Wild Nature Institute

THE JOHN MUIR PROJECT of EARTH ISLAND INSTITUTE

August 29, 2016
Paul Souza, Regional Director
U.S. Fish and Wildlife Service, Pacific Southwest Region
2800 Cottage Way
Sacramento, CA 95825

Dear Mr. Souza,

On behalf of the John Muir Project (JMP) and the Wild Nature Institute (WNI), we are submitting the following information in further support of the December 2014 Petition to list the California spotted owl (*Strix occidentalis occidentalis*) under the ESA. We write to address a new study upon which the U.S. Forest Service relies in its August 2016 decision on the "Rim Fire Reforestation" Project. Most significantly, the Project Decision illustrates that the U.S. Forest Service intends to continue to log important owl habitat by wrongly relying on this new study, and we therefore wish to bring this information to your attention as it directly implicates the ability of California spotted owl habitat to be maintained for the future.

The Rim Fire Reforestation Project proposes to intensively log over 15,000 acres of currently intact, and ecologically vital, post-fire, snag forest habitat[1] using ground-based logging machinery that results in the death of the great majority of the currently abundant natural regeneration of conifers and oaks. Further, these logged snags would be sold to biomass logging companies that would burn them as bioenergy, pumping many thousands of tons of greenhouse gases into the atmosphere. After conducting the intensive logging, the Project then plans to cause even greater harm by spraying toxic herbicides to kill the native post-fire shrubs that would otherwise support abundant avian biodiversity.[2] Numerous scientific studies indicate that snag forest habitat is comparable to unburned old forest in terms of native biodiversity and wildlife abundance, and many rare, imperiled, and declining wildlife species have evolved to depend on either the snags or the shrub/understory components of this rich habitat. With regard to the spotted owl, studies (e.g., Bond et al. 2009, Bond et al. 2013) show that the owls have been found to preferentially forage in snag forest habitat when it is left unlogged, likely due to the complex forest structure available in such habitat and the prey available in such habitat.

On pages 4 and 12 of the Rim Fire Reforestation Project Decision, the Forest Service cites to a study, Jones et al. (2016), which reported a reduction in California spotted owl occupancy as a result of the King fire of 2014 on the Eldorado National Forest. On page 12 of the August 2016 Decision, the Forest Service states that "Jones and others (2016) demonstrate that mega-fires

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[1] Snag forest habitat refers to mature forest (pre-fire) that has now experienced high-intensity fire thus creating a high density of standing dead trees.
[2] The Forest Service claims that the shrubs will outcompete the growing conifers but in fact the shrubs can help the conifers by providing them cover from herbivory, etc.

such as the Rim Fire are a threat to spotted owls and other old-forest associated species" and quotes a statement from the paper's authors that "forest ecosystem restoration and old-forest species conservation may be more compatible than previously believed". The Forest Service describes the Rim fire logging/herbicide/artificial planting Project as furthering the sort of "forest ecosystem restoration" that is advocated by Jones et al. 2016.

As discussed below, the Rim Fire Reforestation Project and Decision's reliance on Jones et al. (2016) is misguided for a number of reasons, and as a result, owl habitat is being lost under the guise of "forest restoration" at a time when the owls are already experiencing substantial population declines (e.g., Connor et al. 2013, discussed at length in our 2014 Petition).

First, in relying upon Jones et al. (2016) to promote the Rim Reforestation Decision, the Forest Service neglects to mention that a peer-reviewed published study, Lee and Bond (2015), already examined the Rim fire area and reported some of the highest California spotted owl occupancy levels ever found anywhere in the Sierra Nevada at one-year post-fire in the Rim fire, before post-fire logging. This indicates that owl occupancy likely increased after the fire and is thus directly contrary to the assertions being made by the Forest Service to log the area under the false pretense of "forest restoration."

Second, in several serious ways, Jones et al. (2016) misrepresents California spotted owl occupancy and foraging data in the King fire, creating a false impression of a substantial reduction in owl occupancy in the King fire area, and falsely reporting that the owls avoided foraging in high-intensity fire areas. As we discuss below, neither of these conclusions is accurate, and Jones et al. (2016) failed to properly portray the King fire owl data by:

- Characterizing spotted owl territories in the King fire as "extinct" in 2015 when, in fact, the Forest Service's own owl surveys report they were occupied in 2015.

- Claiming owl territories were rendered "extinct" by the King fire when, in fact, several of these territories were not occupied by spotted owls prior to the King fire.

- Asserting that only 2% or less of the owl territories in the King fire had been subjected to post-fire logging by the beginning of the 2015 spotted owl nesting season when, in reality, several territories that lost occupancy had far higher levels of post-fire logging.

- Asserting that spotted owls were avoiding high-intensity fire areas for foraging, but neglecting to incorporate available data regarding the presence of pre-fire and post-fire logging with respect to owl use of high-intensity fire areas. Not all high-intensity fire areas are the same and instead will reflect their pre-fire condition (e.g., unlogged mature forest versus an even-aged tree plantation) and post-fire condition (e.g., if logged post-fire). Here, once the condition of the high-intensity fire areas is addressed, the results show that the owls were preferentially selecting high-intensity fire areas where no clearcutting had occurred—i.e., they were foraging in snag forest habitat more than would be expected based on its availability in their territories.

- Using a false population trendline, masking the fact that 2015 owl occupancy levels in the King fire are consistent with the two-decade declining population trendline, and do not represent a downward departure from the existing trend.

Below we discuss these points in greater detail.

With regard to the spotted owl occupancy figures reported by Jones et al. (2016) in the King fire, the authors failed to report two territories that were occupied in 2015 (one year after the fire): ELD085 and PLA016.[3] Jones et al. (2016) also claim that the King fire rendered owl territories PLA043, PLA049, ELD060, PLA065, and PLA007 "extinct", but none of these territories were occupied in 2014, prior to the fire, and most of these had not been occupied since 2010 or 2011. Exacerbating this, Jones et al. (2016) reported territory "extinctions" for PLA039 and ELD012 when, in fact, these territories remained occupied— the owls just shifted their location by several hundred meters. The occupancy history of the owls in the Eldorado spotted owl study area, where Jones et al. (2016) was conducted, establishes that the owls regularly shift the location of their territories by several hundred meters or more from year to year, and the longstanding practice has appropriately been to recognize these as the same territories. Jones et al. (2016) did not follow this standard practice, however, which inflated their "extinction" figures by improperly classifying minor annual shifting as lost occupancy.

Moreover, Jones et al. (2016) dismissed post-fire logging as a concern, claiming that only about 2% of the area in the owl territories had been post-fire logged. However, several territories that were not occupied one year after the fire were subjected to much higher levels of post-fire logging, including PLA113, PLA012, PLA109, and PLA015, averaging approximately 15%, with post-fire logging coming within 300 meters or less of nest/roost sites in most cases, based on our assessment, using Google Earth (see, e.g., Figure 1 below). Clark (2007) found such levels of post-fire logging to be associated with a loss of spotted owl occupancy. Further, Jones et al. (2016) claim that post-fire logging was an "uninformative parameter", but only seven territories had post-fire logging (in addition to the four territories mentioned above, PLA016, PLA051, and PLA067 each had approximately 4-5% post-fire logging), yet post-fire logging was part of the second-ranked model in Jones et al. (2016) pertaining to territory "extinction" (see WebTable 3 [available at: http://onlinelibrary. wiley.com/doi/10.1002/fee.1298/suppinfo]). And, when the high-severity fire proportion was held constant at 50%, the probability of a territory not being occupied in 2015 went from 38% (with 0% post-fire logging) up to 67% (with 33% post-fire logging) (see WebFigure 5b [available at: http://onlinelibrary. wiley.com/doi/10.1002/fee.1298/suppinfo]). There is no statistical basis in AIC model selection to dismiss a second-ranked model as being unimportant, as Jones et al. (2016) did here.

Jones et al. (2016) pertained only to the northern half of the King fire. Below are the spotted owl occupancy results from Forest Service surveys just before the fire and at one-year post-fire, for the northern half of the King fire area. Once the confounding influence of post-fire logging is

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[3] PLA016, which is partially in the large high-intensity fire patch, was not acknowledged at all by Jones et al. (2016: Figure 2). Jones et al. (2016: Figure 2) show an unoccupied territory (the southern-most territory shown on their Figure 2) on the southwestern edge of the historical area occupied by ELD085, while Forest Service surveys report ELD085 occupied by a pair of spotted owls several hundred meters northeast of this location in 2015, within the large high-intensity fire patch.

reduced by eliminating the four logged territories, it becomes clear that, even in the northern half of the King fire, where the fire burned most intensely, spotted owl occupancy changed very little from pre-fire to post-fire (see Table 1 below).

Table 1. Spotted owl occupancy in 2014 and 2015 in the northern half of the King fire (in the Jones et al. 2016 study area) in territories with no post-fire logging, or <5% post-fire logging.

Territory	2014 Occupied?	2015 Occupied?
PLA039	Y	Y
ELD085	Y	Y
PLA043	N	N
PLA040	Y	Y
PLA049	N	N
PLA050	Y	N
ELD012	Y	Y
ELD060	N	N
PLA038	N	Y
PLA067	Y	N
ELD058	Y	N
ELD086	Y	Y
PLA016	Y	Y
ELD057	Y	N
PLA122	N	Y
PLA065	N	N
PLA051	N	Y
PLA007	N	N
		Y (new territory, as reported by Jones et al.)
Occupancy:	**56%**	**53%**

Perhaps more importantly, while Jones et al. (2016) repeatedly make claims about the King fire as a whole, their results pertain only to the northern half of the fire, as discussed above. When the entire King fire is assessed, spotted owl occupancy increased slightly from a pre-fire level of 50% to a post-fire level of 52%, or 56% if the four post-fire logged territories are excluded (see Appendices A and B below). While a larger number of spotted owl territories were surveyed in the King fire area in 2015 than in 2014, in both cases the number of territories surveyed represent a statistical large sample and should be representative of occupancy in the area in each year.

With regard to the spotted owl foraging component of Jones et al. (2016), the authors failed to distinguish high-intensity fire areas in pre-fire or post-fire clearcuts (which are pervasive in the King fire area) from intact snag forest habitat created by high-intensity fire occurring in mature conifer forest which has not been logged. This is a serious error, particularly in light of the failure of Jones et al. (2016) to acknowledge the findings of Bond et al. (2009), which found that spotted owls preferentially selected high-intensity fire areas for foraging (likely due to enhanced small mammal prey base) in a landscape wherein pre-fire and post-fire logging were so minimal as to be nearly absent.

Using the foraging locations from Jones et al. (2016: WebFigure 3), spotted owls in the King fire used snag forest habitat more than expected based on availability, and avoided areas where even-aged logging occurred pre- or post-fire (pre-fire clearcuts and post-fire logging combined). Using Google Earth to identify even-aged logged areas, and using the same data and definition for high-severity fire as used by Jones et al. (2016), we found the following within a 1000-meter radius of territory centers: (1) unlogged high-intensity fire areas (snag forest habitat) comprised 7.6% of the territory area, (2) even-aged logged areas (young tree plantations and post-fire clearcuts) that experienced high-severity fire comprised 3.4% of the territory area (the owls chosen by Jones et al. for their foraging analysis were only a small subset of all the owls in the King fire, and were near the edge of the fire), and (3) other categories (i.e., lower-intensity and unburned areas) comprised 89%. Yet 10.3% of the 388 spotted owl foraging locations within a 1000-meter radius of territory centers were in snag forest habitat (higher than would be expected, based on only 7.6% of the area being comprised of snag forest habitat), and only 0.03% of owl foraging locations were in even-aged logged areas, with the remainder in other areas (see, e.g., Figure 1 below). This outcome is statistically significant ($\chi^2 = 15.03$, degrees of freedom = 2, p < 0.001). In other words, spotted owls were selecting snag forest habitat created by high-intensity fire in mature conifer forest, rather than avoiding it, as Jones et al. (2016) misleadingly claim, but the owls avoided heavily logged areas, which often burned at high-intensity.

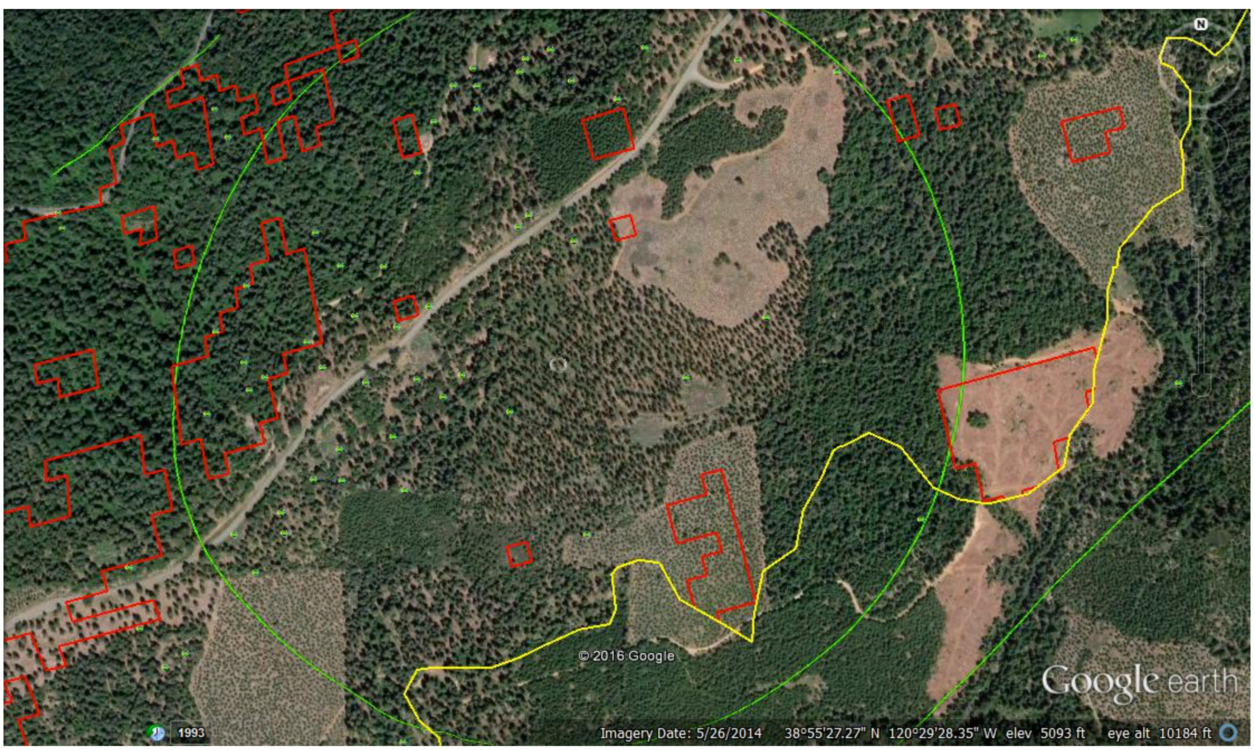


Figure 1. Pre-fire (2013) image of foraging locations (green dots), with high-severity fire patches (open red polygons) that occurred the following year in both pre-fire clearcuts/plantations (e.g., right side and lower center of image) and in mature forest (left side of image—i.e., snag forest habitat). The owls were foraging in snag forest, but not in

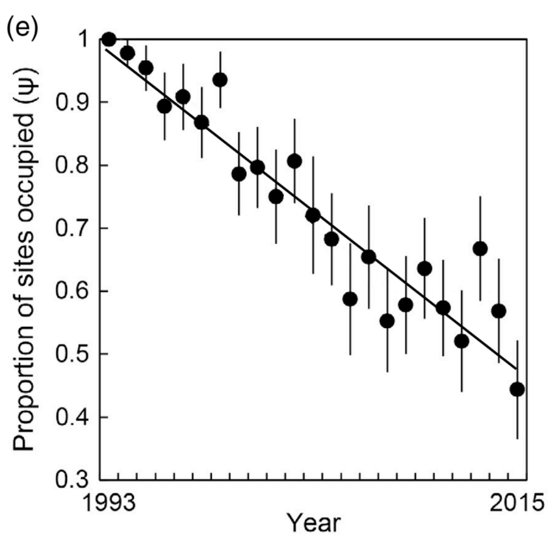
clearcuts/plantations that burned at high-severity.

Finally, Jones et al. (2016) has additional flaws in its analyses that render the results and discussion incorrect, including:

- Jones et al. (2016) improperly claimed that owl territories not occupied in a single year (2015) were “extinct”, despite the fact that any given spotted owl territory in this study area is only occupied, on average, approximately once every three years (see Appendix A below).

- Very small sample sizes exist for the occupancy analysis. The authors do not provide the 2014 occupied site sample size, but the 2014 occupancy rate was 0.57, so one can compute approximate 2014 pre-fire occupied site sample sizes of 17 burned and 9 unburned sites. Only 14 burned sites were in the large high-severity patch in the northern part of the fire, so they are making a claim of substantial extinction effects from 8 severely burned, previously occupied sites, versus 9 unburned sites.

- Excluding the temporal trend from the occupancy analysis. This is a serious flaw because the local spotted owl population is in freefall in the Eldorado spotted owl density study area. Jones et al. (2016)’s Figure 3e portrayal of a hockeystick trend is thus ad hoc and unjustified. Occupancy was plummeting for 23 years and the authors claim the last year is lowest due to the King fire. Here are the linear and quadratic trends they should have presented and included in their analysis of occupancy (Figure 2 below). Including these pre-fire trends in the analysis would swamp the effect the authors attributed to fire.



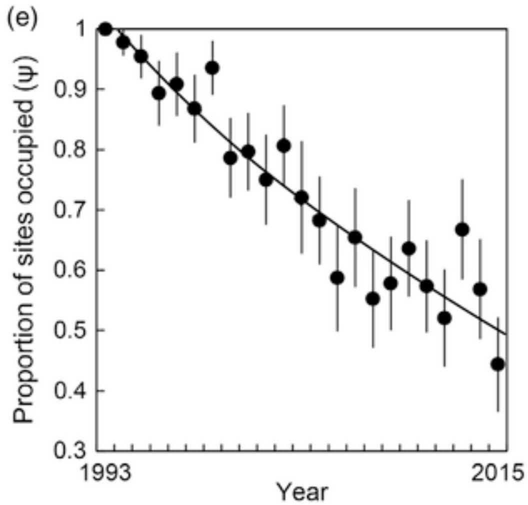


Figure 2. Annual spotted owl site occupancy data from the Eldorado owl density study area with a quadratic trend (top), and Annual spotted owl site occupancy data from Eldorado owl density study area with linear trend (bottom).

- Compositional analysis of foraging habitat as done by the Jones et al. (2016) paper is inappropriate for central place foragers like spotted owls. By choosing owls located on the periphery of the fire (there were many in the interior of the King fire, in the southern half of the fire area, that could have been chosen, but were not), where most of the high-severity fire was a long distance from the territory centers, Jones et al. (2016) biased their findings regarding owl use of high-severity fire, and their radiotelemetry results and discussion are therefore invalid.

- Page 304 of the paper states: "The observation that lower severity fire is benign, and perhaps even moderately beneficial, to spotted owls is consistent with previous studies (Roberts et al. 2011; Lee et al. 2012)." But both of those cited studies found no effect on occupancy from mixed-severity fire, as is common in the Sierra Nevada with a mix of low, moderate, *and high severity* burn. Further, page 305 states, "because owls were not individually ma*rked in the Rim F*ire study, some detections at 'occupied' sites may have involved individuals from neighboring territories or non-territorial 'floaters' (Lee and Bond 2015), both of which may have contributed to inflated estimates of territory occupancy." This exact same situation exists in the data analyzed by Jones et al. The data were collected as described in Tempel and Gutiérrez (2013): "We included both nocturnal and diurnal surveys in our occupancy analyses." During nocturnal surveys, leg bands are usually not resighted, therefore detections at occupied sites would have been similarly inflated by individuals from neighboring territories or non-territorial floaters.

- Jones et al. (2016) openly advocate logging ostensibly to save the spotted owl from fire, but fail to note that both mechanical thinning and post-fire logging have been found to result in severe losses of spotted owl occupancy (numerous studies cited in Bond and Hanson 2014—

the California spotted owl ESA listing petition), and fail to note that the Forest Service's own science concludes that large, weather-driven fires like the Rim and King fire are not curbed by reducing forest density and creating more "open" forest conditions. With regard to the Rim fire, Lydersen et al. (2014) found, for example, the following: "Plots that burned on days with strong plume activity experienced moderate- to high-severity fire effects regardless of forest conditions, fire history or topography…Our results suggest that wildfire burning under extreme weather conditions, as is often the case with fires that escape initial attack, can produce large areas of high-severity fire even in fuels-reduced forests with restored fire regimes."

In summary, the Jones et al. (2016) paper is based upon serious errors and mischaracterizations of the data, and the authors' advocacy for increased logging on Sierra Nevada national forests, and other forests in the range of the California spotted owl, is unwarranted and would further threaten this species. Indeed, the fact that the Forest Service is already using this faulty study to promote intensive logging of over 15,000 acres of current snag forest habitat, within dozens of occupied California spotted owl territories analyzed by Lee and Bond (2015), indicates that the urgency and need to list the California spotted owl as threatened or endangered is increasing.

Sincerely,

Chad Hanson, Ph.D., Director
John Muir Project of Earth Island Institute
P.O. Box 697
Cedar Ridge, CA 95924
530-273-9290
cthanson1@gmail.com

Derek Lee, Ph.D., Principal Scientist
Wild Nature Institute
P.O. Box 165
Hanover, NH 03755
415-630-3487
Derek@WildNatureInstitute.org

Monica Bond, M.S., Principal Scientist
Wild Nature Institute
P.O. Box 165
Hanover, NH 03755
415-630-3487
Monica@WildNatureInstitute.org

Appendix A. Results of Spotted Owl Territories Surveyed in 2014 Throughout the King fire, Conducted Just Before the Fire Occurred

CSO PAC	Best Status/ Year Pre-Fire	Pre-fire Territory Occupancy – Latest Year Occupied
ELD0009	S / 2014	2014
ELD0012	R / 2014	2014
ELD0040	P / 2012	2013
ELD0051	R / 2014	2014
ELD0057	R / 2014	2014
ELD0058	P / 2013	2014
ELD0060	P / 2010	2010
ELD0068	R / 2014	2014
ELD0081	S / 2012	2012
ELD0085	P / 2014	2014
ELD0086	R / 2012	2014
ELD0140	P / 2012	2013
ELD0219	P / 2008	2008
PLA0007	S / 2013	2013
PLA0011	P / 2011	2014
PLA0012	S / 2011	2011
PLA0013	S / 2011	2013
PLA0015	P / 2012	2013
PLA0016	P / 2014	2014
PLA0038	P / 2008	2008
PLA0039	R / 2014	2014
PLA0040	R / 2014	2014
PLA0043	S / 2011	2011
PLA0049	S / 2011	2011
PLA0050	R / 2014	2014
PLA0051	P / 2013	2013
PLA0065	R / 2013	2013
PLA0067	P / 2014	2014
PLA0080	S / 2014	2014
PLA0098	S / 2014	2014
PLA0101	R / 2002	2002
PLA0109	S / 2013	2013
PLA0113	P / 2014	2014
PLA0122	S / 2010	2010

<u>Summary</u>: Of 34 territories surveyed in 2014 in what, soon thereafter, became the King fire area, 17 were occupied by spotted owls—50% pre-fire occupancy.

Appendix B. Results of Spotted Owl Territories Surveyed in 2015 Throughout the King fire (7/15/15—blank spaces under Activity Center Status indicate no occupancy).

Owl PAC	Activity Center Status	Activity Center UTM	
ELD0001	Pair - Nesting Unknown		
ELD0009			
ELD0012	Pair - Nesting Confirmed	722074	4315729
ELD0014	Pair - Nesting Unknown	701229	4300734
ELD0015	2 birds, pair status unknown		
ELD0034	2 birds, pair status unknown	705373	4296012
ELD0036			
ELD0040	Verified unoccupied		
ELD0042	Resident Single	717709	4301968
ELD0043	Status Unknown (Single Owl)		
ELD0051	Pair -- Non-nesting Confirmed	717904	4298526
ELD0052			
ELD0054	Status Unknown (Single Owl)		
ELD0057	Verified unoccupied		
ELD0058	Verified unoccupied		
ELD0060	Verified unoccupied		
ELD0067	Pair - Nesting Unknown	708220	4301553
ELD0068	Verified unoccupied		
ELD0071	Pair - Nesting Unknown		
ELD0081	Verified unoccupied		
ELD0085	Pair -- Non-nesting Confirmed	716876	4311761
ELD0086	Pair - Nesting Confirmed	723908	4320474
ELD0097	Pair - Nesting Confirmed	706020	4311355
ELD0140	Verified unoccupied		
ELD0206	Status Unknown (Single Owl)	717984	4294463
ELD0213			
ELD0216	Status Unknown (Single Owl)		
ELD0217	Status Unknown (Single Owl)		
ELD0219	Status Unknown (Single Owl)		
ELD0300			
ELD0303			
ELD0315	Pair - Nesting Confirmed	704137	4294901
ELD0320	Pair -- Non-nesting Confirmed	718688	4302401
PLA0007	Verified unoccupied		

PLA0011	Verified unoccupied		
PLA0012	Verified unoccupied		
PLA0013	Verified unoccupied		
PLA0015	Verified unoccupied		
PLA0016	Pair - Nesting Confirmed	717549	4323246
PLA0038	Pair - Nesting Unknown	713847	4319734
PLA0039	Status Unknown (Single Owl)		
PLA0040	Pair - Nesting Confirmed	710927	4314999
PLA0043	Verified unoccupied		
PLA0049	Verified unoccupied		
PLA0050	Verified unoccupied		
PLA0051	Pair -- Non-nesting Confirmed	719885	4326661
PLA0065	Verified unoccupied		
PLA0067	Verified unoccupied		
PLA0080	Status Unknown (Single Owl)		
PLA0098	Verified unoccupied		
PLA0101	Status Unknown (Single Owl)		
PLA0109	Verified unoccupied		
PLA0113	Verified unoccupied		
PLA0122	Status Unknown (Single Owl)		

Summary: Of 54 territories surveyed in 2015 in the King fire area, 28 were occupied by spotted owls—52% pre-fire occupancy. When the four post-fire logged territories are excluded, post-fire occupancy fire-wide was 56%.