawed. The project impacts should be assessed on the original PAC acres rather than the remapped areas because owls use, and in some instances prefer to forage in (Bond et al. 2009), severely burned forests. The PACs should not be re-drawn or retired before the project analysis is conducted. To re-draw the PACs or retire PACs and then conduct the analysis on the new PAC acres is putting the cart before the horse. This results in a process whereby the true impacts on owls (which may be using habitat in the severely burned areas that are retired or eliminated from PACs; see Bond et al. 2009) cannot be quantified or assessed.

Furthermore, our 2012 study in the Sierra Nevada (Lee et al. 2012) recommended surveying all burned sites before salvage logging to determine occupancy, not just those sites that experienced lower levels of fire. It is only after at least 2 years of post-fire protocol-level surveys that non-occupancy can be inferred (Lee et al. 2012). The simulation results in Lee et al. (2012) showed that the number of sites surveyed affected the estimability, bias, and power to detect an effect of fire on occupancy. If, for example, the Forest Service conducted 5 surveys on 50 sites (a close approximation of the 6-survey protocol for the 46 Rim Fire sites), estimates of initial occupancy would be biased low and estimates of local colonization and extinction rates would be biased high compared with surveying 100 sites (see Figure 6 on page 799 of Lee et al. 2012). Detectability from Forest Service surveys was just 0.55 (compared with 0.698 at demography-study sites), thus we recommended more than one year of surveys be conducted to determine site occupancy prior to conducting post-fire management activities such as salvage-logging. Again, I suggest conducting at least 2 years of surveys in all of the Rim Fire's burned PACs to properly determine occupancy status, before salvage-logging projects are designed. This is the only way to truly assess the impacts to Spotted Owls of the Rim Fire Recovery project as well as any future logging projects in the vicinity of the Rim Fire.

Finally, it is entirely possible that Spotted Owls could colonize an abandoned burned territory at some point in the future, so even after non-occupancy is established after the 2 years of post-fire surveys, the habitat could be utilized at some future time; thus, salvage-logging could prevent or hinder colonization of a burned but currently unoccupied site. This is inappropriate forest

management in habitats for a species whose Sierra Nevada population is in serious decline (Conner et al. 2013, Tempel and Gutiérrez 2013).

PACs are a human construct. They do not necessarily reflect what is actually used by Spotted Owls; they are what we define as suitable habitat and a 'best guess' at what we believe may be important to the owls. The definition of suitable habitat as green forest, dominated by large trees, and containing large snags, multi-layered canopies, and fallen logs is based on extensive habitat-association studies in unburned forests (some of which I myself have participated in). This definition works well to protect owl habitat in unburned forests that are subjected to human impacts such as logging. But in a natural disturbance such as fire, where habitat can be altered but still utilized and may even represent preferred foraging habitat, the inclusion of only unburned older forest habitat as suitable is simply not consistent with the best, latest available science. No PACs should be redrawn. Salvage logging should not be conducted in any burned PACs or within 1.5 km of core areas (Bond et al. 2009). All PACs/HRCAs should be surveyed for at least 2 years post-fire (Lee et al. 2012). Finally, the BE's analysis must be conducted within the original pre-fire PAC boundaries for the public to be able to make an informed decision about the true impacts of the Rim Fire Recovery project on California spotted owls.

In addition, the BE and DEIS completely fail to acknowledge and analyze the impacts of the proposed salvage logging to HRCAs. California Spotted Owls cannot survive in PACs alone, and therefore, HRCAs also must be protected. The Rim Fire Recovery project proposes to massively log the HRCAs thus rendering them unsuitable as owl habitat. At least 34 HRCAs will be harmed by salvage logging (see Table 2 below). Even if a PAC itself is not logged, many are surrounded by logging which would render the HRCA unsuitable and, in turn, reduce the suitability of the associated PAC. Proposed retention standards of snags are woefully inadequate to meet the needs of Spotted Owls because studies show that owl foraging habitat in burned forests is associated with high levels of snags. For example, Bond et al. (2009) found owls preferentially foraging in severely burned stands that supported much higher densities of snags than non-preferred foraging habitats. The Rim Fire Recovery project's Alternative 4 (the "better alternative") proposes to retain only 4–6 conifer snags per acre, and some of these trees will fall over time, thus further reducing the snag basal area.

TABLE 2. Proposed Alt 4 salvage logging units near 46 California Spotted Owl PACs within the 2013 Rim Fire, Stanislaus National Forest, California, USA.

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

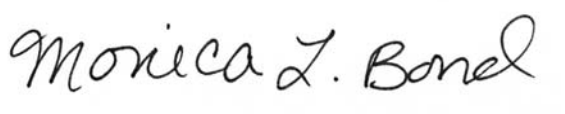
TUO0028: overlapped by T04A, T04B, T27B; adjacent to U03
TUO0029: overlapped by N01D, N01E, N01I, N01J, N01H, ; adjacent to M12, M20, N01C
TUO0030: overlapped by O03; adjacent to O201B
TUO0031: overlapped by Unit F12, F13, F20; adjacent to F11, F14
TUO0032: adjacent to Unit 04B, 4A
TUO0034: overlapped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

Currently, due to the high number of occupied Spotted Owl territories within the Rim Fire, and due to the well-documented adverse effects of salvage logging not only on Spotted Owls but on

numerous snag-forest species, I strongly recommend that the Forest Service adopt Alternative 2, the no-action alternative.

Thank you for the opportunity to provide these comments. Please do not hesitate to contact me with questions or requests for manuscripts, at monica@wildnatureinstitute.org.

Sincerely,



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