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Subject: Wishon Project Scoping Comments for Sequoia ForestKeeper and the Kern-Kaweah Chapter of the Sierra Club

Sequoia ForestKeeper (SFK) and the Kern-Kaweah Chapter of the Sierra Club (SC) thank you for the opportunity to comment.

Background and Summary of Comments

The Western Divide Ranger District is planning the Wishon Project in and around the Alder Creek Giant Sequoia Grove and several private inholdings just to the north of Camp Nelson, entirely within the Giant Sequoia National Monument. The District is proposing to fell trees on 2,550 acres, which includes commercial logging on 1,150 acres of those acres, allowing the removal of live trees up to 20 inches in diameter. On the remaining 1,400 acres, the District proposes to fell and leave the trees, as well as pile and burn them.

This following summary is not all-inclusive, and the Forest Service should also consider our full comments and the referenced scientific studies in its analysis and response.

Tree Removal is Not be Permitted: SFK and SC object to the removal of felled trees from the Wishon Project area and the Giant Sequoia National Monument because tree removal is not clearly needed for ecological restoration and maintenance or public safety. When the felled trees are properly treated similar to felled trees in areas where no tree removal is proposed, the District cannot justify their removal. And because the Monument Plan's decision tree requires the Forest Service to first consider mechanical treatments without removal, the District must drop their proposal to allow the sale and removal of felled trees from the Wishon Project area.

The Wishon Project is, in many ways, similar to the Tule River Reservation Protection Project (TRRPP) just to the south of Camp Nelson, in which the Forest Service has proposed and is now implementing a community protection project without tree removal. It is also similar to the Ponderosa Project where no trees were removed. Both projects, located in the same District, used 12 inch diameter limits to treat standing fuels without the need to remove trees. There is no reason why this approach could not work equally well in the Wishon Project area.

A Full EIS is Required: And because the Wishon Project would likely have a greater impact than the TRRPP, the Forest Service must prepare an EIS. As proposed, the Wishon Project at 9,720 project area acres and 2,550 treatment acres is much larger than the TRRPP, for included only 1,410 acres of treatments and no tree removal, but for which the District prepared an EIS. The Wishon Project is similar in size and would have similar impacts as the Tobias Project (11,000 project area acres, 4,898 treatment acres) and Summit Project (10,000 project area acres, 2,500 treatment acres), both of which require the preparation of an EIS. Moreover, the Wishon Project is similar to Tobias and Summit in the types of impacts on sensitive species, including the Pacific fisher, California spotted owl,[1] Northern goshawk, and the Federally-endangered mountain yellow-legged frog.

Multiple Alternatives Must be Considered: Similar to the Summit Project, the full EIS analysis should include at least multiple alternatives to comply with NEPA and legal settlements. First, the proposed action/preferred alternative should be changed to a non-commercial proposal with a smaller diameter limit, similar to the TRRPP and Ponderosa projects. Other alternatives should include the currently-proposed action, another non-commercial alternative with a 20-inch diameter limit, and finally, an alternative that implements the new "*Draft Interim Recommendations for the Management of California Spotted Owl Habitat on National Forest System Lands 29 May 2015*," as required by the settlement agreement in *Sierra Forest Legacy, et al. v. Bonnie*, No. 13-16105, Dkt. ## 15, 16, pp. 5 (9th Cir. Oct. 9 & 20, 2014, respectively).

All of the alternatives must be consistent with the recently-proposed *Southern Sierra Nevada Fisher Conservation Strategy* (Fisher Conservation Strategy), since the Wishon Project is entirely within the Southern Sierra Pacific Fisher Conservation Area. The Southern Sierra Pacific Fisher is listed by the State of California as a threatened species under the California Endangered Species Act. In 2014, the U.S. Fish and Wildlife Service proposed listing the West Coast population of the Pacific fisher as a threatened species under the Endangered Species Act (ESA). It, however, declined listing the fisher across the entire West Coast range. It also declined to list the fisher in the Southern Sierra Nevada Mountains, even though only about 300 individual fishers remain in an isolated population, constituting the southern-most extent of the fisher's range. It likely did so only because it assumed that the Forest Service would require each National Forest to strictly follow the Fisher Conservation Strategy.

Detailed Comments

1. Scoping should be redone when the Forest Service can provide sufficient information for the public to provide meaningful comments.

Even though SFK and SC are sophisticated participants in the public NEPA process, we do not have sufficient information to provide more specific meaningful comments. NEPA requires that the agency analyze impacts in comparison to an accurate determination of baseline data, such that the Forest Service adequately and accurately describes the "affected environment." 40 C.F.R. § 1502.15. The necessary baseline data to justify the proposed action must first be

[1] The U.S. Fish and Wildlife Service (FWS) recently found that listing petitions for the CSO presented substantial scientific or commercial information indicating that the Endangered Species Act (ESA) listing may be warranted. 80 Fed. Reg. 56423, 56426 (Sept. 18, 2015).

provided in a meaningful form to the public before the Forest Service can actually craft its proposed action. Without this level of accurate information, we are having a difficult time providing meaningful comments that adequately respond to the proposal and the purpose and need for the project.

First, the District should disclose that other projects would have cumulative effects on sensitive wildlife, including the TRRPP, Frog, Tobias, Summit, Summit CE, Ice Tractor, White River, Saddle, Ice Helicopter, Rancheria, Red Mountain, and other projects we have not listed.

The cumulative effects analysis should consider effects on Townsend's big-eared bat, ring-tailed cat, Pacific fisher, northern flying squirrel, mountain quail, California condor, golden eagle, sharp-shinned hawk, northern goshawk, great gray owl, California spotted owl, black-backed woodpecker, pileated woodpecker, gregarious slender salamander, Greenhorn Mountains slender salamander, yellow-blotched ensatina, southern mountain yellow-legged frog, foothills yellow-legged frog, Blainville's horned lizard, Sierra night lizard, southern rubber boa, western bumble bee, Piute cypress, southern honeysuckle, Tulare cryptantha, Kern County larkspur, Greenhorn fritillary, tube flower bluecup, Munz's iris, gray-leaved violet, three bracted onion, Shirley meadows star tulip, forget-me-not popcornflower, and slender leaved ipomopsis.

Second, scoping should also be redone to disclose the location of California spotted owl (CSO) Protected Activity Centers and other habitat areas where they may overlap Wishon treatment units based on the new draft owl management recommendations. This information should have been disclosed in scoping and depicted on the scoping map. Due to the sensitivity of this information, we request that the Forest Service redact information about CSO nest trees before releasing the PAC maps to the public.

Third, scoping should also be redone after the Forest Service discloses that some of the units are located within a potential wilderness area. The Forest Service must provide the public with information about the potential wilderness area that overlaps the project area. This information is not disclosed or depicted on the project map, nor is it mentioned in the scoping narrative. Several units are clearly located in the recently-inventoried potential wilderness area described as Polygon 173 (South of Wishon) and depicted in the Forest Service's 2015 inventory and described in the attached map and narrative. *See* Exhibit A – South of Wishon, Polygon 173. Any environmental analysis must consider and analyze the effects from the various project activities on the potential wilderness values of this area.

2. The Forest Service must specifically consider the recent *Southern Sierra Nevada Pacific Fisher Conservation Strategy* in its analysis.

In February 2016, a Forest Service-sanctioned team of researchers and managers released a final version of the *Southern Sierra Nevada Pacific Fisher Conservation Strategy* (Fisher Conservation Strategy). This strategy and the accompanying Conservation Assessment represent the best available scientific information, which must be considered and incorporated into the design of the Wishon Project. *See* Fisher Conservation Strategy, attached as Exhibit A.

The Fisher Conservation Strategy includes specific direction for fisher habitat management in the Southern Sierra Pacific Fisher Conservation Area. The Fisher Conservation Strategy will also be used to inform the forest plan revision for the Sequoia National Forest. *See Sierra Forest Legacy, et al. v. Bonnie*, No. 13-16105, Dkt. ## 15, 16, p. 3 (9th Cir. Oct. 9 & 20, 2014, respectively) (attached as Exhibit C). Because of its scope, and because the entire Sequoia National Forest includes habitat for Pacific fishers, this strategy must also be considered in the Giant Sequoia National Monument.

The importance of the southern-most habitat of the fisher, where the Wishon Project is located, cannot be overstated because it contains the highest occupancy rates, greatest genetic diversity, and best average habitat quality for the fisher in the Sierras. The Fisher Conservation Strategy on page 14 delineates this area as "Core 2" and describes it as follows:

> Core 2 includes the southwestern tip of the Sierra Nevada and Greenhorn Mountains—between the Kern River and Bear Creek in the Tule River watershed—mostly on Sequoia National Forest and Giant Sequoia National Monument (Figure 3). It has the highest recorded fisher occupancy rates (Zielinski et al. 2013a), highest predicted average habitat quality (Table 1), and highest genetic diversity (Tucker et al. 2014) in the Assessment Area. Genetic patterns suggest this area may have served as a refuge for fishers following European settlement—perhaps due to steep terrain that limited human impacts compared to other areas (Beesley 1996)—and the population may have re-expanded northward from this area during the 20th century.
>
> Zielinski et al. (2004a) found fishers to have smaller home ranges in Core 2 than in other regions, which they suggested may be due to high quality habitat (dense mixed-coniferous forests, large trees, and abundant black oak). Statistical analysis of female home range composition shows that home ranges in the high-quality habitat in the western portion of Core 2 have higher average tree basal area, greater black oak basal area, greater diversity of tree diameter classes, more dense (>70%) canopy cover, and a greater coverage of high-value fisher CWHR (California Wildlife Habitat Relationships) reproductive habitat than home ranges in Cores 4 and 5. These results probably reflect the greater availability of old-forest habitat conditions from which fishers can select home range areas, compared with other cores.
>
> This core may be less in need of fisher habitat restoration than others, but management should help maintain habitat resiliency, ideally using fire as a natural process. Much of the core is within the Giant Sequoia National Monument and Golden Trout Wilderness, where current management calls for restoration of essential ecological processes and patterns that enhance forest ecosystem resilience to stressors (e.g., uncharacteristic wildfire, climate change) and protect or enhance high-value wildlife habitat. Management treatments include the use of prescribed fire, wildfire managed for resource objectives, or mechanical treatments to increase resiliency and help restore fire as an ecological process.

3. The Forest Service must not only include a specific alternative for CSO management, it must also use the new CSO management recommendations to inform all alternatives, not just a single alternative.

The Sierra Nevada Framework settlement agreement also requires that "any environmental impact statement or environmental assessment prepared for a site-specific, vegetation management project within the range of the California spotted owl in the Sierra Nevada National Forests, for which public notice of scoping is published after receipt of the recommendations described in paragraph 4, shall include and analyze an alternative consistent with (a) the recommendations described in paragraph 4 or (b) the final CASPO Strategy." *Sierra Forest Legacy, et al. v. Bonnie*, No. 13-16105, Dkt. ## 15, 16, pp. 5-6 (9th Cir. Oct. 9 & 20, 2014, respectively) (attached as Exhibit C1). The CSO management recommendations are attached as Exhibit C2.

And while the settlement agreement states that the Forest Service must craft an alternative in its proposed vegetation management projects, the CSO management recommendations or CASPO Strategy must inform the environmental analysis for all the alternatives because they represent the most recent and best available scientific information about habitat conservation and management for the CSO.

NEPA requires agencies to "insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." 40 CFR 1502.24. These NEPA regulations encourage accuracy in presenting scientific data and analysis in the environmental impact statement. 40 CFR 1500.1(b), 1500.4, and 1502.24. At a minimum, an agency must "identify any methodologies used and make explicit reference by footnote to the scientific and other sources relied upon for conclusions" in the EIS (40 CFR 1502.24).

4. Thresholds of logging, thinning, and restorative treatments should not exceed, on average, 2.6% of Pacific fisher habitat per year.

According to the Zielinski et al. (2013b) Fisher Tolerance Study (*see* Exhibit C, hereto), fisher occupation of larger habitat areas begins dropping quickly when logging, thinning, and restorative treatments, which include fuel reduction thinning, prescribed fire, or pre-commercial (hand) thinning, exceed a rate of about 13% over a 5 year period, or an average of about 2.6% of the overall habitat area per year. Fisher use was lowest in habitat areas where the rate of treatments was only slightly higher; that is, when 3.5% of the area has been disturbed each year. In other words, as the rate of treatments increases from 2.6% per year, the fisher's use of the larger habitat area declines, with data showing the lowest habitat use when an area was treated at 3.5% per year or 17.5% over a 5-year period.

The cumulative treatments from the Wishon Project will likely exceed this threshold, putting fisher habitat and fisher use of the project area at risk.

The types of treatments proposed in the Wishon Project are referred to in Zielinski et al. (2013b) (Exhibit D) as restorative, which include fuel reduction thinning, prescribed fire, or pre-commercial (hand) thinning. Zielinski et al. (2013b) suggest that fishers occupy habitat at the

highest rates where restorative treatments "are applied at rates that do not exceed about 13% of an area in 5 years …." or 2.6% per year. See p. 825. Zielinski et al. (2013b) noted that although fishers showed no aversion to including treated areas within their home ranges, Garner (2013) (Exhibit E, hereto) found that "fishers avoided using treated areas when resting and foraging." *Id.*

The Fisher Conservation Strategy specifically references and incorporates the Zielinski et al. (2013b) Fisher Tolerance Study in its management recommendations:

> Design treatments to keep affected management grid cells in suitable fisher habitat condition *and* limit disturbance from mechanical treatments to <13% of the affected cells over a 5-year period (Zielinski et al. 2013b) or <25% over a 10-year period, unless treatments will not fragment fisher core or linkage areas and will better meet fisher conservation objectives. In areas at highest risk of severe fire in critical locations, up to 30% of the area may be treated over a 5-year period or up to 50% in a 10-year period, so long as the retention guidelines in Section 4.5.3 are adhered to and fisher core or linkage areas are not fragmented.

The treatments for the Wishon Project, if carried out over a 5-year or shorter period are likely to exceed the 2.6% average annual treatment threshold, and therefore the proposed treatments "may put fisher habitat and fisher use of these areas at risk." Zielinski et al. (2013b). The Forest Service must therefore rethink its course of treatments in the Wishon Project area.

The following analysis includes only the Wishon Project treatment acres, and the District must also consider other adjacent projects, such as the TRRPP, in its detailed cumulative impact analysis. We don't have detailed information of the location of the management grid cells discussed in the Fisher Conservation Strategy, so we are using the overall project size instead to determine whether the Wishon Project exceeds the recommended thresholds. Conservatively, we have assumed that the entire Wishon Project area is considered fisher habitat. As described in the project proposal, the Wishon Project includes 2,550 acres of restorative treatments (fuel reduction thinning & prescribed burning) or commercial thinning within the project area. The total project area is roughly 9,720 acres.

If the project is implemented over 5 years, then roughly 26% (2,550/9720 acres) of the fisher's habitat will be affected over that 5-year timeframe, which amounts to 5.2% annually or double the rate that fishers tolerate. The project must either be implemented at a much slower rate (say over 10 years), or it must be reconfigured so fishers can tolerate the project's activities.

And even though we have included a short and simple analysis based only on the information we have at the time to estimate the projects' effects on fishers' tolerance, the District must do a much more precise analysis. Because the District has all the information (and we don't), it must prepare this analysis to ensure its scientific accuracy and integrity, as required by NEPA.

5. <u>The Giant Sequoia National Monument Plan precludes the sale and removal of trees from the Wishon Project area.</u>

Just like any other project in the Monument, the Wishon Project must use the "Decision Tree" before the Forest Service can consider removing trees from the Monument. Mechanical treatments without removal would be effective in implementing the Wishon Project, and therefore the Monument Plan's Decision Tree precludes the removal of trees.

While managed wildfire or prescribed fire will likely not achieve the purpose and need of the Wishon Project as currently proposed, the District can implement the project using mechanical treatments without tree removal. According to the Monument Plan,

> [m]echanical treatment with tree removal (Box #4) will only be considered if other methods do not meet ecological objectives in the project purpose and need. Additional analyses of the risks and hazards of leaving the trees in the Monument, the effectiveness of the treatment, and feasibility must show that mechanical treatment with tree removal is clearly needed to reduce the risk to acceptable levels, make the project effective in meeting restoration and protection objectives, and make it feasible. Only by meeting these criteria, would tree removal be used as part of a viable project.

Monument Plan at 84.

For Wishon, as with the Tule River Reservation Protection Project, project analysis will show that the project's ecological objectives in the project's purpose and need can be met without tree removal. In fact, because the District is required prepare a viable non-commercial project as an alternative that achieves the Wishon Project's purpose and need, mechanical treatment without removal must become the final choice to implement the project.

The Wishon Project scoping notice on p. 3 describes tree felling and removal as follows:

> On about 2,550 acres, live trees up to 20 inches in diameter at breast height (dbh) would be felled. Forest [sic] On approximately 1,150 acres, trees would be sold and removed using mechanical equipment (such as skidders and loaders). Other trees and vegetative material within the 1,150 acres would be hand piled then chipped or burned. Tree felling and piling and burning by hand would occur on 1,400 acres where slopes are steeper. Existing ground fuels would be piled and burned where needed to meet desired conditions.

In other words on the 1,400 acres where trees are not proposed for sale or removal, the Forest Service can achieve the project's purpose and need without tree removal. Similarly, the Forest Service should be able to achieve the project's purpose and need without tree removal on the other approximately 1,150 acres. The map does not make clear where the Forest Service intends to sell and remove trees. As a threshold matter, the scoping notice fails to explain why mechanical treatment with tree removal is clearly needed to achieve the project's purpose and need on those 1,150 acres and why it can achieve it without tree removal on the remaining 1,400 acres.

6. The proposal should eliminate the construction of fuel breaks 600 feet wide along ridgelines.

The District fails to explain how the proposed 600-ft wide massive fuel breaks along four ridgelines will help achieve the purpose and need of the project. The width of these fuel breaks is unprecedented and would have significant adverse effects on wildlife habitat. Moreover, the proposal to shred and chip the material in the fuel break could potentially make matters worse by putting more fine fuels on the forest floor (see discussion below about mastication and its adverse effects on fire behavior and soils).

For comparison, most fuel breaks in the TRRPP were only 150-200 feet wide, with the exception of the 300 ft. wide break on the eastern project boundary and a 400 ft. wide break along the western boundary. These wider breaks were along roads and not on ridge lines. The proposal also does not state whether the proposed fuel breaks would be shaded.

7. Areas around Giant Sequoia groves have higher mean down woody material, so reducing levels to standard there is unwarranted.

Because of the size of trees in and around Giant Sequoia Groves, the size and amount of large down woody material is inherently greater in these areas. Therefore, removing or reducing downed woody material to achieve the minimum large down log standards specified in the plan is unwarranted.

8. Masticating 77 acres of brush by 75% is unwarranted.

The District proposes, on approximately 77 acres, to reduce continuous brush stands by cutting and piling approximately 75 percent of the brush material using a masticator to shred the material. In the TRRPP mastication was proposed but dropped because it was infeasible, and out of concerns that mastication can inhibit the natural germination of plants, which would interfere with the restoration of plantations back to their natural conditions, and concerns about the ability and effects of using fire after mastication: could fire be used after mastication, how fire would behave, how hot would it burn (see below). These concerns apply equally to the Wishon proposal.

In 2008, the Forest Service published a paper about the effects of the American River Complex fire on forest stands in the Tahoe National Forest resulting from various treatments. One of the main findings of this study was that mastication without the subsequent treatment of fine fuels could have severe effects that may result in 100% mortality of the remaining trees in a subsequent fire. It explained:

> Mastication does not remove fuels from the site, but redistributes them (Figure 19). By design, mastication reduces the ladder fuel effect but increases surface fuels. Until the masticated fuels decompose, they are also much drier and more easily ignited than live fuels. The American River Complex burned early in the fire season, and primarily under moderate weather conditions, when fuel moistures were still relatively high. As a result, live shrubs and hardwoods were

> resistant to burning, and even masticated units may have provided some resistance to fire (although this was probably at least partly due to the shrubby live fuels on site). However, under the more severe fire weather conditions encountered on July 9, masticated fuels proved no barrier to fire spread and tree mortality in the masticated stands was 100%. The fact that these masticated units performed so poorly under early season conditions suggests that caution should be used in their implementation, especially in areas of long summer drought like the Sierra Nevada. It is recommended that readers consult Stephens and Moghaddas (2005, *For. Ecol & Mgt.*, vol. 215:21-36) and Knapp et al. (2008, Final Report, Joint Fire Science Program Project 05-2-1-20) for results of scientific trials and fire modeling which call into question the advisability of using masticated treatments alone (i.e., without further treatment) in Sierra Nevada mixed conifer forest. In the Stephens and Moghaddas (2005) study, a comparison of different treatment techniques showed that masticated treatments supported the highest rates of spread, fireline intensities, flame lengths, and levels of tree mortality (even higher than or equal to the untreated control) under 80th and 90th percentile weather conditions. In the Knapp et al. (2008) study, modeled wildfire in 10 different masticated units in northern California resulted in >95% tree mortality under only 80th percentile weather conditions.

Safford et al. (2008) at 20.

9. Ecological restoration principles suggest felling only small diameter trees and treatments without tree removal.

The Wishon Project should not place too much reliance on only mechanical methods for ecological restoration and maintenance. Instead, after mechanical or hand pre-treatments of small diameter material, fire should be the primary tool for restoring ecological conditions, as suggested in both the CSO and Fisher Conservation Strategies. Moreover, the project should not overstate the need for ecological restoration to create resiliency from drought, and native insects and diseases, which are natural processes that should be preserved rather than eliminated. These natural processes create the habitat that the most sensitive species need more of, including many large snags and large down logs.

Thinning of medium diameter trees (12-20" DBH) should not be permitted for the purpose of ecological restoration to prevent natural stresses from competition. Tree competition, caused primarily by increases in stand density, is a natural process which induces other natural process that deal with this density, such as native insect- and disease-caused tree mortality. These processes, in turn, produce structural forest elements that are vital for wildlife—snags. While cutting and/or removing trees to reduce this natural competition may prevent the death of a small number of large trees, it also prevents the creation of some of the most important elements in the forest ecosystem—snags—for the perpetuation of certain wildlife species, including California spotted owls, California condor, various woodpeckers, and countless other species. It is well-documented that these species need abundant large snags at certain densities in order to thrive. Even the artificial method of increasing the number of snags by girdling trees will not create as diverse a variety of snags for these species as natural snag recruitment.

The proposed action promotes resilience as a goal. But it is important to understand that resilience is not a process. Instead, it is a characteristic, which results from the continued perpetuation of natural processes, including competition. The perpetuation of the forest ecosystem is not the same as the perpetuation of the lives of all of the larger trees in that ecosystem. This means that we need some of these large trees to die at a rate that can sustain certain wildlife species. Competition mortality will result in large snag recruitment beyond what silviculturalists may want in a forest that is "managed" to produce maximum growth.

Even if the project allows cutting a few of the larger trees for ecological restoration or to reduce safety hazards along roads, these tree boles should be retained in the forest as large standing or down woody material. Ecological restoration provides an opportunity to restore forest areas with large down woody material for wildlife (especially for Pacific fishers), soils, and to maintain ecological functions.

Leaving a large number of downed logs will not increase fire risk. The Forest Service's own science clearly concludes that large logs (defined by the 2001 Sierra Nevada Forest Plan Amendment as being over 12 inches in diameter) are essentially irrelevant to fire behavior. And tree boles over 12 inches in diameter that the agency needs to fell for ecological restoration would not create any significant fire hazard. Operability for prescribed fire management should not be an issue when leaving these large tree boles as down logs. In fact, the 2004 Framework standards take large down logs into consideration, stating that managers should design prescribed burn prescriptions and techniques to minimize the loss of large down material.

The Forest Service should use the reintroduction of fire as the primary tool for ecological restoration and prohibit the thinning of larger trees to reduce fire risk (see more discussion about the science of fuel reduction below). The agency should limit manual or mechanical methods that prepare the forest for the reintroduction of fire to the cutting of only some trees 8-10 inches DBH and smaller. As the adjacent Sequoia and Kings Canyon National Parks ("SEKI") has found, "cutting trees up to and including 8" in diameter has proven effective in fuels reduction in SEKI." Moreover, the Sequoia National Forest has found that limiting tree cutting to 12 inches in diameter in the Giant Sequoia National Monument is adequate to protect communities. *See*, e.g., the Ponderosa and Tule River Reservation Protection Project. After fire is reintroduced into these stands, natural processes can perpetuate, making future thinning applications for ecological maintenance unnecessary.

Although we prefer a diameter limit of 8-10 inches, the Forest Service must consider an alternative that limits tree cutting to 12 inches in diameter, which the Western Divide Ranger District has found to be effective in reducing fuels and increasing resiliency in the adjacent Monument. *See, e.g.*, the Tule River Reservation Protection Project. That project has a similar-enough purpose and need to require detailed analysis of a 12-inch DBH limit alternative for the Wishon Project. Of course, these diameter limits should be lowered in CSO PACs and home ranges and treatments should retain sufficient densities of much small trees for maintenance of Pacific fisher and goshawk habitat.

Restoration projects to restore resilience must take a different approach, and should not repeat the mistakes of past management where thinning for fuel reduction and removal of timber or biomass have driven project design. In fact, North et al. (2009) states that the removal of trees over 10-16 inches in diameter is done primarily "for socioeconomic purposes" such as "generating revenue" or "providing merchantable wood for local sawmills."

Here, only smaller trees need to be felled do not need to be removed to restore resilience. A mosaic of seral change from well-managed prescribed fire will foster resilience, especially in light of climate change. Moreover, tree removal requires mechanized equipment, resulting in increased soil bulk density and greater erosion, setting back restoration.

10. A Priority for the Wishon Project, as a principle of ecological restoration, should be to maximize improving Pacific fisher (and CSO) habitat without habitat degradation.

Snags and downed logs are some of the most important habitat elements for Pacific fishers. Zielinski et al. (2006 [Table 2]) found that fishers selected sites with 15.4 large snags (over 38.1 cm in diameter, or over 15 inches in diameter) on average per 0.5 hectares, or about 12.5 large snags per acre, within Sierra and Sequoia National Forests, including within the Giant Sequoia National Monument. Using the U.S. Forest Service's own Forest Inventory and Analysis (FIA) fixed plots to determine the average snag density across the forested landscape within the fisher's range in Sequoia and Sierra National Forests, Zielinski et al. (2006) found that there were only about 8.7 large snags per acre on average—well below the level selected by fishers.

But the proposed action includes commercial thinning, which would eliminate the very habitat elements that fishers need over the long term. The EIS and Wildlife BE must analyze the impacts of repeatedly thinning for the express purpose of preventing medium/large snag recruitment from fire and insects. Moreover the EIS and BE must divulge whether the current basal area levels of medium/large snags in the Wishon Project area meets the levels selected by fishers, or whether they may currently be lower than optimal. Given the importance of medium/large snag basal area to fishers, this must be carefully analyzed in the EIS.

Furthermore, the Wildlife BE and EIS must analyze the impacts of proposed forest thinning on large downed log levels, and whether sufficient downed logs of a certain size are available for fishers. Zielinski et al. (2006) found that fishers selected sites with 65 large downed logs (over 25.4 cm in diameter) per hectare, or about 26 logs over 10 inches in diameter per acre. Using the U.S. Forest Service's own Forest Inventory and Analysis (FIA) fixed plots to determine the average large downed log density across the forested landscape within the fisher's range in Sequoia and Sierra National Forests, Zielinski et al. (2006) found that there were only about 19 large downed logs per acre on average within the fisher's range—well below the level selected by fishers. Zielinski et al. (2006) also found that fishers selected sites with 169 cubic meters of large down logs per hectare (2,427 cubic feet per acre), relative to only 118 cubic meters per hectare at FIA plots in general (1,690 cubic feet per acre).

These same habitat elements are also important for the California spotted owl, which benefit from and prefer a closed canopy and an abundance of large snags and downed logs as well as closed canopy. Moreover, woodpecker abundance and diversity is also enhanced by fire and

insect outbreaks. Although Black-backed Woodpeckers have not yet been discovered in the Wishon Project area in the Great Western Divide subrange, the immediate removal of dead trees prevents the occupation of newly created habitat.

11. Alternatives to the Proposed Action

    a. Develop a non-commercial alternative, as required by *SFL v. Rey*

The analysis must include a "non-commercial alternative" based on the requirements of the *Sierra Forest Legacy (SFL) v. Rey* permanent injunction. That ruling required that "the Forest Service [] include a detailed consideration of project alternatives, including a non-commercial funding alternative, for all new fuel reduction projects not already evaluated and approved as of the date of this Memorandum and Order." *SFL v. Rey*, 2:05-cv-00205-MCE-GGH, 2:05-cv-00211-MCE-GGH, 2009 WL 3698507 at *5 (E.D. Cal. Nov. 4, 2009) (permanent injunction order). Because the Wishon Project includes fuel reduction treatments and has not already been evaluated and approved as of Nov. 4, 2009, this alternative must be considered in detail. We suggest that small diameter limit alternatives (discussed below) be evaluated under this requirement.

    b. Develop an alternative that does not reduce crown thinning spacing.

Because this project is also billed as an ecological restoration project, the Forest Service should include an alternative that can achieve the purpose and need of the project without crown thinning or spacing, which only serve as a strategy for pure fire risk reductions in extreme conditions to prevent a crown fire. Forest restoration projects should not be designed to fire-proof a forest, to prevent something that only occurs under extreme fire conditions, except possibly in the 200 feet immediately adjacent to homes.

In fact, opening up the canopy could have the opposite effect. Tree removal reduces canopy cover, which increases temperatures and dries soil and flammable materials, prompts brush growth, and increases surface wind in the forest, all of which increase the fire danger. *See* Fire Weather Handbook (USFS 1970). These types of treatments often open the understory so that midflame windspeed will increase and fine fuel moisture will decline (van Wagtendonk 1996, Weatherspoon 1996).

Moreover, reductions in canopy cover are associated with reductions in CSO survival and territory colonization rates, as well as increases in territory extinction rates. *See* Tempel et al. (2014). Tempel et al. (2014) found that greater than 90% of medium intensity harvests converted high-canopy forests into lower-canopy vegetation classes, suggesting that landscape-scale fuel treatments could have negative impacts on populations of CSOs. They found that medium-intensity timber harvests, characteristic of the proposed fuel treatments in Wishon, were negatively related to reproduction of CSOs, with CSO reproduction appearing sensitive to even modest amounts of medium-intensity harvests.

    c. Develop an alternative with an 8 to 10 inch DBH limit.

Scientific studies have found that pre-commercial thinning of only some sapling and pole-sized trees (up to 8-10 inches in diameter) effectively reduces fire severity (see next section below). Therefore, the Wishon project should include an alternative with an 8-10 inch DBH limit.

d. Develop an alternative using only prescribed burning.

The Forest Service should explore whether the fuel reduction and ecological/forest health goals can be accomplished with prescribed burning only as an alternative. During the right conditions, even with heavy fuel loads but sufficient fuel moisture, it may be possible to safely re-introduce fire into the project area without pre-treatments.

12. Science shows that treatments of only small diameter trees effectively reduce fire severity.

Scientific reports have found that pre-commercial thinning of only sapling and pole-sized trees (up to 8-10 inches in diameter) effectively reduces fire severity. See, for example:

a) Omi, P.N., and E.J. Martinson. 2002. Effects of fuels treatment on wildfire severity. Final report. Joint Fire Science Program Governing Board, Western Forest Fire Research Center, Colorado State University, Fort Collins, CO. Available from http://www.cnr.colostate.edu/frws/research/westfire/finalreport.pdf (found that precommercial thinning of trees under 8 to 10 inches in diameter reduced potential for severe fire (email communication with the authors confirmed that trees removed were of this small size class)). More specifically, the Omi and Martinson (2002) study, found that precommercial thinning reduced stand damage (a measure of fire severity generally related to stand mortality) in both of the two thinned study sites, Cerro Grande and Hi Meadow (the authors reported that the Hi Meadow site was marginally significant, $p<.1$, perhaps due to small sample size), each with several plots.

b) Martinson, E.J., and P.N. Omi. 2003. Performance of fuel treatments subjected to wildfires. USDA Forest Service Proceedings RMRS-P-29 (found that non-commercial thinning of submerchantable-sized trees, generally followed by slash burning or removal, in several areas across the western U.S. greatly reduced fire severity, and that this result held true regardless of post-thinning basal area density).

c) Strom, B.A., and P.Z. Fule. 2007. Pre-wildfire fuel treatments affect long-term ponderosa pine forest dynamics. International Journal of Wildland Fire **16**: 128-138 (non-commercial thinning of very small trees under 20 cm DBH (8 inches DBH) in seven different sites dramatically reduced fire severity, resulting in post-fire basal area mortality of only about 28% (low severity) in non-commercially thinned areas versus post-fire basal area mortality of about 86% in untreated areas).

The Proposed Action summary suggests that commercial thinning, as proposed, will reduce potential for severe fire. Research conducted in the Sierra Nevada, however, found evidence to contradict this claim. A recent study conducted after the Rim Fire found

> 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.

Lyderson et al. (2014) (enclosed as Exhibit L). In another study, an area of the Eldorado National Forest that was mechanically thinned very shortly before the fire, and was masticated (material <10" diameter) mere months before the fire, had higher combined mortality from thinning and fire than the adjacent un-thinned area (Hanson and Odion 2006). A further study found that

> Compared with the original conditions, a closed canopy would result in a 10 percent reduction in the area of high or extreme fireline intensity. In contrast, an open canopy [from fuel treatments] has the opposite effect, increasing the area exposed to high or extreme fireline intensity by 36 percent. Though it may appear counterintuitive, when all else is equal open canopies lead to reduced fuel moisture and increased midflame windspeed, which increase potential fireline intensity.

Platt et al. 2006 (Annals of the Assoc. Amer. Geographers 96: 455-470). The EIS must analyze this type of evidence from actual wildland fires burning through thinned areas rather than rely upon modeling results, which are based on assumptions that may not reflect actual real-world fire behavior. Increased fire severity could result from: a) increased mid-flame windspeeds due to a reduction in the buffering effect of mature tree boles; b) slash debris (even if you make efforts to reduce slash, this is never totally effective, and much slash remains—enough to perhaps increase overall surface fuels relative to current levels, something the Forest Service generally fails to adequately discuss); c) accelerated brush growth due to increased sun exposure; and d) desiccation of surface fuels due to increased sun and wind exposure.

Moreover, research provides evidence that seriously questions the very basis for thinning and its assumed effectiveness. Rhodes and Baker (2008) found that, based upon the fire rotation interval for high severity fire, and assuming an effectiveness period of 20 years for a mechanically-thinned area (i.e., before it would need to be treated again to maintain effectiveness from a fire/fuels perspective), the probability of a thinned area encountering a high severity fire patch during the 20-year effectiveness period (assuming for the sake of argument that the thinning actually does reduce fire severity during this period) is only about 3.3% in California's forests. And it would be less than 2% if an 11-year thinning effectiveness period is assumed (Rhodes and Baker 2008). This means that, in order to have a 50% chance of having the thinned area reduce the severity of a fire patch that would have otherwise been high severity, the thinned area would have to be re-thinned every 20 years for about 300 years (see Rhodes and Baker 2008).

Please fully analyze the implications of these findings, and please also fully divulge whether you intend to and have funding to re-thin this area over and over again every couple of decades or so for the next three centuries in order to have a reasonable probability of having the thinning area actually prevent high severity fire from occurring in the thinned area. If so, please fully analyze the cumulative environmental impacts on wildlife, soils, watersheds, and climate change from such repeated mechanical activities on this site. Also, please disclose the source of the funding for these recurring mechanical activities over the decades. If not, please divulge the fact that the probability that the thinned area will NOT encounter a high severity fire is about 97% or greater, and that your thinning activities are extremely unlikely to be effective in any tangible or meaningful way for fuels/fire management.

13. Scientific information shows that insect outbreaks reduce the severity of subsequent fires.

A recent compilation of data by leading scientist in the Pacific Northwest has found that "By dampening subsequent burn severity, native insects could buffer rather than exacerbate fire regime changes expected due to land use and climate change. In light of these findings, we recommend a precautionary approach when designing and implementing forest management policies intended to reduce wildfire hazard and increase resilience to global change." *See* Miegs et al. (2016) Abstract, attached as Exhibit G.

Based on these findings, the District must revise their approach with regard to thinning or other treatments for resiliency to prevent insect outbreaks. The assumptions the Forest Service makes, that trees killed by insect infestations increase the risk of wildfire and wildfire severity must be revisited as they apply to proposed treatments in the Wishon project.

14. The analysis should consider an alternative approach to providing defensible space.

The Wishon Project is proposing to treat the WUI defense and threat zones, supposedly to create defensible space to protect the homes in the adjacent communities from a wild fire. Defensible space is a place where firefighters can be safely stationed in the path of the advancing fire. And although the Forest Service has designated large WUI areas, cutting down trees beyond 200 to 300 feet from homes to create defensible space for firefighters to battle the wall of flames that might be approaching and to protect the homes from the fire will place firefighters in danger and will cause unnecessary resource damage. It will eventually result in areas that will become more flammable because of the subsequent growth of more flammable bushes and grasses than existed prior to leaving the forest canopy intact, including exotic grasses and herbaceous annuals that carry fire quickly to the base of the remaining trees.

Treating the Home Ignition Zone (HIZ), the 200 to 300 feet surrounding homes, and using that treated HIZ as the defensible space from which prescribed fire is anchored and allowed to burn into the surrounding forest would be far less costly and more effective than mechanical treatments beyond the HIZ.

We urge the Forest Service to consider this alternative WUI size, defined by the Home Ignition Zone (HIZ) as a safezone from which firefighters would initiate prescribed fire to burn away from the HIZ and into the WUI.

Science support treatments limited to the Home Ignition Zone. The Forest Service's own Jack Cohen (Jack D. Cohen, Research Physical Scientist, Fire Sciences Laboratory, PO Box 8089, Missoula, MT 59807 406-329-4821 (fax) 406-329-4825 jcohen@fs.fed.us), has shown that the Home Ignition Zone – the 200 to 300 feet immediately surrounding homes, is where mechanical fuel treatments should be implemented to protect homes. The Home Ignition Zone treatments can be the mechanically-treated safezone that anchors prescribed fire treatments that would then be implemented beyond the HIZ and into the WUI to protect homes.

Treating areas for thousands of feet down slope of rural residences will only cause unnecessary changes in the wildlands and not protect the rural residences from the wildfire that could start in the wildland area, if treatments have not been applied to the area within 200 feet of structures (Cohen 1999).

The alternative of using the HIZ as the safezone anchor for prescribed fires into the WUI is reasonable because firefighters have successfully utilized narrower areas than the 200 to 300 foot wide HIZ when prescribed fires or backfires are initiated from roads and trails in forested areas.

15. <u>The Wishon EIS must analyze the project's effects on the character of a potential wilderness area identified in the recent plan revision as Polygon 173 (South of Wishon).</u>

The Forest must take a hard look at the effects of the proposed action and other alternatives on the area's roadless character and wilderness values. "Roadless character" as defined in the Roadless Rule (36 CFR § 294.11) includes:

> (1) Quality of undisturbed soil, water, and air;
> (2) Diversity of plant and animal communities;
> (3) Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land;
> (4) Primitive, semi-primitive non-motorized and semi-primitive motorized classes of dispersed recreation;
> (5) Natural appearing landscapes with high scenic values;
> (6) Traditional cultural properties and sacred sites;
> (7) Other locally identified unique characteristics.

Roadless/potential wilderness areas provide substantial water resource benefits (DellaSala *et al*., 2011), are important for conserving biodiversity (Strittholt and DellaSala, 2001), and are important climate change refugia for biodiversity (Olson *et al*., 2012). The Forest Service should review and explain its management guidelines for this potential wilderness and explain how each alternative reviewed in the NEPA documents is compatible with maintaining potential wilderness values.

Wilderness character would also be affected in many of the units of the Wishon Project area that were recently identified in the plan revision's potential wilderness inventory (see Exhibit B). Therefore these effects must be disclosed in the Wishon EIS.

16. The analysis must disclose the project's effects on and its contribution to climate change.

The environmental analysis must also discuss how the Wishon project will potentially emit CO_2 and CH4 or other short-term GHG that may contribute to climate change or what efforts will be taken to mitigate these emissions, by disclosing and analyzing the carbon and GHG emitted from fuel reduction treatments, slash treatments, and biomass cutting, collecting, hauling, and burning/incineration or prescribed burning.

A recent article by Mitchell et al. (2009) describes tradeoffs for managing for carbon storage (a valid goal in any forest management action) versus fuels reduction. That study suggests that, with the exception of some xeric ecosystems (not present in the current project area), "fuel reduction treatments should be forgone if forest ecosystems are to provide maximal amelioration of atmospheric CO_2 over the next 100 years." *Id.* at 653. For that reason, each alternative should discuss and analyze carbon and GHG emissions from implementation, and the no-action alternative should also provide information about the potential for carbon storage from foregoing project implementation.

Depro et al., 2007, found that eliminating logging would result in massive increases in Carbon sequestration. "Our analysis found that a "no timber harvest" scenario eliminating harvests on public lands would result in an annual increase of 17–29 million metric tons of carbon (MMTC) per year between 2010 and 2050—as much as a 43% increase over current sequestration levels on public timberlands and would offset up to 1.5% of total U.S. GHG emissions." (Depro et al., 2007 abstract)

Moreover, Mitchell et al. (2009) found the amount of net carbon released into the atmosphere, on an acreage basis with small diameter thinning for fuel reduction (if used for biomass), puts more carbon into the atmosphere than an average fire, on an acreage basis:

> Our simulations indicate that fuel reduction treatments in these ecosystems consistently reduced fire severity. However, reducing the fraction by which C is lost in a wildfire requires the removal of a much greater amount of C, since most of the C stored in forest biomass (stem wood, branches, coarse woody debris) remains unconsumed even by high-severity wildfires. For this reason, all of the fuel reduction treatments simulated for the west Cascades and Coast Range ecosystems as well as most of the treatments simulated for the east Cascades resulted in a reduced mean stand C storage. One suggested method of compensating for such losses in C storage is to utilize C harvested in fuel reduction treatments as biofuels. Our analysis indicates that this will not be an effective strategy in the west Cascades and Coast Range over the next 100 years.

Mitchell et al., 2009 abstract.

In any case, the environmental analysis must disclose the emissions from fuel reduction treatments, associated slash treatments, and biomass collection, hauling, and burning/incineration or prescribed burning for each action alternative. For this, the Washington Office of the Forest Service has generated specific direction on how to discuss climate change effects in a NEPA

analysis. *See* Climate Change Considerations in Project Level NEPA Analysis (Jan. 13, 2009) (attached as Exhibit F). That document specifically mentions fuel reduction projects in the types of projects that should disclose direct effects on climate change:

- **The effect of a proposed project on climate change** (GHG emissions and carbon cycling). Examples include: short-term GHG emissions and alteration to the carbon cycle caused by hazardous fuels reduction projects, GHG emissions from oil and gas field development, and avoiding large GHG emissions pulses and effects to the carbon cycle by thinning overstocked stands to increase forest resilience and decrease the potential for large scale wildfire.

Id. at 2. To assist in disclosing these effects, the Forest Service provides tools that can help managers determine the direct contributions of GHG emissions from project burning or treatments. *Id.* at 5 (*FOFEM 5.5, Consume 3.0,* and the *Forest Vegetation Simulator*). Because the Forest Service has tools or models to effectively calculate emissions, it must disclose these emissions for each of the action alternatives. In addition, the guidance document suggests that the NEPA document include a qualitative effects analysis. *Id.* Such an analysis should include the cumulative effects, quantified in an "individual, regional, national, global" context. *Id.* at 6.

Finally, the guidance suggests that NEPA provides direction on how managers should respond to comments raised during project analysis regarding climate change:

1. Modify alternatives including the proposed action.
2. Develop and evaluate alternatives not previously given serious consideration by the Agency.
3. Supplement, improve, or modify the analysis.
4. Make factual corrections.
5. Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the Agency's position and, if appropriate, indicate those circumstances that would trigger agency reappraisal or further response.

Id. at 8. At the very least, because this project includes fuel reduction treatments and burning that will contribute GHG emissions, the EIS must include an acknowledgment of carbon and GHG emissions and must provide a response to this issue.

Moreover, the analysis should account for and quantify (as part of the cumulative effects analysis) not only the emission from prescribed burning on-site and the emissions from any biomass that is removed from the project area and later burned or incinerated off-site, but also the contribution of emissions from cutting, collecting, and transporting this material for off-site burning or incinerating, and the contribution of emissions from planning and implementing the project by a contractor and by the Forest Service, including the local, regional, and Washington offices.

This holistic approach to account for GHG emission is necessary to provide managers and the public with the kind of information under NEPA to make informed choices between alternatives

and to mitigate for climate change, and to consider and assess the larger picture of GHG contributions from all projects on the national forests that may contribute GHG emissions.

17. The analysis must disclose the impact from mechanized equipment on soils, streams, and watersheds

The Wishon Project proposes to use both commercial and non-commercial activities to thin ladder fuels, restore species composition to those present before fire suppression and logging, and increase the resiliency of stands of trees to drought, insects, and fire. And even if commercial activities use rubber-tired skidders or log forwarders on slopes up to 35%, skyline yarding on slopes between 35 - 60%, and allow tractor use when there is acceptable risk of soil erosion, any loss of soil to erosion is unacceptable.

Mechanized fuel treatments incur ecological costs by damaging soils, vegetation, and hydrologic processes, as proponents of fuel reduction treatments have acknowledged (e.g., Allen et al., 2002; Graham et al., 1999; 2004; Agee and Skinner, 2005). Mechanical fuel reduction treatments typically involve the same suite of activities as logging, with the same set of impacts to soils, runoff, erosion, sedimentation, water quality, and stream structure and function. These effects, their mechanisms, and their aquatic impacts have been extensively and repeatedly documented across the West (e.g., Geppert et al., 1984; Meehan, 1991; USFS et al., 1993; Rhodes et al., 1994; CWWR, 1996, USFS and USBLM, 1997a; c; Beschta et al., 2004). Watershed damage ultimately translates into aquatic damage.

The collateral impacts of fuel treatments are of considerable concern due to the existing aquatic context. Across the West, aquatic systems are significantly and pervasively degraded (Rieman et al., 2003; Beschta et al., 2004). As a result, many populations of aquatic species, including most native trout and salmonids, have undergone severe contractions in their range and number and remaining populations are now imperiled and highly fragmented (Frissell, 1993; USFS and USBLM, 1997a; Kessler et al., 2001; Behnke, 2002; Bradford, 2005). Additional damage to watersheds and aquatic systems reduces the prospects for the protection and restoration of imperiled aquatic species (USFS and USBLM, 1997c; USFWS, 1998; Karr et al., 2004). The loss of aquatic systems has also reduced the number of native fish species including: California roach, speckled dace, Sacramento hitch, Sacramento pikeminnow, Sacramento splittail, Sacramento sucker, and caused the extinction of the thicktail chub.

Impact to soils, streams, and watersheds from this project must be added to the existing watershed damage and foreseeable future damage to provide an accurate assessment of the adverse effects. No additional erosion or sediment flow into down-stream watersheds would be considered acceptable. All sediment flows into streams are cumulative and eventually contribute to causing reservoirs like Lake Isabella and Lake Success to fill with sediment, as they have.

18. We request that specific base-line information and results from treatments be disclosed in the environmental analysis.

Information provided as part of scoping is so limited that it is difficult to comment adequately on the proposal. Please provide us with further specific information in the analysis that could help us understand the base-line and results from project treatments:

- Please provide data in the DEIS about the existing conditions <u>for each unit</u>, including:
    - tree density
    - the range of tree sizes and basal area
    - % of current canopy cover
    - the number and size of snags
    - the number or size of large down logs (>12 inch at midpoint)
    - information about the understory for each unit, such as the % of area with shrub cover or in montane chaparral patches

- Please provide specific information in the DEIS about what the Forest Service plans to leave after implementation <u>for each unit</u> <u>by action alternative</u>, including:
    - tree density
    - the range of tree sizes and basal area
    - % of canopy cover after thinning
    - the number and size of snags (here's an opportunity to increase the number of snags by girdling trees rather than felling or removing them)
    - the number or size of large down logs (>12 inch at midpoint) (here's also an opportunity to increase the number of large down logs rather than removing them)
    - information about the understory for each unit, such as the % of area with shrub cover or in montane chaparral patches after thinning

- The scoping summary has insufficient information to comment on nests, detections, or home ranges for spotted owls, where old forest emphasis allocation are located, and where any current and historical condor roosts are located. Please provide more detail about these.

- The scoping summary does not include any information about the extent and quality of Pacific fisher habitat in the project area. Please provide information about any fisher habitat capability in the treatment units or in areas adjacent to treatment units.

19. <u>The Forest Service must use the best available scientific information.</u>

Forest Service regulations require that projects that implement forest plans consider the best available science in their analysis. 36 C.F.R. § 219.35(a), (d) (2000); 69 Fed. Reg. 58055 (Sept. 29, 2004). To correctly apply this standard, the Forest Service "should seek out and consider all existing scientific evidence relevant to the decision and it cannot ignore existing data. . . . The Forest Service must determine which data are the most accurate, reliable, and relevant, and that will be reviewed deferentially, but it still must be good science-that is reliable, peer reviewed, or otherwise complying with valid scientific methods." *Ecology Center v. U.S. Forest Service*, 451 F.3d 1183, 1194, n. 4 (10th Cir. 2006).

This also means that, in the final analysis, the Forest Service must disclose and discuss any science that it rejected as less accurate, reliable, or relevant than the science it actually applied to the project.

20. The analysis must consider all existing water uses and resources

After thinning stands of mature trees, to increase heterogeneity and resilience, and after hand thinning stands of smaller trees, the temperature of forest fuels and forest air will increase, the moisture level of forest fuels decreases, and the relative humidity in the understory decreases, it stands to reason that surface and groundwater resources could also be impacted by the removal of these materials. It therefore stands to reason that the Forest Service should provide a comprehensive inventory of surface and groundwater resources in the watersheds of the Wishon Project area as a way to establish a baseline for assessing the impacts of the project on forest resources. These inventories and an analysis of water resources must be considered in the environmental analysis, especially in light of the current and predicted future prolonged drought periods in California.

The Wishon EIS must therefore consider how unlogged forests retain water before approving tree removal. The EIS must consider whether commercial logging is an appropriate treatment since commercial logging would cause the forest to become hotter and drier and allow surface winds to increase, all of which would exacerbate wildfire.

If the project is to restore and maintain the forest ecosystem so it is resilient to the effects of wildfire, drought, disease, and other disturbances, the EIS must include an assessment of and documentation to show all water diversions, withdrawals, and developments that utilize water in the watersheds involved in the project area in order to establish a baseline of available water for making a decision as to what can be done to protect the forest ecosystem from drought and whether commercial thinning would be effective, since thinning would cause the forest understory to become hotter and drier, and would allow moisture-robbing surface winds to increase. Monitoring wells need to be placed throughout the WUI project areas to determine the anthropogenic effects on the aquifers in order to establish a baseline of available water for making a decision on the Wishon Project.

Managing forest ecosystems and clearing fire prone vegetation runs counter to common sense by exposing soils and understory vegetation to desiccating conditions. Removing forest biomass to supposedly reduce fire danger runs counter to making the forest resilient to climate change because opening the forest canopy to winds or the drying heat of the sun results in drying out the layers of moisture-holding duff, small trees, and down woody material, especially in the southern portion of the Sierra Nevada in Sequoia National Forest, which receives relatively much less moisture due to geography and prevailing weather patterns.

Water vapor in the air comes almost entirely from three sources: Evaporation from any moist surface or body of water, evaporation from soil, and transpiration from plants. Plants have large surfaces for transpiration; occasionally they have as much as 40 square yards for each square yard of ground area. Transpiration from an area of dense vegetation can contribute up to eight times as much moisture to the atmosphere as can an equal area of bare ground.

Relative humidity is most important as a fire-weather factor in the layer near the ground, where it influences both fuels and fire behavior. The relative humidity that affects fuels on the forest floor is often quite different from that in the instrument shelter, particularly in unshaded areas where soil and surface fuels exposed to the sun are heated intensely, and warm the air surrounding them. This very warm air may have a dew point nearly the same or slightly higher than the air in the instrument shelter, but because it is much warmer, it has a much lower relative humidity. Vegetation moderates surface temperatures and contributes to air moisture through transpiration and evaporation – both factors that affect local relative humidity. A continuous forest canopy has the added effect of decreasing surface wind speeds and the mixing that takes place with air movement. The differences in humidity between forest stands and open areas generally vary with the density of the crown canopy. Under a closed canopy, humidity is normally higher than outside (the closed canopy) during the day, and lower at night. The higher humidities are even more pronounced when there is a green understory. While temperature and moisture distribution in the layer of air near the ground are important in fire weather because of their influence on fuel moisture, the distribution of temperature and moisture aloft can critically influence the behavior of wildland fires.

Cumulative impacts that remove trees up to 20 inch diameter and larger that results in opening the canopy and causes the sun to shine where the trees once stood heats and dries forest materials and soil and causes flammable brush to grow where the less flammable tree trunks once stood. Sequoia ForestKeeper's teams of ecological graduate summer interns have repeatedly observed and documented in Sequoia the inverse relationship between canopy cover and ground cover. When forest canopy increases, groundcover decreases: when forest canopy decreases, groundcover increases. (See Fire Weather and other research that indicates the same.)

Much of this is known and is discussed in the US Forest Service's Publication FIRE WEATHER . . . A Guide For Application Of Meteorological Information To Forest Fire Control Operations, by Mark J. Schroeder, Weather Bureau, Environmental Sciences Administration, U.S. Commerce Department and Charles C. Buck, Forest Service, U.S. Department of Agriculture U.S. Government Printing Office: 0-244 :923, first published in May 1970. Reviewed and approved for reprinting August 1977, Stock No. 001-000-0193-0 / Catalog No. A 1.76:360 (available at http://tinyurl.com/pqeqhbj).

Congress recognized that managing natural resources in National Forests was "highly complex" and enacted the Forest and Rangeland Renewable Resources Planning Act. The Act requires that the Forest Service develop an inventory of "present and potential renewable resources, and an evaluation of opportunities for improving their yield of tangible and intangible goods and services." In addition the Act requires that all forest management activities to be preceded by a "comprehensive assessment" of environmental and economic impacts in order to create a management plan that is consistent with MUSYA and NEPA. Congress emphasized the "fundamental need" for the management plans to "protect and, where appropriate, improve the quality of soil, air, and water resources." Developing an inventory of surface and groundwater resources and an assessment of the environmental impacts on surface and groundwater including potential impacts of groundwater use on surface water resources, is an integral step in ensuring

that a management plan protects the water quality in Sequoia National Forest and the Giant Sequoia National Monument.

For Sequoia ForestKeeper and the Kern-Kaweah Chapter of the Sierra Club,

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