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JOHN MUIR PROJECT

October 22, 2021

San Bernardino National Forest
Mountaintop Ranger District
Attn: Marc Stamer, District Ranger
PO Box 290
Fawnskin, CA 92333

Re: <u>North Big Bear Landscape Restoration Project – Draft Environmental Assessment</u>

Dear Mr. Stamer:

Thank you for this opportunity to provide our initial comments on the North Big Bear Landscape Restoration Project ("Project") in the Mountaintop Ranger District of the San Bernardino National Forest. Below are our detailed concerns about the draft Environmental Assessment ("EA").

1. The EA does not consider the best available scientific information.

The EA and supporting documents that have been released by the agency for the Project do not adequately discuss the best available science about a variety of topics related to how the Proposed Action is unlikely to achieve specific goals such as improved stand resilience to drought and bark beetles or community protection from wildfire as well as the current and natural conditions of the ecosystems that occur in the Project Area.

A. Effects of the Proposed Action on Drought Susceptibility

The EA contains very little information about the specific effects of drought on the Project Area in the past or present. Rather, the EA vaguely portrays drought as a contributing factor to insect outbreaks and, through the addition of dead trees to the landscape, stand-replacing wildfire. Thus, it seems that the ability of drought to influence bark beetle activity and wildfire is the U.S. Forest Service's real concern here. It is true that bark beetle activity can increase during drought periods, a process that has been occurring in western forests for millions of years, but the ability to control such outbreaks is not well-supported by,[1] and native insect outbreaks' impact on future fire risk or severity has been found to be minimal.[2] Issues related to bark beetles and wildfire are discussed in more detail below.

B. Effects of the Project on Future Bark Beetle Activity

Few long-term studies of thinning projects and their impacts on subsequent bark beetle outbreaks have been conducted, and the studies that exist show mixed results due to complex site-specific factors.[3]

Studies that have shown success of such projects on reducing bark beetle mortality generally do not consider the treatment-caused mortality when considering the concept of a successful treatment. For instance, Fettig et al (2012)[4] examined the effect on bark beetle-induced tree mortality of various levels of thinning in comparison to unthinned areas in mixed-conifer forests in the Sierra Nevada. While they stated that "[i]n the present study, bark beetle-caused tree mortality was relatively low the decade after thinning, never reaching a level that would be considered epidemic for either *P. jeffreyi* or *P. ponderosa*…" the authors did not consider the initial mortality event caused by the thinning treatment itself. Their measure of success was whether the level of tree mortality in thinned stands was less than that in the unthinned stands, but apparently mortality was only significant to success if caused by bark beetles. When analyzing the data they present, it is actually quite simple to glean that the overall mortality (i.e. mortality from thinning plus mortality from subsequent bark beetles) in the three thinning treatments was substantial (109 – 289 trees killed per hectare on average) compared to the overall mortality in the unthinned stands (approximately 13 trees killed per hectare on average). Granted, the number of trees killed by bark beetles was slightly lower in the thinning

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[1] Six, D.L., E. Biber, and E. Long. 2014. Management for Mountain Pine Beetle Outbreak Suppression: Does Relevant Science Support Current Policy? Forests, 5(1):103-133. doi:10.3390/f5010103

[2] Black, S.H., D. Kulakowski, B.R. Noon, and D.A. DellaSala. Do Bark Beetle Outbreaks Increase Wildfire Risks in the Central U.S. Rocky Mountains? Implications from Recent Research. *Natural Areas Association*, 33(1):59-65. doi.org/10.3375/043.033.0107

Hart, S.J., T. Schoennagel, T.T. Veblen, and T.B. Chapman. 2015. Area burned in the western United States is unaffected by recent mountain pine beetle outbreaks. PNAS, 112(14):4375-4380. doi: 10.1073/pnas.1424037112

Meigs, G.W., H.S.J. Zald, J.L. Campbell, W.S. Keeton, and R.E. Kennedy. 2016. Do insect outbreaks reduce the severity of subsequent forest fires? doi:10.1088/1748-9326/11/4/045008

Andrus, R.A., T.T. Veblen, B.J. Harvey, and S.J. Hart. 2016. Fire severity unaffected by spruce beetle outbreak in spruce-fir forests in southwestern Colorado. *Ecological Applications*, 26(3):700-711.

[3] Black, S.H., D. Kulakowski, B.R. Noon, and D.A. DellaSala. 2013. Do Bark Beetle Outbreaks Increase Wildfire Risks in the Central U.S. Rocky Mountains? Implications from Recent Research. *Natural Areas Association*, 33(1):59-65. doi.org/10.3375/043.033.0107

Six, D.L., E. Biber, and E. Long. 2014. Management for Mountain Pine Beetle Outbreak Suppression: Does Relevant Science Support Current Policy? Forests, 5(1):103-133. doi:10.3390/f5010103

[4] Fettig, C.J., C.J. Hayes, K.J. Jones, S.R. Mckelvey, S.L. Mori, and S. L. Smith. 2012. Thinning Jeffrey pine stands to reduce susceptibility to bark beetle infestations in California, U.S.A. *Agricultural and Forest Entomology*, 14:111-117. doi: 10.1111/j.1461-9563.2011.00543.x

treatments (3 – 11 trees killed per hectare on average) compared to the unthinned stand (13 trees killed per hectare on average), but this pales in comparison to overall number of trees killed due to the thinning itself (see Figure 1). Another way to view this is, approximately 289 trees per hectare were killed in the most intensive treatment by the thinning itself in order to prevent 10 trees from being killed in the future by bark beetles.

Six et al. (2014)[5] notes a similar pattern:

> "Although more trees were killed overall in control units during the outbreak, all controls still retained a greater number of residual mature trees than did thinned stands as they entered the post-outbreak phase."

And a separate study in ponderosa pine forests in the Black Hills similarly demonstrated that far more trees were killed through the actual thinning process than through a subsequent bark beetle outbreak that was more severe than that experienced in the study by Fettig et al. (2012). Negron et al (2017)[6] examined stands in which the overall mortality (again, mortality caused by thinning plus mortality caused by bark beetles) was 242.6 trees killed per acre on average in thinned stands compared to 87.7 trees killed per acre in unthinned stands. As with other similar studies, the treatment was the primary source of mortality in the stand rather than bark beetles. By the end of the outbreak, not only were there more trees in the unthinned stands (203.2 TPA on average) compared to the thinned stands (55 TPA on average) as well as more basal area (which could be considered a proxy for both biomass and carbon storage; 67.8 ft^2 per acre compared to 32.3 ft^2 per acre).

Again, this pattern is consistent in multiple studies across various forest types in California and the western U.S., and it highlights that mixed-conifer and yellow pine forests are generally already resilient to bark beetle outbreaks. In examining forests that experienced multiple bark beetle outbreaks at different temporal and spatial scales, Andrus et al (2020)[7] concluded:

> We identified that greater pre-outbreak stand structural complexity and species diversity were key traits that provided stands with a high potential for physiognomic recovery, which supports the long-standing idea that diversity enhances ecological resilience.

The Proposed Action would clearly reduce structural complexity in the Project Area, and because a goal is to reduce abundance of certain tree species in combination with the fact that the Project activities are likely to increase the spread of non-native, invasive plants across the

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[5] Six, D.L., E. Biber, and E. Long. 2014. Management for Mountain Pine Beetle Outbreak Suppression: Does Relevant Science Support Current Policy? Forests, 5(1):103-133. doi:10.3390/f5010103

[6] Negron, J.F., K.K. Allen, A. Ambourn, B. Cook, and K. Marchand. 2017. Large-Scale Thinnings, Ponderosa Pine, and Mountain Pine Beetle in the Black Hills, USA. *Forest Science*. doi.org/10.5849/FS-2016-061

[7] Andrus, R.A., S.J. Hart, and T.T. Veblen. 2020. Forest recovery following synchronous outbreaks of spruce and western balsam bark beetle is slowed by ungulate browsing. *Ecology*, 101(5):e02998. doi.org/10.1002/ecy.2998

area (described in more detail below), it is very likely that the Proposed Action will also reduce species diversity. Thus, the Project may *reduce* ecosystem resilience to future disturbances such as bark beetle outbreaks.

As the U.S. Forest Service here is proposing a similar treatment (before some possible, unpredictable outbreak in the future), it is highly likely that many more trees would be killed and removed from the ecosystem than would ever succumb to bark beetles. Consider that yellow pine and mixed-conifer areas would be thinned to a basal area between 60 and 80 ft^2 per acre. While all of the tree stand data collected in the Project Area were not provided to the public, a sample of stand information is provided in Table 2 in the EA. Thinning in those example stands caused a 63% reduction (mortality) of basal area on average. This is typically much greater than basal area mortality from bark beetle outbreaks.

It should also be noted that the use of prescribed fire can increase bark beetle activity in yellow pine forests.[8]

A key question arises from these considerations: Would drastically increasing overall mortality through thinning compared to an unthinned stand and reducing structural complexity and species diversity make ecosystems in the Project Area more resilient? Not only has the agency not demonstrated—using the best available science—that the Proposed Action would promote resilience, it has provided only minimal citation to scientific literature largely produced by the U.S. Forest Service itself.

C. Effects of the Proposed Action on Future Wildfire Behavior

When considering the potential effects the Proposed Action would presumably have on future wildfire behavior, the EA is once again somewhat vague. The U.S. Forest Service seems to be primarily concerned with the occurrence of high severity, stand-replacing fire in the Project Area. However, many studies have found that historically in yellow pine and mixed-conifer forests, mixed-severity fire was the dominant fire type on the landscape and continues to be today.[9] Mixed-severity fire occurs when a given wildfire burns across the landscape with a

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[8] Bradley, T. and P. Tueller. 2001. Effects of fire on bark beetle presence on Jeffrey pine in the Lake Tahoe Basin. *Forest Ecology and Management*, 142:205-214.

[9] Baker, W.L. and D. Ehle. 2001. Uncertainty in surface-fire history: the case of ponderosa pine forests in the western United States. *Canadian Journal of Forest Research*, 31(7):1205-1226. doi: 10.1139/cjfr-31-7-1205

Bekker, M.F. and A.H. Taylor. 2010. Fire disturbance, forest structure, and stand dynamics in montane forests of the southern Cascades, Thousand Lakes Wilderness, USA. *Ecoscience*, 17(1):59-72. doi: 10.2980/17-1-3247

Williams, M.A. and W.L. Baker. 2012. Spatially extensive reconstructions show variable-severity fire and heterogeneous structure in historical western United States dry forests. *Global Ecology and Biogeography*, 21:1042-1052. doi: 10.1111/j.1466-8238.2011.00750.x

Baker, W.L. 2014. Historical forest structure and fire in Sierran mixed-conifer forests reconstructed from General Land Office survey data. *Ecosphere*, 5(7):79. dx.doi.org/10.1890/ES14-00046.1

Odion, D.C., C.T. Hanson, A. Arsenault, W.L. Baker, D.A. DellaSala, R.L. Hutto, M.A. Moritz, R.L. Sherriff, T.T. Veblen, and M.A. Williams. 2014. Examining Historical and Current Mixed-Severity Fire Regimes in variety of fire effects including low-severity (< 20% overhead canopy mortality measured by basal area reduction), moderate-severity (20 – 70% overhead canopy mortality measured by basal area reduction), and high-severity (> 70% overhead canopy mortality measured by basal area reduction) occurring in a mosaic pattern within the total burned area,[10] though importantly much of the delineated fire perimeter may actually be unburned.[11] Apparently the agency does not take issue with a fire burning with low- to moderate-severity effects, as the EA states that this was presumably the norm historically. The agency goes on to highlight the type of fire that is considered undesirable in the area is "high severity," "high intensity" (this term does not always share the same definition with high-severity fire, though we assume the two terms are used interchangeably here), "large scale," and "stand replacement."[12] The EA implies that any amount of high-severity fire is unnatural and undesirable and that a future fire has a high probability of being high-severity, therefore the Proposed Action is necessary. There are several issues that must be addressed here.

First, as there is ample evidence that mixed-severity fire was historically (before the era of modern fire suppression) dominant in mixed-conifer and yellow pine forests, then some amount of high-severity fire is a naturally-occurring event on these forested landscapes. Countless studies have demonstrated that the habitat created by high-severity fire in both mixed-conifer and yellow pine (dominated by either *P. ponderosa* and/or *P. jeffreyi*) is

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Ponderosa Pine and Mixed-Conifer Forests of Western North America. *PLoS ONE*, 9(2):e87852. doi:10.1371/journal.pone.0087852

Williams, M.A. and W.L. Baker. 2014. High-severity fire corroborated in historical dry forests of the western United States: response to Fulé et al. *Global Ecology and Biogeography*, 23:831-835. doi: 10.1111/geb.12152

Hanson, C.T. and D.C. Odion. 2016. Historical Forest Conditions with the Range of the Pacific Fisher and Spotted Owl in the Central and Southern Sierra Nevada, California, USA. Natural Areas Journal, 36(1):8-19. doi.org/10.3375/043.036.0106

Odion, D.C., C.T. Hanson, W.L. Baker, D.A. DellaSala, M.A. Williams. 2016. Areas of Agreement and Disagreement Regarding Ponderosa Pine and Mixed Conifer Forest Fire Regimes: A Dialogue with Stevens et al. *PLoS ONE*, 11(5):e0154579. doi:10.1371/journal.pone.0154579

Baker, W.L. 2017. Restoring and managing low-severity fire in dry-forest landscapes of the western USA. *PLoS ONE*, 12(2):e0172288. doi:10.1371/journal.pone.0172288

Baker, W.L. and M.A. Williams. 2018. Land surveys show regional variability of historical fire regimes and dry forest structure of the western United States. *Ecological Applications*, 28(2):284-290.

[10] Halofsky, J.E., D.C. Donato, D.E. Hibbs, J.L. Campbell, M. Donaghy Cannon, J.B. Fontaine, J.R. Thompson, R.G. Anthony, B.T. Bormann, L.J. Kayes, B.E. Law, D.L. Peterson, and T.A. Spies. 2011. Mixed-severity fire regimes: lessons and hypotheses from the Klamath-Siskiyou Ecoregion. *Ecosphere*, 2(4):art40. doi: 10.1890/ES10-00184.1

Odion, D.C., C.T. Hanson, A. Arsenault, W.L. Baker, D.A. DellaSala, R.L. Hutto, M.A. Moritz, R.L. Sherriff, T.T. Veblen, and M.A. Williams. 2014. Examining Historical and Current Mixed-Severity Fire Regimes in Ponderosa Pine and Mixed-Conifer Forests of Western North America. *PLoS ONE*, 9(2):e87852. doi:10.1371/journal.pone.0087852

[11] Kolden, C.A., J.A. Lutz, C.H. Key, J.T. Kane, and J.W. van Wagtendonk. 2012. Mapped versus actual burned area within wildfire perimeters: Characterizing the unburned. *Forest Ecology and Management*, 286:38-47. dx.doi.org/10.1016/j.foreco.2012.08.020

[12] U.S. Forest Service. 2021. North Big Bear Landscape Restoration Project EA.

important for a variety of plants and wildlife.[13] Furthermore, the landscape heterogeneity created by mixed-severity fire is likely important for conferring adaptation and resilience in these forests in the face of climate change and against future disturbances.[14] It is also important to note that conifer regeneration is generally occurring unimpeded (though often staggered both temporally and spatially, which again creates more landscape heterogeneity that may be important for adaptive resilience) in areas that have burned at high-severity as part of a larger mixed-severity fire in recent years[15] indicating that forests go through natural and important successional processes following such disturbances—a sign of ecosystem resilience to wildfire.

However, the EA does not provide any of this context nor does it cite any of the relevant literature cited in this letter. Rather, the EA and associated specialist reports cite primarily U.S.

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[13] Hutto, R.L. 2008. The ecological importance of severe wildfires: some like it hot. *Ecological Applications*, 18(8):1827-1834.

Odion, D.C., M.A. Moritz, and D.A. DellaSala. 2010. Alternative community states maintained by fire in the Klamath Mountains, USA. *Journal of Ecology*, 98:96-105. doi: 10.1111/j.1365-2745.2009.01597.x

Buchalski, M.R., J.B. Fontaine, P.A. Heady III, J.P. Hayes, and W.F. Frick. 2013. Bat Response to Differing Fire Severity in Mixed-Conifer Forest California, USA. *PLoS ONE*, 8(3):e57884. doi:10.1371/journal.pone.0057884

DellaSala, D.A., M.L. Bond, C.T. Hanson, R.L. Hutto, and D.C. Odion. 2014. Complex Early Seral Forests of the Sierra Nevada: What are They and How Can They Be Managed for Ecological Integrity? *Natural Areas Journal*, 34(3):310-324. doi.org/10.3375/043.034.0317

Hutto, R.L., R.E. Keane, R.L. Sherriff, C.T. Rota, L.A. Eby, and V.A. Saab. 2016. Toward a more ecologically informed view of severe forest fires. *Ecosphere*, 7(2):e01255. doi: 10.1002/ecs2.1255

Tingley, M.W., V. Ruiz-Gutierrez, R.L. Wilkerson, C.A. Howell, and R.B. Siegel. 2016. Pyrodiversity promotes avian diversity over the decade following forest fire. *Proceedings of the Royal Society B*, 283:20161703. doi.org/10.1098/rspb.2016.1703

Hanson, C.T. 2018. Landscape Heterogeneity Following High-Severity Fire in California's Forests. *Wildlife Society Bulletin*, 42(2):264-271. doi: 10.1002/wsb.871

[14] Swanson, M.E., J.F. Franklin, R.L. Beschta, C.M. Crisafulli, D.A. DellaSala, R.L. Hutto, D.B. Lindenmayer, and F.J. Swanson. 2011. The forgotten stage of forest succession: early-successional ecosystems on forest sites. *Frontiers in Ecology and the Environment*, 9(2):117-125. doi:10.1890/090157

Baker, W.L. and M.A. Williams. 2015. Bet-hedging dry-forest resilience to climate-change threats in the western USA based on historical forest structure. *Frontiers in Ecology and Evolution*, 2:88. doi: 10.3389/fevo.2014.00088

Seidl, R., D.C. Donato, K.F. Raffa, and M.G. Turner. 2016. Spatial variability in tree regeneration after wildfire delays and dampens future bark beetle outbreaks. *PNAS*, 113(46):13075-13080. doi.org/10.1073/pnas.1615263113

[15] Shatford, J.P.A., D.E. Hibbs, and K.J. Puettmann. 2007. Conifer Regeneration after Forest Fire in the Klamath-Siskiyous: How Much, How Soon? *Journal of Forestry*, 105(3):139-146.

Owen, S.M., C.H. Sieg, A.J. Sanchez Meador, P.Z. Fule, J.M. Iniguez, L.S. Baggett, P.J. Fornwalt, and M.A. Battaglia. 2017. Spatial patterns of ponderosa pine regeneration in high-severity burn patches. *Forest Ecology and Management*, 405:134-149. dx.doi.org/10.1016/j.foreco.2017.09.005

Hanson, C.T. 2018. Landscape Heterogeneity Following High-Severity Fire in California's Forests. *Wildlife Society Bulletin*, 42(2):264-271. doi: 10.1002/wsb.871

Kauffman, J.B., L.M. Ellsworth, D.M. Bell, S. Acker, and J. Kertis. 2019. Forest structure and biomass reflects the variable effects of fire and land use 15 and 29 years following fire in the western Cascades, Oregon.

Forest Service-produced or -funded research articles. Furthermore, high-intensity or high-severity fire has historically and continues to be the norm in pinyon-juniper.[16]

The EA overall paints high-severity (and high-intensity) fire negatively despite its importance temporally and spatially in the region. It is clear that the agency finds this type of fire to be undesirable, which answers a question posed earlier in this subsection: What type of wildfire is undesirable in the Project Area?

Moreover, there is a serious question as to whether the Project can alter wildfire behavior, spread, etc, especially under extreme weather conditions (>97% percentile at which modeling of treatment effects was conducted according to the EA). Here the U.S. Forest Service is entirely focused on one factor that can affect wildfire: fuel (vegetation, live and dead). While this may be the one factor that is alterable, other factors such as climate, weather, and topography exert a stronger influence over fire severity and spread,[17] and a realistic analysis and discussion about the ability of the Proposed Action to affect a future wildfire in relation to these factors is needed.

For example, a study examining factors determining fire severity during the 2013 Rim Fire in the Sierra Nevada found that fire severity tended to be driven by daily fire weather conditions in forests that had burned relatively recently (which the authors considered "fire restored" as they had burned multiple times in previous decades with the last fire at least 17 years earlier), with mostly low- to moderate-severity fire occurring under milder weather conditions.[18]

Another study found that daily fire weather was the strongest driver of fire severity, with pre-fire biomass being an unimportant predictor of fire severity.[19] Similarly, Thompson and Spies (2009)[20] found that weather was the most important determinant for fire severity during a large wildfire.

Even for wildfires that burned in areas with previous bark beetle outbreaks (and thus a greater number of dead trees or amount of downed woody material), fire weather variables such as

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[16] Baker, W.L. and D.J. Shinneman. 2004. Fire and restoration of pinon-juniper woodlands in the western United States: a review. *Forest Ecology and Management*, 189:1-21.

[17] Dillon, G.K., Z.A. Holden, P. Morgan, M.A. Crimmins, E.K. Heyerdahl, and C.H. Luce. 2011. Both topography and climate affected forest and woodland burn severity in two regions of the western US, 1984 to 2006. *Ecosphere*, 2(12):130. doi: 10.1890/ES11-00271.1

[18] Lydersen, J.M., M.P. North, and B.M. Collins. 2014. Severity of an uncharacteristically large wildfire, the Rim Fire, in forests with relatively restored frequent fire regimes. *Forest Ecology and Management*, 328:326-334. dx.doi.org/10.1016/j.foreco.2014.06.005

[19] Zald, H.S.J. and C.J. Dunn. 2018. Severe fire weather and intensive forest management increase fire severity in a multi-ownership landscape. *Ecological Applications*, 28(4):1068-1080. https://doi.org/10.5061/dryad.3gv5c78

[20] Thompson, J.R. and T.A. Spies. 2009. Vegetation and weather explain variation in crown damage within a large mixed-severity fire. *Forest Ecology and Management*, 258:1684-1694. doi: 10.1016/j.foreco.2009.07.031

maximum daily temperature and wind speed were the most important predictors of fire severity in one study.[21] That study concludes:

> Here, we found daily fire growth was sensitive to both daily weather variability (maximum temperature, gust speed, and relative humidity) and moderate-term drought (ERC), supportive of the idea that variation in weather is a key driver of fire size. Thus, predictions of future wildfire should incorporate both the effects of slowly changing broad-scale climate, which promote periods of widespread wildfire, and extreme weather events, which lead to rapid periods of fire growth.

Similarly, another study found that antecedent temperatures and low precipitation were more important factors in determining wildfire extent than previous bark beetle outbreaks.[22] Furthermore, intraseasonal precipitation patterns may also exert a strong influence over fire severity.[23]

The EA does not analyze the importance of climate and weather when discussing potential future fire behavior, instead implying that forests in the Project Area are only at risk of high-severity fire (though again, this type of fire is a natural component of a landscape historically dominated by mixed-severity fire) because of vegetation conditions. The agency does not acknowledge that fire weather conditions are likely to drive fire severity in the area regardless of vegetation conditions. The end result is that the agency overstates its ability to alter future fire behavior through the Proposed Action and understates the existing resilience of the area's ecosystems to wildfires.

The EA makes it apparent that white fire is a primary target for removal as it is deemed a shade-tolerant ladder fuel. Such statements about white fir or other shade-tolerant species often imply that the species increase wildfire risk. By mentioning ladder fuels, the agency is also stating that small trees are problematic from a wildfire perspective. However, Lydersen et al. (2014)[24] found that stands with higher levels of shade-tolerant basal area and densities of small trees tended to burn at *lower* severity during the 2013 Rim Fire in the Sierra Nevada:

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[21] Hart, S.J. and D.L. Preston. 2020. Fire weather drives daily area burned and observations of fire behavior in mountain pine beetle affected landscapes. *Environmental Research Letters*, 15:054007. doi.org/10.1088/1748-9326/ab7953

[22] Mietkiewicz, N. and D. Kulakowski. 2016. Relative importance of climate and mountain pine beetle outbreaks on the occurrence of large wildfires in the western USA. *Ecological Applications*, 26(8):2525-2537. doi.org/10.1002/eap.1400

[23] Holden, Z.A., P. Morgan, M.A. Crimmins, R.K. Steinhorst, and A.M.S. Smith. 2007. Fire season precipitation variability influences fire extent and severity in a large southwestern wilderness area, United States. *Geophysical Research Letters*, 34:L16708. doi:10.1029/2007GL030804

[24] Lydersen, J.M., M.P. North, and B.M. Collins. 2014. Severity of an uncharacteristically large wildfire, the Rim Fire, in forests with relatively restored frequent fire regimes. *Forest Ecology and Management*, 328:326-334. dx.doi.org/10.1016/j.foreco.2014.06.005

Several forest structure variables were somewhat important in predicting fire severity; however the nature of these relationships with fire severity was different than what is often suggested. For example, plots with greater white fir basal area, a species generally associated with greater sensitivity to fire, tended to burn with lower fire severity. This effect was marginal but still present when plots that burned on a plume-dominated day were removed from the analysis. Similarly, lower fire severity was also observed in plots with a greater proportion of shade-intolerant species (proportion of white fir and incense-cedar relative to pine and oak species), although the effect was marginal in both analyses. Density of small to intermediate size trees (20–40 cm dbh in the analysis with all plots and both 40–60 cm and 60–80 cm dbh in the analysis excluding plots burned on a plume-dominated day) were also related to Rim Fire severity, with plots with a greater small tree density tending to burn with lower severity.

Thus, in mixed-conifer stands, the presence of small trees or shade-tolerant species does not necessarily increase fire severity even during a large wildfire event.

A report prepared for Congress stated: "We do not presume that there is a broad scientific consensus surrounding appropriate methods or techniques for dealing with fuel build-up or agreement on the size of areas where, and the time frames when, such methods or techniques should be applied".[25] A research report by Omi and Martinson (2002)[26] states: "Evidence of fuel treatment efficacy for reducing wildfire damages is largely restricted to anecdotal observations and simulations."

In a large analysis of fires and fuel treatments across forests in eleven states (the western portion of the contiguous U.S.), including in California, Rhodes and Baker (2008)[27] found that the probability of a fuel treatment even encountering a fire over a 20-year period following the implementation of the fuel treatment:

…our results indicate that, on average, approximately 2.0 to 4.2% of areas treated to reduce fuels are likely to encounter fires that would otherwise be high or high-moderate severity without treatment. In the remaining 95.8-98.0% of treated areas, potentially adverse treatment effects on watersheds are not counterbalanced by benefits from reduced fire severity.

[25] U.S. General Accounting Office. 1999. Western National Forests: A Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats. GAO/RCED-99-65. pg. 56

[26] Omi, P.N. and E.J. Martinson. 2002. Effects of Fuels Treatment on Wildfire Severity. Report to Joint Fire Science Program Governing Board. pg. 1

[27] Rhodes, J.J. and W.L. Baker. 2008. Fire Probability, Fuel Treatment Effectiveness and Ecological Tradeoffs in Western U.S. Public Forests. *The Open Forest Science Journal*, 1:1-7. doi: 1874-4208/08

Schoennagel et al. (2017)[28] similarly found that only 1% of fuel treatments in national forests experience fire each year on average, "suggesting that most treatments have little influence on wildfire."

In fact, there is scientific evidence that thinning can make the fuel hazard worse instead of better. Graham et al. (2004)[29] noted that "[d]etailed site-specific data on anything beyond basic forest structure and fuel properties are rare, limiting our analytical capability to prescribe management actions to achieve desired conditions for altering fuels and fire hazard." Further, thinning can alter the heating of the understory and subsequently reduce moisture levels:

> Thinning opens stands to greater solar radiation and wind movement, resulting in warmer temperatures and drier fuels throughout the fire season.
>
> [T]his openness can encourage a surface fire to spread…Opening up closed forests through selective logging can accelerate the spread of fire through them because a physical principle of combustion is that reducing the bulk density of potential fuel increases the velocity of the combustion reaction. Wind can flow more rapidly through the flaming zone. Thinned stands have more sun exposure in the understory, and a warmer microclimate, which facilitates fire (Countryman 1955)…
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> [F]uel reduction activities – particularly mechanized treatments – inevitably function to disturb soils and promote the invasion and establishment of non-native species. Pile burned areas associated with the treatments are also prone to invasion (Korb et al. 2004). Annual grasses can invade treated areas if light levels are high enough, leading to increased likelihood of ignition, and more rapid spread of fire, which can further favor annual grasses (Mack and D'Antonio 1998). This type of feedback loop following the establishment of non-native plants may result in an altered fire regime for an impacted region, requiring extensive (and expensive) remedial action by land managers (Brooks et al. 2004).[30]

The authors of a study that analyzed fires in thinned and unthinned areas in Sierra Nevada forests noted:

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[28] Schoenagel, T., J.K. Balch, H. Brenkert-Smith, P.E. Dennison, B.J. Harvey, M.A. Krawchuk, N. Mietkiewicz, P. Morgan, M.A. Moritz, R. Rasker, M.G. Turner, and C. Whitlock. 2017. Adapt to more wildfire in western North American forests as climate changes. *PNAS*, 114(18):4582-4590. doi.org/10.1073/pnas.1617464114

[29] Graham, R.T., McCaffrey, S., and Jain, T.B. 2004. Science Basis for Changing Forest Structure to Modify Wildfire Behavior and Severity. General Technical Report RMRS-GTR-120. U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.

[30] Odion, Dennis. 2004. Declaration in NWEA v. Forest Service. *citing* Countryman, C. M. 1955. Old-growth conversion also converts fire climate. U.S. Forest Service Fire Control Notes 17:15-19.

> Thinned areas predominantly burned at high severity, while unthinned areas burned predominantly at low and moderate severity….
>
> …combined mortality was higher in thinned than in unthinned units.[31]

Hanson and Odion (2006)[32] went on to suggest that mechanical thinning may have "effectively lowered the fire weather threshold necessary for high severity fire occurrence." Furthermore, researchers with the U.S. Forest Service acknowledge the potential for thinning to create more intense conditions for surface fire spread:

> Theoretically, fuel treatments have the potential to exacerbate fire behavior. Crown fuel reduction exposes surface fuels to increased solar radiation, which would be expected to lower fuel moisture content and promote production of fine herbaceous fuels. Surface fuels may also be exposed to intensified wind fields, accelerating both desiccation and heat transfer.
>
> Treatments that include prescribed burning will increase nutrient availability and further stimulate production of fuels with high surface-area- to-volume ratios. All these factors facilitate the combustion process, increase rates of heat release, and intensify surface fire behavior….
>
> Thus, treatments that reduce canopy fuels increase and decrease fire hazard simultaneously. With little empirical evidence and an infant crown fire theory, fuel treatment practitioners have gambled that a reduction in crown fuels outweighs any increase in surface fire hazard….

A recent study also found that protected forests (those with more restrictions on logging activities such as those in the Proposed Action) had lower fire severity levels over a 30-year period (and across 1,500 fires), but they actually had *lower* fire severity levels despite being identified as having increased biomass and fuel loading compared to less-protected forests with more logging activities.[33]

Along these lines, a recent Ninth Circuit Court of Appeals decision for a case that involved an approved project that involved thinning in mixed-conifer forests states:

> Substantial expert opinion presented by the Appellants during the administrative process disputes the [U.S. Forest Service's] conclusion that thinning is helpful for

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[31] Hanson, C.T. and D.C. Odion. 2006. Fire severity in mechanically thinned versus unthinned forests of the Sierra Nevada, California. In: Proceedings of the 3rd International Fire Ecology and Management Congress, November 13-17, 2006, San Diego, CA.

[32] *Id.*

[33] Bradley, C.M., C.T. Hanson, and D.A. DellaSala. 2016. Does increased forest protection correspond to higher fire severity in frequent- fire forests of the western United States? *Ecosphere*, 7(10):e01492. doi: 10.1002/ecs2.1492

> fire suppression and safety…. Appellants thus have shown a substantial dispute about the effect of variable density thinning on fire suppression. [34]

Furthermore, the decision pointed to the agency's own fuels specialist report in discussing such activities' potential effects on fire spread:

> Importantly, even the Fuels Specialist Report produced by the [U.S. Forest Service] itself noted that "reducing canopy cover can also have the effect of increasing [a fire's rate of spread] by allowing solar radiation to dry surface fuels, allowing finer fuels to grow on . . . the forest floor, and reducing the impact of sheltering from wind the canopy provides."[35]

Additionally, significant scientific controversy exists surrounding the effectiveness of fuel breaks specifically, with many studies showing that they are ineffective under the extreme weather conditions that accompany most large fires in southern California. It should be noted that fires that occur under these conditions (i.e. strong winds) cause the vast majority of damage to communities in California.[36] In a review of fuel break effectiveness in four southern California national forests (including over 745 miles of fuel breaks in the San Bernardino National Forest alone) over a 28-year period, fuel breaks were found to be the least effective in the San Bernardino National Forest.[37] That study found that fuel breaks helped stop the spread of a fire only 29% of the time they were intersected by a fire.

Furthermore, the construction and maintenance of fuel breaks as well as maintenance of mechanically thinned areas may lead to an increase in invasive plants in the Project Area that, in turn, could spread to surrounding wildlands and communities. One fire scientist wrote:

> Fuel manipulation can contribute to invasion by exotic plants. For example, fuel breaks can act as invasive highways, carrying exotic species into uninfested wildlands. Normally destroyed by stand-replacing fires, exotic seed banks can survive the lower fire severities in fuel breaks, resulting in source populations poised to invade adjacent burned sites….
>
> Fuel manipulations such as fuel breaks can create favorable conditions for nonnative weeds, increasing their movement into wildlands and building seed sources capable of invading after fire.[38]

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[34] *Bark v. United States Forest Service*, 958 F.3d 865 (9th Cir. 2020)
[35] *Id.* at 10
[36] Jin, Y., M.L. Goulden, N. Faivre, S. Veraverbeke, F. Sun, A. Hall, M.S. Hand, S. Hook, and J.T. Randerson. 2015. Identification of two distinct fire regimes in Southern California: implications for economic impact and future change. *Environmental Research Letters*, 10:094005. doi:10.1088/1748-9326/10/9/094005
[37] Syphard, A.D., J.E. Keeley, and T.J. Brennan. 2011. Comparing the role of fuel breaks across southern California national forests. *Forest Ecology and Management*, 261:2038-2048. dx.doi.org/10.1016/j.foreco.2011.02.030
[38] Keeley, J.E. 2003. Fire and invasive plants in California ecosystems. *Fire Management*, 63(2):18-19.

Elsewhere, the same researcher states:

> Forests and shrublands, particularly in California, have had a long history of experimentation with different types of fuel breaks. They are constructed to create barriers to fire spread and to provide access and defensible space for fire-suppression crews during wildfires. These activities have the potential for creating suitable sites for alien plant invasion, and invasion is closely tied to the loss in overstory cover. In a recent study of 24 fuel breaks distributed throughout California, alien plants constituted as much as 70% of the plant cover and the proportion of aliens varied significantly with distance to roads, fuel break age, construction method, and maintenance frequency (Merriam et al. 2006). The association of alien species with fuel breaks raises two critical concerns. One is that the linear connectedness of these disturbance zones acts as corridors for alien invasion into wildland areas. Another is that these zones of reduced fuels produce lower temperatures and thus safe sites for alien propagules during wildfires, ensuring survivorship of seed banks (Keeley 2001, 2004b). Consequently, following fires these fuel breaks represent a major source area for alien invasion of adjacent wildlands.[39]

Invasive plants such as cheatgrass (*Bromus tectorum*)—which is present in the Project Area, particularly within the dozer lines opened during the Thomas Fire (Figure 7)—can alter fire regimes, fire behavior, ignition probability, and other aspects of wildfire risk as they become more prominent on the landscape.[40] This is especially true in chaparral ecosystems, but non-native plant invasion in forests—particularly following fuel treatments—is an increasing concern.[41]

Brooks et al. (2004)[42] noted in regard to the effect of invasive plants on fuel continuity:

> Horizontal fuel continuity can affect how wind moves across the vegetation canopy, which in turn can influence the rate of fire spread.

The authors also note that invasive plants can alter the fuel packing ratio:

> Changes in fuel packing ratios can either increase or decrease fuel flammability, depending on the optimal ratio for combustion of a given fuel type. For example,

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[39] Keeley, J.E. 2006. Fire management impacts on invasive plants in the western United States. *Conservation Biology*, 20(2):375-384. doi: 10.1111/j.1523-1739.2006.00339.x

[40] Brooks, M.L., C.M. D'Antonio, D.M. Richardson, J.B. Grace, J.E. Keeley, J.M. DiTomaso, R.J. Hobbs, M. Pellant, and D. Pyke. 2004. Effects of invasive alien plants on fire regimes. *Bioscience*, 54(7):677-688.

[41] Keeley, J.E. 2006. Fire management impacts on invasive plants in the western United States. *Conservation Biology*, 20(2):375-384. doi: 10.1111/j.1523-1739.2006.00339.x

[42] Brooks, M.L., C.M. D'Antonio, D.M. Richardson, J.B. Grace, J.E. Keeley, J.M. DiTomaso, R.J. Hobbs, M. Pellant, and D. Pyke. 2004. Effects of invasive alien plants on fire regimes. *Bioscience*, 54(7):677-688.

grass invasions into shrublands, or shrub invasions into grasslands, can change the fuel packing ratio, respectively increasing and decreasing the chance of fire.[43]

Thus, in the Project Area any shift to a greater abundance of invasive plants such as *B. tectorum* could increase the chance of fire occurring and the rate at which fire spreads. A large-scale study also found that non-native grass invasions can significantly alter fire regimes by increasing fire occurrence.[44]

A large evaluation of fuel treatments in chaparral in northern California found the following:

- In sites where understory vegetation is masticated and left on site**, fire behavior indices actually increased** in comparison to unmasticated fuelbeds under the tested parameters.
- Low intensity spring burns can be used to reduce surface fuel loading in masticated fuels, but mortality to residual vegetation may be high.
- Vegetation response to treatments is highly variable, and closely correlated with pre-existing condition.
- **Most exotic plant species are adapted to disturbances and will increase post treatment.**
- Treatments that retain greater levels of overstory shading and litter/surface cover greatly mitigate risk of increasing exotic plant cover.[45]

Other researchers similarly found that mastication of chaparral increase herbaceous cover fivefold, and that herbaceous fuels "are finer and more flammable, and they increase surface fuel depths as well as fuel continuity."[46] While the authors did not examine whether herbaceous plants that grew in masticated areas were native or non-native, other studies have found such treatments to increase the relative abundance of non-native, invasive species.[47]

Overall, the Proposed Action (which would involve mastication, mechanical thinning, and other ground-disturbing activities) is likely to increase non-native, invasive plant occurrence in the area, particularly *B. tectorum*. Opposite to the intended effect of decreasing wildfire risk, this

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[43] *Id.*

[44] Fusco, E.J., J.T. Finn, J.K. Balch, R.C. Nagy, and B.A. Bradley. 2019. Invasive grasses increase fire occurrence and frequency across US ecoregions. *PNAS*, 116(47):23594-23599. doi.org/10.1073/pnas.1908253116

[45] Bradley, T., J. Gibson, and W. Bunn. 2006. Fuels Management and Non-native Plant Species: an Evaluation of Fire and Fire Surrogate Treatments in a Chaparral Plant Community. Final Report to the Join Fire Science Program.

[46] Brennan, T.J. and J.E. Keeley. 2015. Effect of mastication and other mechanical treatments on fuel structure in chaparral. *International Journal of Wildland Fire*, 24(7):949-963. dx.doi.org/10.1071/WF14140

[47] Bradley, T., J. Gibson, and W. Bunn. 2006. Fuels Management and Non-native Plant Species: an Evaluation of Fire and Fire Surrogate Treatments in a Chaparral Plant Community. Final Report to the Join Fire Science Program.

could lead to more ignition-prone landscapes within the Project Area and may increase the rate of fire spread. And this concern is not limited to chaparral-dominated areas. Keeley (2006)[48] states in regard to fuel reduction projects in forests:

> There is growing evidence that these fuel reduction projects alter ecosystem structure in ways that promote alien plant invasion…. Restoration includes restoring not only natural processes such as fire but also natural structure through mechanical thinning of forests, and these practices also may enhance alien invasion. Extensive forest restoration is currently under way in many western U.S. ponderosa pine forests. These treatments alone or in combination with burning of slash increase both the diversity and abundance of alien plant species…

In light of the ongoing controversy surrounding the overall effectiveness of fuel breaks, and with the potential environmental impacts of fuel breaks in mind, we continue to believe that the U.S. Forest Service should focus its efforts on fuel treatments immediately adjacent to structures in the WUI. In fact, the U.S. Forest Service's own expert concluded:

> Effective fuel modification for reducing potential WUI fire losses need only occur within a few tens of meters from a home, not hundreds of meters or more from a home. This research indicates that home losses can be effectively reduced by focusing mitigation efforts on the structure and its immediate surroundings.[49]

Finally, the EA implies that the presence of dead or dying trees (especially associated with bark beetles) increases the risk of high-severity fire occurring in the Project Area. However, this is not borne out in the scientific literature. Bond et al. (2009)[50] found no evidence that pre-fire mortality influenced fire severity in coniferous forests in the San Bernardino Mountains. The authors note that their "results provide compelling evidence that when fire does occur, stands with considerable tree mortality due to drought and insects will not burn at higher severity than stands without significant tree mortality, either in the short or long term". Several other studies have found that area burned or the risk of fire occurrence does not increase following bark beetle outbreaks that cause significant tree mortality in conifer forests.[51] Furthermore, several

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[48] Keeley, J.E. 2006. Fire management impacts on invasive plants in the western United States. *Conservation Biology*, 20(2):375-384. doi: 10.1111/j.1523-1739.2006.00339.x

[49] Cohen, J.D. 1999. Reducing the Wildland Fire Threat to Homes: Where and How Much? U.S. Forest Service Gen. Tech. Rep. PSW-GTR-173 (Exhibit 3).

[50] Bond, M.L., D.E. Lee, C.M. Bradley, and C.T. Hanson. 2009. Influence of pre-fire tree mortality on fire severity in conifer forests of the San Bernardino Mountains, California. *The Open Forest Science Journal*, 2:41-47.

[51] Hart, S.J., T. Schoennagel, T.T. Veblen, and T.B. Chapman. 2015. Area burned in the western United States is unaffected by recent mountain pine beetle outbreaks. PNAS, 112(14):4375-4380. doi: 10.1073/pnas.1424037112

Meigs, G.W., H.S.J. Zald, J.L. Campbell, W.S. Keeton, and R.E. Kennedy. 2016. Do insect outbreaks reduce the severity of subsequent forest fires? doi:10.1088/1748-9326/11/4/045008 studies have found that bark beetle outbreaks (and the presence of dead trees) do not increase subsequent fire severity,[52] and that they may, in fact, reduce it under some circumstances.[53]

Thus, not only has the agency overstated its ability to reduce wildfire risk through the Proposed Action or mischaracterized the risks associated with certain factors such as bark beetles and dead trees, certain activities being proposed may in fact increase various aspects of wildfire risk in the Project Area.

2. **The Project may negatively impact California spotted owls and northern goshawks as well as their habitat.**

Current research indicates that fuel treatments may negatively impact CSOs. A study in 2014 examining the effects of establishing a network of fuel breaks on various species including the California spotted owl found, in response to fuel treatments:

> …the number of California spotted owl territories declined. The effects on owls could have been mitigated by increasing the spatial heterogeneity of fuel treatments....[54]

While the Project Area has not been impacted by recent fires, the agency's aim to prevent particular fire effects in the future could negatively impact CSO habitat. Research suggests that recently-burned areas can provide suitable habitat for California spotted owls. For example, a 2015 study found that:

> Based on this and other studies of Spotted Owls, fire, and logging, we suggest land managers consider burned forest within and surrounding [protected activity

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[52] Kulakowski, D. and T.T. Veblen. 2007. Effect of Prior Disturbances on the Extent and Severity of Wildfire in Colorado Subalpine Forests. *Ecology*, 88(3):759-769.
Harvey, B.J., D.C. Donato, W.H. Romme, and M.G. Turner. 2013. Influence of recent bark beetle outbreak on fire severity and postfire tree regeneration in montane Douglas-fir forests. *Ecology*, 94(11):2475-2486.
Harvey, B.J., D.C. Donato, W.H. Romme, M.G. Turner. 2014. Fire severity and tree regeneration following bark beetle outbreaks : the role of outbreak stage and burning conditions. *Ecological Applications*, 24(7) :1608-1625.
Andrus, R.A., T.T. Veblen, B.J. Harvey, and S.J. Hart. 2016. Fire severity unaffected by spruce beetle outbreak in spruce-fir forests in southwestern Colorado. *Ecological Applications*, 26(3):700-711.

[53] Meigs, G.W., H.S.J. Zald, J.L. Campbell, W.S. Keeton, and R.E. Kennedy. 2016. Do insect outbreaks reduce the severity of subsequent forest fires? doi:10.1088/1748-9326/11/4/045008
Sieg, C.H., and R.R. Linn, F. Pimont, C.M. Hoffman, J.D. McMillan, J. Winterkamp, and L.S. Baggett. 2017. Fires following bark beetles: factors controlling severity and disturbance interactions in ponderosa pine. *Fire Ecology*, 13(3). doi: 10.4996/fireecology.130300123

[54] Stephens, S.L., S.W. Bigelow, R.D. Burnett, B.M. Collins, C.V. Gallagher, et al. 2014. California spotted owl, songbird, and small mammal responses to landscape fuel treatments. *BioScience*, 64(10):893-906.

> centers (“PACs”)] as potentially suitable California Spotted Owl foraging habitat when planning and implementing management activities….[55]

This in combination with the results of other studies[56] indicate that California spotted owls may be able to thrive in post-fire landscapes and that fuel treatment may have a negative impact on spotted owl communities.

The U.S. Forest Service has also identified vegetation removal and human disturbance as two of the primary factors threatening the viability of spotted owls according to its species account, likely due to its complex habitat needs. The agency’s species account for the CSO highlights the species’ need for complex habitat in Southern California mountains:

> California spotted owl habitats are consistently characterized by greater structural complexity compared to available forest habitat….
>
> - Canopy closure of at least 60 and commonly greater than 70 percent.
> - A mature overstory with average **[diameter at breast height (“DBH”)] exceeding 24 inches**.
> - A densely stocked stand with basal areas averaging in excess of 190 ft^2, **with none less than 160 ft^2**.
> - Much of the basal area in the overstory and mid-story, with stands having an average of 10 trees exceeding 26 inches DBH and 29 trees of 16 to 26 inches DBH per acre.
> - Multi-layered stands, often having hardwood understories.
> - Decadent stands containing large diameter snags, trees with broken tops, diseased trees in which cavities frequently form, and large diameter fallen trees.[57]

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[55] Lee, D.E. and M.L. Bond. 2015. Occupancy of California spotted owl sites following a large fire in the Sierra Nevada, California. *The Condor*, 117(2):228-236.

[56] Bond, M.L., D.E. Lee, R.B. Siegel, and J.P. Ward Jr. 2009. Habitat use and selection by California spotted owls in a postfire landscape. *The Journal of Wildlife Management*, 73(7):1116-1124.

Lee, D.E. and M.L. Bond. 2015. Occupancy of California spotted owl sites following a large fire in the Sierra Nevada, California. *The Condor*, 117(2):228-236.

Hanson, C.T., M.L. Bond, and D.E. Lee. 2018. Effects of post-fire logging on California spotted owl occupancy. *Nature Conservation*, 24:93-105. doi: 10.3897/natureconservation.24.20538

Lee, D.E. 2020. Spotted Owls and forest fire: Reply. *Ecosphere*, 11(12):e03310.

Hanson, C.T., D.E. Lee, and M.L. Bond. 2021. Disentangling post-fire logging and high-severity fire effects for Spotted Owls. *Birds*, 2:147-157. doi: 10.3390/birds2020011

[57] U.S. Forest Service. 2005. Species Account—California Spotted Owl. (emphasis added)

The U.S. Forest Service completed the *Conservation Strategy for the California Spotted Owl (*Strix occidentalis occidentalis*) on the National Forests of Southern California* ("CSO Conservation Strategy") in 2004. The CSO Conservation Strategy presents the following guidelines for fuels management activities outside of the WUI Defense or Threat Zones on national forest land characterized by pine and mixed conifer forest:

- Where treatments have to occur in PACs and [home range core areas ("HRCs")], retain existing canopy closure in the PAC and 40 to 50 percent canopy closure in the HRC. In PACs, use understory treatments to remove ladder fuels rather than altering canopy closure….
- Retain the largest trees within PACs and [home range cores ("HRCs")], **including all live trees greater than 24 inches DBH**, unless they are at unnaturally high densities. Exceptions allowed for operability.
- Within PACs and HRCs, retain 4 to 8 of the largest snags available per acre, or at least 20 ft^2 basal area per acre of snags greater than 15 inches DBH and 20 feet tall.
- Within PACs and HRCs, retain at least 9 down logs per acre of the largest logs available, ideally at least 12 inches in diameter and at least 20 feet long (at least 180 lineal feet of logs).
- During mechanical fuel treatment activities, retain all woodrat nests in spotted owl habitat; avoid disturbing/destroying them. Exceptions allowed for operability.[58]

The Project would reduce yellow pine and mixed-conifer stands to between 60 and 80 ft^2 basal area per acre—well below the basal area per acre needed by CSO as described in the species account mentioned above (i.e. > 160 ft^2 basal area per acre). Additionally, the Project would allow cutting of trees greater than 24 inches DBH.

The Project does not align with the CSO Conservation Strategy for several reasons. Trees greater than 24 inches DBH within HRCs will be removed. Additionally, the EA cites Land Management Plan Standard S14 when discussing retention of logs and snags. That standard indicates that 10 to 15 hard snags may be retained per five acres or about two to three per acre on average—significantly less than the recommended 4 to 8 per acre. However, that same standard states that there can be "[e]xception allowed in Wildland/Urban Interface Defense Zones, fuelbreaks, and where they pose a safety hazard."[59] This indicates that the Project may

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[58] U.S. Forest Service. 2004. Conservation Strategy for the California Spotted Owl (*Strix occidentalis occidentalis*) on the National Forests of Southern California.

[59] U.S. Forest Service. 2005b. Land Management Plan Part 3: Design Criteria for the Southern California National Forests. R5-MB-080. See S-14

remove all dead and downed material from forested treatment areas since it would fall under the “exception” to the standard as it is labeled as a fuel break. Finally, the Proposed Action does not include any measures to retain woodrat nests in the Project Area.

The presence of these guidelines in the CSO Conservation Strategy indicates that the U.S. Forest Service has determined or is aware that impacts to CSOs could occur if such guidelines are not followed. Therefore, the Project may have significant impacts on CSOs as the Proposed Action does not follow these guidelines. Again, due to this likelihood of significant impacts to CSOs, the U.S. Forest Service must prepare an EA to determine the degree to which the Proposed Action may affect this Sensitive species.

The Proposed Action may significantly impact the northern goshawk habitat in the Project Area. According to the U.S. Forest Service’s species account prepared with the Land Management Plan of 2005:

> When foraging, northern goshawks utilize a wider range of forest types and conditions, but most populations still exhibit a preference for high canopy closure and a high density of larger trees…. Large snags and downed logs are believed to be important components of northern goshawk foraging habitat because such features increase the abundance of major prey species (Reynolds and others 1992).[60]

However, the Proposed Action would significantly lower tree density, including that of larger trees as well as large snags and downed logs. The CDFW species account similarly states:

> Goshawks forage in mature and old-growth forests that have relatively dense canopies…[61]

Moreover, the CDFW account states:

> Uncertainty exists regarding the effects of proposed timber harvest and fuels management strategies on goshawk habitat quality at the home range and landscape scales.[62]

This uncertainty as to the Project’s degree of effect on California spotted owls and habitat triggers the “extraordinary circumstance” threshold, requiring the U.S. Forest Service to prepare an EA or EIS that analyzes the Project’s potential impacts to the species based on pre-decisional focused protocol surveys in the area.

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[60] U.S. Forest Service. 2005. Species Account—Northern goshawk.
[61] *Id.* pg. 159
[62] *Id.* pg. 160

Thank you for this opportunity to provide comments on the Project. Please provide us with all future public notices, environmental documents, and decision documents related to this project.

Sincerely,

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Figure 1. Table showing overall mortality from thinning plus bark beetles adapted from Fettig et al. 2012.