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Thank you for this opportunity to comment on the Antelope and Tennant Fire Recovery Project.

Hazardous trees and fuel conditions

Unfortunately, the downloadable BAER Soil Severity map[1] available for this incident in the .tif format compatible with Google Earth was lacking the coloration denoting the severity levels making it quite tedious for comparison with satellite imagery.

> "Hazardous trees and fuel conditions need to be abated where they exist, especially within one-quarter mile of private property in burned areas."

It is appreciated that about two dozen private residences were destroyed or impacted by the Antelope Fire[2]. However, the fuels, the fine woody debris and probably much of the coarse woody debris, combusted in the fire and are no longer present to be considered hazardous fuel particularly in the high burn severity patches. A study in the Illilouette Creek Basin found:

> "There were no re-burns, regardless of fire weather, when time-since-last-fire is less than 9 years."

> "Under 9 years, the categorical tree analysis indicates a 0 probability of reburn, and a 100% probability of an extent-constrained interaction."[3]

The question arises as to what hazardous fuels are being referred to?

The one-quarter mile (402 meters) distance from private property for abatement is wildly excessive given the generally accepted home ignition zone boundary of 100 feet (30 meters) advised for home hardening[4]. This distance was well established by Field studies conducted during the International Crown Fire Modelling Experiment in 1997. Wall sections were set at 10, 20 and 30 meter distances downwind from a series of five crown fires with the result that:

> "The 30-meter (distant) wall section had no scorch from any of the crown fires."[5]

It is not the line of flames that ignites structures at this distance but the wind-carried firebrands created in a wildfire. The aforementioned study also stated:

> "Firebrands are a significant ignition source during WUI fires, particularly when flammable roofs are involved. Foote (1994) found a significant difference in home survival solely based on roof flammability. Homes with nonflammable roofs had a 70 percent survival rate compared with 19 percent for homes with flammable roofs."

This was readily observed in the town of Paradise, destroyed by the 2018 Camp Fire. Multiple photos of the aftermath show totally burned neighborhoods with the surrounding trees standing unburned.

Although the maps for the project indicate a few scattered Late Successional Reserve stands, examining satellite imagery of the area shows mostly tree plantations in which trees 65 feet or taller are not very likely. This would preclude any hazardous trees at or beyond 100 feet falling and impacting a structure. The need for a quarter-mile abatement zone around private property is very questionable and its necessity needs to be thoroughly explained.

Roadside Hazard Tree Removal

The 4,000+ acre Roadside Hazard Tree Removal aspect of the project is a large amount of acreage to be considered as being sufficiently evaluated by an Environmental Assessment (EA) with a Finding of No Significant Impact. The EA claims acreages based on widths that do not agree with the distances shown in Table 1 and Table 2. These tables allow for much greater widths than noted raising the question of how the stated widths were determined and if these widths are the true extent. It is acknowledged that portions of these roads do run alongside or through areas slated to be salvage logged so the issue of the roadside margins in these areas might be considered moot. However, this is not the majority of the roads. It would be better if a finite distance from the road center was specified and undershot rather than having exceedances of specified distances on a vagary.

On viewing the timelapse of the area on Google Earth, it was noticed that the most recent images, which do not yet cover the whole of the project area, show that mapped roads slated for hazardous tree removal are visible in the newest imagery and are already having trees removed even though the comment period for this project has not closed. Seeing these images elicits a grave doubt as to the candor of the Forest Service in having a period for the public to comment on the "proposed" actions of the project when logging is already happening.

"NEPA procedures must ensure that environmental information is available to public officials and citizens **before decisions are made and before actions are taken**." 40 CFR 1500.1(b). NEPA was enacted to ensure that important environmental effects "will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast." *Robertson v. Methow Valley Citizens*, 490 US 332, 348, 109 S.Ct. 1835.

Salvage for Site Preparation

> "Commercial treatments would be considered where possible, though ***economic recovery is a secondary consideration*** to WUI fire mitigation areas and reforestation potential." (emphasis added)

There are several pieces of legislation passed over the years defining the role of the US Forest Service.[6]

- *Multiple Use - Sustained Yield Act of 1960 (June 12, 1960) (P.L. 86-517; 16 U.S.C. §§ 528–531).* This act declares that the purposes of the national forests include outdoor recreation, range, timber, watershed, and fish and wildlife.
- *National Environmental Policy Act (January 1, 1970) (P.L. 91–190; 42 U.S.C. §§ 4321–4347).* This act requires Federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.
- *Endangered Species Act (December 28, 1973) (16 USC 1531–36, 1538–40).* This act governs the process of identifying threatened and endangered species, provides protections for such species, and governs Federal actions that could affect such species or their habitat.

We are in the midst of intertwined Climate and Biodiversity Crises. Leading climate and biodiversity experts recently concluded that we must tackle both crises together to protect a livable future for all of earth's inhabitants.[7] Forests are crucial for addressing both the climate and biodiversity crises, and their conservation and restoration must be a priority for global sustainability efforts. A new report from leading biodiversity and climate experts details how humanity must tackle the climate and biodiversity crises together if we want to effectively address either. This requires a profound shift in how we look at nature and a breaking away from destructive ideas about economic progress.[8]

This country has pledged support for two goals to be achieved by 2030: a 50% reduction in US Greenhouse Gas emissions and an end to deforestation. But we are lacking any goals or approaches for addressing the biodiversity crisis.

> "Stand-replacing fire has a negative connotation in resource management disciplines because of their narrow focus on impacts to timber values. But suppression of fire and removal of biomass after a fire are causes of reduced biodiversity and ecological integrity. Early seral forests are generated by disturbances that reset successional processes and follow a pathway that is influenced by biological legacies (e.g., large live and dead trees, downed logs, seed banks, resprout tissue, fungi, and other live and dead biomass) that were not removed during the initial disturbance. Where these legacies are intact, complex early successional forests (CESFs) develop with rich biodiversity due to the function of the remaining biomass in providing resources to many life forms and because of habitat heterogeneity provided by the mixed-severity fires that generated them.
>
> In terms of their contribution to biodiversity and vital life-history stages of many species, CESFs have disproportionately important ecological roles in the overall ecological integrity of forested landscapes."[9]

Salvage logging reduces forest resilience by removing the natural regeneration process occurring after a natural disturbance as found in early seral forests. This results in a more homogenous forest with lower biodiversity and reduced ecological functions. Additionally, salvage logging removes vegetation cover that helps to prevent soil erosion, leading to increased sedimentation in nearby streams and rivers, damaging aquatic habitats and water quality. The heavy machinery used in salvage logging

causes soil compaction and erosion, affecting soil fertility and nutrient cycling. Salvage logging delays forest recovery by removing the organic matter that is essential for soil development and nutrient cycling.

Most importantly, salvage logging destroys the habitat of many forest-dwelling animals, including species that rely on standing dead trees or decaying wood for nesting or food.

> "Ecologically detrimental management of CESFs, or unburned forests that may become CESF's following fire, is degrading the region's globally outstanding qualities."[10]

The Klamath National Forest in the vicinity of the Antelope-Tennant Fire is habitat for several listed species under the Endangered Species Act (ESA) or the California Endangered Species Act (CESA), namely the Grey Wolves of the Beckwourth Pack whose territory includes portions of this burn area and Pacific Fishers among others. The Black-backed Woodpecker is a CESA candidate. Fire suppression and salvage logging pose particular threats to the Black-backed Woodpecker, a pioneering cavity-excavating species, as both result in what is essentially habitat loss for this and other species.

> "Researchers have found that Black-backed Woodpeckers play a key role in providing cavities that help other animals repopulate burned forests. These secondary cavity users, including birds such as the Mountain Bluebird and White- breasted Nuthatch, and small mammals such as flying squirrels, help disperse seeds, keep insect populations in check, and serve as prey for larger carnivores during post-fire forest regeneration."[11]

A study of the association between listed ESA species and state listed species in relation to early-seral forest ecosystems in the Pacific Northwest concluded that 61 percent of listed native bird species, 80 percent of listed mammal species and 91 percent of listed butterfly and moth species are associated with this early-seral forest habitat. 22 of these species are obligates found only in this type of forest ecosystem.[12]

> "One of the problems associated with the lack of appreciation of the impacts of salvage logging lies in the terminology itself. Dictionary definitions of the term salvage associate it with "recover or save" or "saving of anything from loss or danger". Although salvage logging removes wood from burned areas, such practices generally do not help regenerate or save ecosystems, communities, or species. Most documented effects of salvage logging are negative from an ecological standpoint."[13]

> "Post-disturbance ecosystems are also often rich in biological legacies, including surviving organisms and organically derived structures, such as woody debris. These legacies and post-disturbance plant communities provide resources that attract and sustain high species diversity, including numerous early-successional obligates, such as certain woodpeckers and arthropods. Early succession is the only period when tree canopies do not dominate the forest site, and so this stage can be characterized by high productivity of plant species (including herbs and shrubs), complex food webs,

large nutrient fluxes, and high structural and spatial complexity. Management activities, such as post-disturbance logging and dense tree planting, can reduce the richness within and the duration of early-successional ecosystems. Where maintenance of biodiversity is an objective, the importance and value of these natural early successional ecosystems are underappreciated."[14]

"Postfire logging significantly increased both fine and coarse downed woody fuel loads. This wood was composed of unmerchantable material (e.g., branches), and far exceeded expectations for fuel loads generated by postfire logging. In terms of short-term fire risk, a reburn in logged stands would likely exhibit elevated rates of fire spread, fireline intensity, and soil heating impacts.

Postfire logging alone was notably incongruent with fuel reduction goals, therefore the lowest fire risk strategy may be to leave dead trees standing as long as possible (where they are less available to surface flames), allowing for aerial decay and slow, episodic input to surface fuel loads over decades. Our data show that postfire logging, by removing naturally seeded conifers and increasing surface fuel loads, can be counterproductive to goals of forest regeneration and fuel reduction."[15]

The area of the Antelope Fire in particular and included and larger abutting areas of the Shasta-Trinity National Forest are considered suitable habitat for the Northern Spotted Owl (NSO), a ESA listed species in continual decline known to be intolerant of logging[16] in and near to its territory.

"Research has found these owls preferentially select high-severity fire areas, characterized by high levels of snags and native shrubs, for foraging in forests that were not logged after fire, suggesting that removal of this foraging habitat might impact occupancy. The authors found a significant adverse effect of such logging and no effect of high-severity fire alone. These results indicate it is post-fire logging, not large fires themselves, that poses a conservation threat to this imperiled species."[17]

"Contrary to current perceptions and recovery efforts for the Spotted Owl, mixed-severity fire does not appear to be a serious threat to owl populations; rather, wildfire has arguably more benefits than costs for Spotted Owls. The preponderance of evidence presented here shows mixed-severity forest fires, as they have burned through Spotted Owl habitat in recent decades under current forest structural, fire regime, and climate conditions, have no significant negative effects on Spotted Owl foraging habitat selection, or demography, and have significant positive effects on foraging habitat selection, recruitment, and reproduction."[18]

The Antelope-Tennant Fire Recovery Project map shows 4,667 acres of planned Dwarf Mistletoe Sanitation. However, NSO are known to nest on mistletoe witches' brooms and this aspect of the project will degrade the suitability of these areas as NSO habitat and open up the forest to the detriment of NSO and give advantage to the aggressive Barred Owl, an invasive species out-competing the NSO for territory.

> "Birds also find mistletoe a great place for nesting, especially the dense witches' brooms. In fact, northern and Mexican spotted owls and other raptors show a marked preference for witches' brooms as nesting sites. In one study, 43 percent of spotted owl nests were associated with witches' brooms."[19]

> "In sum, the proposed logging of large trees and the additional resultant fragmentation of forest canopies in the Project area will reduce essential NSO habitat below necessary canopy thresholds for nesting and survival, thereby making the Gualala River corridor even more permeable to the aggressive competitor Barred Owl (Strix varia) that has increased in numbers at the expense of NSO." Friends of Gualala River v. Gualala Redwood Timber, LLC, 20-cv-06453-JD (N.D. Cal. Nov. 16, 2022)

The decline of the threatened Northern Spotted Owl is a serious concern for biodiversity. NSO act as a surrogate delineating the extent of mature and old-growth forest still capable of serving as habitat for NSO. Canada's environment minister plans to use a rare emergency order to protect the last of this endangered owl species in an area where critical old- growth forest is slated for further clearcutting. Before industrial logging in south-west British Columbia, there were nearly 1,000 spotted owls in the old-growth forests, according to the Wilderness Committee. But now, only one wild-born northern spotted owl and two bred in captivity and recently released in the wild remain in British Columbia.[20]

Under the Endangered Species Act, the Forest Service has been tasked with identifying threatened and endangered species and providing protections for such species. "In addition, the legislative history…reveals an explicit congressional decision to require agencies to afford **first priority to the declared national policy of saving endangered species**. The pointed omission of the type of qualifying language previously included in endangered species legislation reveals a conscious decision by Congress to **give endangered species priority over the 'primary missions' of federal agencies.**" *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 185 (1978). (emphasis added)

It can not be any more clear that habitat suitable for all of these listed species must be preserved and protected.

Meadows

The Environmental Assessment and the Proposed Action map include "Meadow Restoration" on 975 acres plus the acreage of the Alder Creek Meadow. Although unstated, the conifers encroaching into the meadows will be removed in some manner. To quote Fred Swanson, a researcher at the Pacific Northwest Laboratory in Corvallis, Oregon:

> "In some cases, we see mature or old- growth forest that abuts a meadow. Here we assume the edge has been stable for centuries and that one or more processes are prohibiting encroachment. Elsewhere, younger trees are found along an edge, suggesting that conditions have changed to allow for encroachment. We know that forests and meadows have formed a shifting mosaic over the centuries."[21]

> "Meadows also occur in conditions that typically support an abundance of trees. Some may have originated with severe fire. And, it is commonly assumed that repeated burning, either through natural ignitions or the activities of Native Americans or sheepherders, kept them free of trees. 'There is an assumption that fire burned through these meadows periodically, killing any trees that had established, and maintaining open conditions indefinitely. Then, as this theory has it, once we began to suppress fire in the larger landscape, meadows lost ground to conifers.' says Charlie Halpern, a professor at the University of Washington."[22]

Two key findings from this same study are:

- Contraction was also more common where meadow openings were adjacent to forest that experienced stand-replacing fire in the previous 150 years; it appears that fire can create forest openings that may take centuries to close.
- Within decades of conifer establishment, meadow species are largely replaced by herbs characteristic of the surrounding forest. Soil chemical and biological properties change rapidly as well, suggesting strong positive feedbacks between conifers and the below-ground ecosystem, facilitating further encroachment of trees.[23]

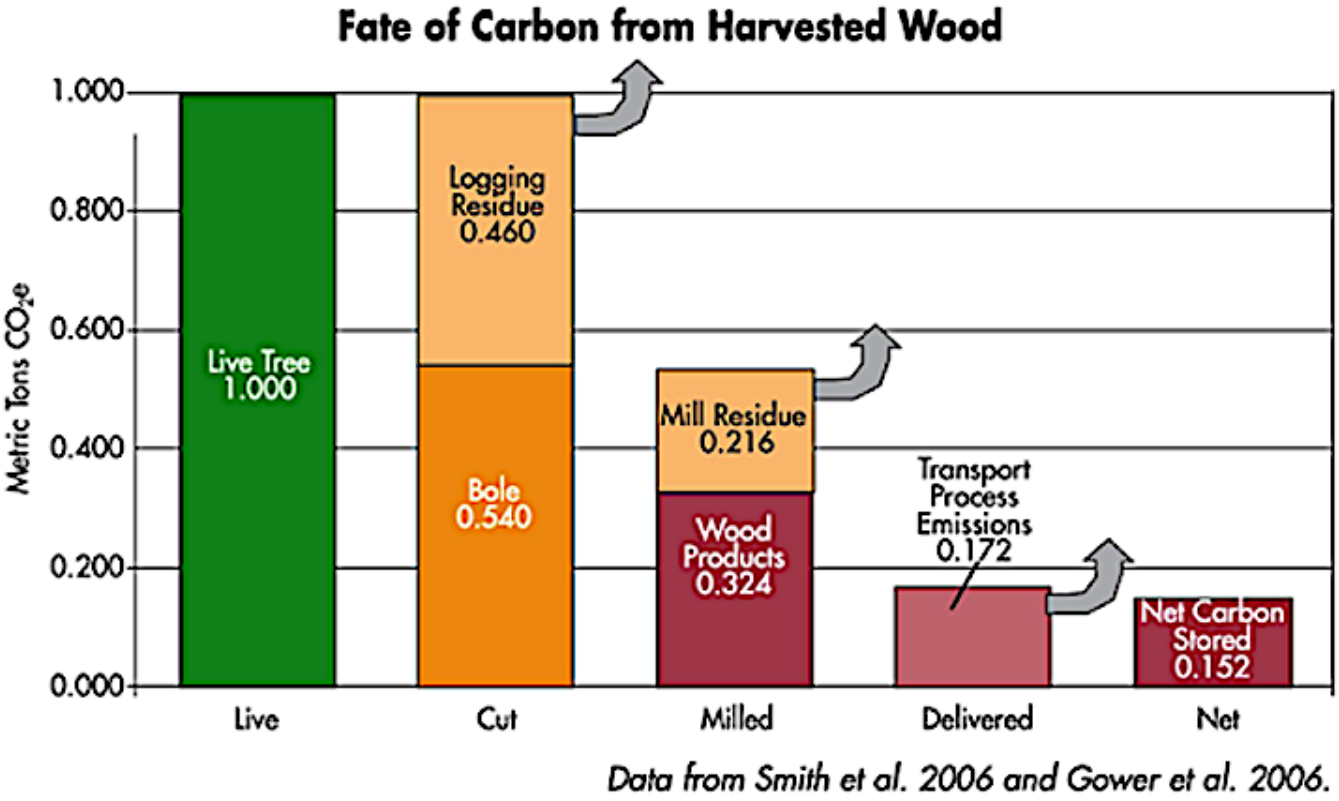
Between proposing to restore meadows that may have appeared after a stand-replacing fire long ago and proposing to restock what previously were likely to have been tree plantations known to burn at extremely high intensities and at a high rate of spread[24] causing an increased incidence of high severity fire in adjacent areas[25], the Forest Service works at the Sisyphean task of opposing Nature's course. It may be that some of the patches that burned at high severity in these fires might actually become meadows for a time if left be. However, the service of seed dispersal by the creatures that would inhabit an early seral forest ecosystem is also profoundly unappreciated.

> "By some accounts, we have entered the Anthropocene, a time of human-dominated command-and-control subjugation of nature from apex predators to keystone ecosystem processes and the dangerous transfer of carbon long buried in the Earth and stored in forests to the atmosphere. This comes with substantial and often underestimated costs along with devaluation of nature as commodities to be extracted and turned into 2x4s, "feed-stock," and "fuels" to be removed at all costs. Past single-minded extensive active management aimed at putting out all fires and logging the large, fire-resistant and carbon-dense trees to make fast-growing timber plantations have proven highly consequential to biodiversity and the climate."[26]

Clean Air Act

Ultimately, the greatest failing of this Environmental Assessment is found in the specious statements: "The Project is compliant with the Clean Air Act and the Conformity Rule." and "Siskiyou County is currently in attainment for all criteria pollutants…" With this country's pledge to reduce carbon emissions by half or more by 2030 and achieve Net Zero emissions by 2050 and California targeting even greater reductions, business as usual does not suffice.

There is absolutely no analysis of the emissions that would be produced by this project. This project proposes Hazard Tree Removals and Salvage Logging yielding merchantable timber and biomass. In the most favorable accounting of the amount of carbon emissions from the milling of logs, over 84 percent of the carbon stored in the wood is spewed back up into the atmosphere.



In the case of biomass - the small non-commercial trees and logging slash - the amount of carbon emitted is 100 percent plus the emissions from transportation. From the horse's mouth (DRAX):

> "Carbon dioxide (CO2) emissions from the combustion of biomass or biomass-based products are captured within the CO2 emissions in the Agriculture, Forestry and Other Land-Use (AFOLU) sector through the estimated changes in carbon stocks from biomass harvest, even in cases where the emissions physically take place in other sectors (e.g., energy)."[27]

This Environmental Assessment contains no accounting of the carbon budget from the wood extracted or the emissions from machinery and transportation. There is no calculation determining how long it will take to re-sequester the amount of carbon emitted from these activities and the subsequent burning of the biomass even assuming that the trees re-sequestering the carbon will not be harvested prior to that time when they will have drawn down the emitted carbon which is not a surety.

> "Cutting down trees for bioenergy results in the release of carbon that would otherwise had been locked up in carbon-rich forests. This increases emissions and creates 'carbon debt', which is only paid off **decades or even centuries later** if the trees are regrown, the scientists say."[28] (emphasis added)

With 2030 looming ever sooner, continuing with the ever increasing carbon emissions may doom the planet to a climate difficult for the inhabitants to survive in, let alone thrive. There have already been reports about the distinct possibility (50 percent probability) of breaching the Paris Agreement's 1.5°C limit within the next five years which will bring severe impacts to billions of people.[29] There seems to be an unfounded expectation that the world will continue to accelerate on its emissions trajectory and miraculously apply the brakes in the nick of time to prevent a deeper catastrophe. It is eminently more rational to begin reducing carbon emissions in the present and minimize the amount of carbon that will then be necessary to remove from the atmosphere after 2050 to return to a more stable climate.

In Conclusion

On the basis of the above facts, it is only possible to advocate for the Native Grass Seeding portion of the project since it will probably be performed to address invasive cheatgrass introduced from previous operations.

As for all other aspects of the project, it is only possible to recommend a **No Action Alternative**.

Thank you for considering these concerns.

Sincerely,

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