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Comments: Please accept the following comments from Oregon Wild concerning the Ellis Integrated Vegetation Project DEIS, https://www.fs.usda.gov/project/?project=41350, on the Heppner and North Fork John Day Ranger Districts of the Umatilla National Forest. Oregon Wild represents 20,000 members and supporters who share our mission to protect and restore Oregon's wildlands, wildlife, and water as an enduring legacy. Our goal is to protect areas that remain intact while striving to restore areas that have been degraded. This can be accomplished by moving over-represented ecosystem elements (such as logged and roaded areas) toward characteristics that are currently under-represented (such as roadless areas and complex old forest).

The modified proposed action, Alternative 2, is described below [see table and maps in attached letter]

Alt 5 is similar to Alt 2, except it would allow removal of Douglas-fir, grand fir, and white fir trees over 21" dbh (up to 30" dbh) across thousands of acres, including treatments within LOS to move OFMS towards OFSS, and Alt 5 would have a different set of open and closed roads after implementation to "increase elk security to help improve elk distribution across the greater landscape."

We appreciated the good relationships and clear / regular communication we had with District Rangers Brandon Houck and Paula Guenther who initiated this project. While we look forward to working with new and retained staff, we were very sorry to see them go. Despite the large size of this project area, the important values, and potentially thorny issues, we felt like we were on track to avoid unnecessary conflict and see a project proposal that we could support. We understand some of that may have been lost and welcome any opportunities to work with you to ensure a successful outcome. We have shared some of these concerns with Lizzy and other members of the team. We also encourage you to look at our scoping comments and previous communications on this project. In particular, please note that we believed we had found some common ground on the following issues that we will elaborate upon further in these comments:

Some of our major concerns with this proposal include:

* Several aspects of this proposal do NOT conserve LOS features as required by the Eastside Screens, including regen harvest, logging to low basal area, removal of large trees (especially Douglas fir trees that are not included the Trump Screens amendment, removal of "dominant trees" (<21" dbh but the largest in the stand) to treat mistletoe, etc;
* The EIS analysis of unroaded is inadequate. The DEIS contains no maps showing location of unroaded areas or overlap with commercial logging and road construction. The DEIS analysis makes no distinction between the ecological value of small and large undeveloped areas. The DEIS contains no meaningful analysis of effects.
* The DEIS analysis of snags is inadequate. The DEIS claims without any analysis or support, that all logging is beneficial to snags when all previous quantitative analyses show that logging is NOT beneficial to snags. The DEIS makes no distinction between the effects of light thinning versus the effects of heavy thinning, large tree removal, dominant tree removal, or regen.
* The DEIS effects analysis of Alt 2 and Alt 5 does not clearly disclose the significant effects of large tree removal, on snags, carbon, habitat, etc.
* The DEIS analysis of carbon/climate analysis is inadequate. The DEIS has no mention of the words carbon or greenhouse gas.
* Creating ember reduction zones is not supported. Wildfire is a given and so is ember production. The DEIS does not disclose the trade-offs in terms of habitat, carbon, snags and other resources.
* Removing medium and large mistletoe trees is not desirable or effective. Mistletoe trees are valuable habitat trees, LOS features in fact. Once stands become infected, removing some of the infected and susceptible trees is

not at all effective.
* Fuel breaks should be shaded and all medium and large canopy trees should be retained. "Feathering" or thinning the canopy will counter-productively modify microclimate and fuel conditions, stimulate the growth of surface and ladder fuels and will increase the cost or future maintenance treatments.

Scoping

Our scoping comments were detailed. Please review them as comments on the DEIS. Key scoping comments include:

* Follow all the requirements of the Eastside Screens, including large tree protection (>21" dbh), connectivity, promote LOS, avoid regen harvest, etc. The intent of the Screens is best met by retaining all large trees (regardless of age) and all old trees (regardless of size). Connectivity corridors must be excluded from logging or marked as separate units to ensure that desired high basal area retention is achieved;
* Consider a range of alternatives that help identify an optimal mix of treated and untreated. This single issue is critical in a project like this that is attempting to replace rather than harmonize with natural processes by treating virtually every acre of a 100,000+ acre landscape. Finding the right mix of treated and untreated also integrates several of the issues below, including: conservation of unroaded area; avoiding the impacts of road building, snag recruitment, meeting the urgent need to store carbon to mitigate global climate change, allowing natural processes to do appropriate ecological work, etc. This should have been a driving criteria for developing alternatives. DEIS Relevant Issue #1 concerns the "scope and scale" of this project. This would be the place to address the optimal mix of treated and untreated, or commercially treated vs non-commercially vs untreated treated portions of the landscape, and the associated trade-offs.
* The FS cannot choose an arbitrary set of things to restore, which just happens to aligned with the agency's timber production goals. There are many restoration needs that are being neglected and the NEPA analysis needs to acknowledge that and honestly disclose the consequences, such as restoration of large blocks of unroaded/undeveloped lands, restoration of large trees and snags, carbon storage, ungrazed native ecosystems/watersheds, restoration rather than replacement of natural disturbance regimes, etc.
* Restore the historic range of variability of large blocks of intact, unroaded habitat. Protect the disproportionate ecosystem services provided by unroaded areas >1,000 acres and larger. Wildlife evolved under conditions with large blocks of unroaded/unfragmented habitat. The EIS analysis needs to recognize restoration of this unroaded condition as equally important as restoring stand density and species composition. Analysis of Relevant Issue #3 related to road closures and Relevant Issue and #5 related to "undeveloped qualities" and Relevant Issue #6 related to temporary road construction need to be reconsidered in light of this critical restoration need;
* Identify and carefully review the trade-offs associated with commercial logging and roads. Logging does not mimic natural disturbance processes because it removes so much biomass (and adversely affects wildlife cover and recruitment of dead wood habitat, and reduced carbon storage) which are important habitat elements, and commercial logging requires building many miles of roads which have serious and long-lasting adverse effects on soil, water, and wildlife;
* Consider the many benefits of allowing natural processes to do the ecological work. Insects, disease and fire are agents of mortality that help thin the forest and increase vigor of surviving trees, plus they create and retain snags which logging does not do;
* Retain enough basal area to ensure viability of species associated with dense forest conditions, carbon storage, and snag recruitment throughout the life of the stand;
* Avoid road building. Road building has significant and long lasting adverse effects and should be avoided unless it can be clearly shown that the ecological benefits of treatments outweigh the negative effects of roads. Temporary roads are temporary only in name. The adverse impacts of temp roads are significant and long-lasting;
* Consider the adverse effects of ongoing livestock grazing on watersheds and forest health. The stated purpose and need to "enhance aspen stands, shrubsteppe communities, meadows and other non-forested plant communities" requires that livestock grazing be addressed in this EIS;

* Conserve aspen by removing small/young conifers. Recognize that aspen can and does happily co-exist with conifers. Large trees (>21" dbh) should also be retained in meadows where they provide a variety of ecological benefits, and where tree regeneration can expect to be limited by natural and prescribed fire.
* "Fuel breaks" should be shaded to reduce hazardous slash production, maintain a fuel moisture content, and reduce future maintenance costs, and mitigate trade-offs with respect to wildlife, carbon, scenic values, etc.
* Logging for "ember reduction" makes no sense. Embers are unavoidable, and it only takes one, so the best strategy is to protect homes and communities with home hardening and fuel reduction in the structure ignition zone;
* Our scoping comments mention carbon 49 times but the Ellis DEIS does not take a hard look at the carbon and climate trade-offs associated landscape scale logging;
* Managing for "resilience" is a vague goal for forest management that is used by the FS as cover to do aggressive density reduction without clear ecological justification. Thinning has only marginal and temporary benefits in terms of resistance to drought and insects. While the adverse effects of widespread logging and roads (on wildlife, soil, water, and carbon) are significant long-lasting. Wildfire and other natural disturbance agents should be viewed as solutions, not problems. These natural agents thin the forest, promote heterogeneity, recruit valuable deadwood habitat, and all for free and without the adverse effects of commercial logging on soil and wildlife.
*
We also wish to reiterate previous comments such as:

* Encouraged complexity at all scales. Even at its best, no amount of human manipulation can replicate the randomness of mosaics crated by contagious disturbances such as fire, insects, and tree fall events. Those are much better at achieving ecological goals than management based on mathematical models and machinery.
* Encouraged considering connectivity at all scales
* Leaving significant portions of the landscape unaltered.
* Conduct a limiting function analysis for things including, but not limited to snags, soils, water, and dead down woody debris.
* Sought ways to assure the portions of the project that has the most public support (such as fire use, non-commercial thinning, fish passage improvement, road closures, monitoring, etc.) actually gets done
* Noted that fuels-driven projects tend to be controversial and lead to bad ecological outcomes
* Raised serious concerns about the lower end of basal area targets
* Raised concerns about the novel idea of "ember reduction" to which we have not received a satisfactory response
* Shared our support for things like road closures, prescribed fire, and some thinning. On our tours, we agreed that some areas could benefit from thinning. However, some areas being considered for thinning and aggressive logging were not ecologically appropriate and seem driven by timber targets.

Large Tree Removal

As ever, and at all scales, we encourage you to maintain the largest trees regardless of age and the oldest trees regardless of size for the unique and important biophysical, ecological, and social values they provide. The EIS needs to better disclose the site-specific effects of removing large and old trees.

The EIS does not do an adequate job describing the differing effect of Alt 2 and Alt 5. Removal of large trees under Alt 5 will have much more significant effects on snag habitat, carbon storage/emissions, wildlife habitat, scenic values, and other resources.

EIS p 18 says "Alternative 5 would be consistent with this guideline" referring to the Trump Amendment to the Eastside Screens adopted in January 2021. In fact Alt 5 is NOT consistent with the Amended Screens, which only allows removal of large grand fir/white fir (not large Douglas fir). Between the draft and final Trump Screens,

Douglas fir were removed from the amendment primarily because, unlike grand fir, Douglas fir are NOT shade tolerant and ARE fire resistant. The EIS failed to disclose this inconsistency and failed to disclose the environmental consequences of removing even more large trees than contemplated in the Trump screens, large trees that are fire resistant and shade-intolerant.

Furthermore, Alt 5 of the Ellis DEIS is inconsistent with the Trump Screens Amendment in another way, because it contemplates removal of large trees 21-30" dbh inside LOS forests. However, the Trump Amendment to the Eastside Screens was also addressed to logging "outside LOS" and by its terms only allows removal of large grand fir/white fir trees outside of LOS. The DEIS does not explain this inconsistency, and does not disclose the environmental effects of removing even more large trees than described in the A supporting the Trump Screens Amendment.

This project was scoped before the Trump Screens Amendment was even scoped, so the public was denied an opportunity to provide scoping comments informed by the illegal amendments adopted by the Trump Administration. The FS should rescope this project in light of this dramatic departure from norms. Some people might not have provided any scoping comments assuming the FS would be protecting all trees >21" dbh. The EIS needs to provide detailed site-specific analysis of the environmental effects of removing large trees up to 30" dbh under Alt 5.

EA p 10 says "The most dominant trees within a stand may be left... In dry stands removal of grand fir and white fir under 150 years in age and less than 21 inches DBH will be considered for removal even if they are the most dominant trees in the stand to promote ponderosa pine as the dominant species." The Eastside Screens require that dominant trees must be retained. The most dominant trees are either over >21" dbh, or they are the closest thing to LOS, so they must be retained. The FS cannot put a priority on restoring species composition when doing so will violate a requirement of the forest plan. That puts a discretionary objective above a mandatory requirement. Furthermore, mistletoe infected trees are structurally modified in a way that is ecologically valuable, making them an LOS feature that should be retained for wildlife per the Screens. AND mistletoe treatments are ineffective. The only way to effectively control mistletoe is to remove all host trees across vast areas, which is accomplished by severe stand replacing fire. So, this project, by managing against such fires, is actually perpetuating mistletoe.

If the Forest Service chooses to adopt Alt 5, they apparently intends to rely on the programmatic EA supporting the Trump administration's last-minute decision to approve the regional Screens Amendment allowing removal of large trees 21-30" dbh. We strongly object to the proposed adoption of Alt 5 of the DEIS. The Trump Screens Amendment is unlawful for a variety of reason, including but not limited to:

1. The Screens Amendment was a public involvement nightmare which fails to meet legal standards. The FS failed to provide a scoping period and failed to provide an objection period (even an objection opportunity was promised from the beginning of the process). The FS failed to meaningfully respond to public comment. The decision was approved at the last minute by a corrupt, lame duck administration, arguably in oreder to avoid the accountabiulity that might be provided by an objection.
2. The decision to amend the Screens and allow removal of large numbers of large trees across a large region is likely to have significant effects on the environment and therefore requires an Environmental Impact Statement.
3. The Screens EA violated NEPA in numerous ways, such as inadequate analysis of cumulative effects, failure to take a hard look at effects on carbon and climate, habitat for viable populations of species that depend on large and old trees, dense/unmanaged forest, snags and dead wood, riparian and aquatic habitats, etc.
4. The Screens EA failed to consider reasonable alternatives to meet the purpose and need such as retaining old trees regardless of size, and allowing the large-young trees within the dripline of legacy trees to be converted to snags, using prescribed fire to control encroachment of shade-tolerant tree species, and adopting a quantitative, science-based standard for conservation and restoration of large snags and green recruitment trees to meet population goals for snag-associated species.

5. The Screens Amendment also adopted a standardless approach to managing snags and green replacement trees, calling for the provision of some snags and green trees to meet the needs of some species, but without any any quantitative measures, or assurances that logging will maintain population viability for the species which are most sensitive to the absence of abundant snags.
6. Approval of the Screens amendment violates the procedural and substantive requirements of the NFMA and its implementing regulations.
7. The FS failed to consult with NMFS and FWS regarding ESA-listed species.
8. The amendment is a bait-and-switch which the agency described as limited to removal of large trees "outside LOS" but the amendment is being interpreted to allow removal of large trees INSIDE LOS, meaning that large trees are being removed from old growth forests without full disclosure of the environmental consequences. By its terms, Scenario A of the 1995 Screens prohibited removal trees over 21" dbh outside LOS stands. This was later clarified to prohibit removal of large trees both inside and outside LOS. The Jan 2021 Trump Screens Amendment explicitly applied only to large tree removal outside LOS. The NEPA process made clear that the amendment did NOT amend the Screens requirements related to conservation of large trees inside LOS stands, which should preserve the original intent of the Eastside Screens to protect large trees >21" within LOS. A 1995 interpretive memo from the Regional Forester says: "[hellip] the intent of the screens is to maintain, in the short-term, all features of late and old structure, whether the stand is actually LOS or not. [hellip] For additional clarification, the screen direction under Scenario A of the wildlife standard is intended to maintain all live trees >21 inches regardless of tree species and regardless of whether a stand is LOS or not. The existing wording in Scenario A could be erroneously interpreted to mean that large trees >21 inches "could" be cut in LOS in some instances. We regret the ambiguous wording used in writing Amendment #2. The intent of Scenario A is as stated above." John Lowe, Nov 14, 1995 implementation memo from the Regional Forester to all eastside forest supervisors following a field trip on the Umatilla NF (emphasis added)
https://drive.google.com/file/d/11krMlEE5UcHJcln5eyjWLyiRaJAFRm_M/view?usp=sharing

We incorporate by reference our scoping comments and comments on the Large Tree Amendment EA and preserve all legal claims related to the issues raised in our NEPA comments.
https://cara.fs2c.usda.gov/Public/ReadingRoom?Project=58050&SearchResultsPerPage=100;
https://cara.fs2c.usda.gov/Public/Letter/2612870?project=58050

In the early planning stages we received some assurance that there would not be forest plan amendments in this project. Given that the cutting of trees over 21"dbh would have required an amendment of that time, it would be disingenuous for the Forest Service to undermine the trust that we had built on this issue and rely on a plan amendment to cut large trees. For this reason we urge the FS not to choose Alt 5 or any alternative that would cut large trees.

If the agency chooses to cut large trees using the Trump Screens Amendment it will generate unnecessary controversy and must be accompanied by robust analysis of all the values of large trees including wildlife habitat, carbon, water, soil health, future snags, and more.

In the past, Oregon Wild and some conservation interests have supported very limited and project specific cutting of trees over 21" dbh. Most often, this has been allowance for cutting large, young, grand fir within 1 - 1.5 driplines of a large and old ponderosa pine or larch where it is clear that the grand fir is only there due to fire suppression. In such cases, our support was higher in dry forest types and if the large trees were dropped or otherwise used on site through things like carefully designed in-stream restoration, road closures, or creating barriers to harmful grazing.

We know that trees over 21" dbh represent the largest 3% of trees in Eastern Oregon and provide disproportionate ecological and social benefits. What percent of the trees in this area are over 21". If they are rare here, they should be protected, and even if in greater local abundance, given that they are so rare in the region, it is still important to protect them here.

Before and after Trump's controversial amendment to the Screens, numerous projects have found that there was no need to cut large trees, and in some cases (Sno-Basin being a prominent one) the agency was better able to accomplish its goals (and avoid unnecessary conflict or ecological damage) by focusing on cutting trees under 21" dbh.

Concerns about "seed rain" from retaining large grand fir/white fir are unfounded. Once small trees are removed, then the FS will be able to reintroduce fire, which will control the regeneration of small trees. The FS could also create snags from large young shade-tolerant trees which would stop seed production and enhance snag habitat. The EIS needs to consider this alternative, especially in light of the severe shortage of large snags and the fact that logging will make a bad situation worse by reducing the population of green trees and the recruitment of large snags over many decades.

Regen Harvest is Not Allowed Under the Eastside Screens.

DEIS p 10 says dry forest treatments include "Shelterwood or seed tree regeneration harvest methods may be implemented where needed to move stand composition toward species that are more resilient to disturbance agents such as insects, diseases, and wildfire." A DEIS footnote indicates that "Retained trees would be less than 10% of the growing space of stand." DEIS p 10 also says that regen is deemed necessary in Cold and Cool Moist Forests "necessary to establish a species mix that is better able to tolerate existing or impending threats from insects or disease. [hellip] To effectively treat insect and disease issues, as well as improve forest health, it may be necessary to plant or let stands naturally regenerate by removing most of the existing basal area and leaving 10 to 50 square feet of basal area/acre in the stand." This is not allowed under the Eastside Screens. All logging both inside and outside LOS is supposed to move stands toward LOS, NOT "start over" with a more desired species mix. Insects and disease do not justify any deviation from this requirement, since these disturbance agents help create complex LOS forest conditions (by among other things, creating snags and small canopy openings) Also, dead and dying trees are important components of LOS forests. Regional Forester John Lowe, in a 11-14-95 memo to eastside forest supervisors regarding Regional Forester Amendment #2 Implementation - Umatilla NF Trip said "Any use of regeneration-type prescriptions, including group selection, are not allowed." This was clarified in 1997 when Regional Forester Robert Williams issued his 12-23-97 memo to eastside forest supervisors, saying "Regeneration prescriptions, including single-tree selection, are not permitted because the emphasis is on retaining existing components that contribute to LOS structure. [hellip] [A] few yellow-barked but under 21" trees were marked to make room for planting a small number of "replacement" trees. Even though an amendment was done for this planting, and no trees over 21" were planned for removal, the treatment would have removed stand components that otherwise were contributing to the value of the LOS stand." The identified need to address "stand composition" can be substantially met by thinning and retaining trees that contribute to LOS conditions. Significantly, the DEIS fails to explain why the planned regeneration logging methods are consistent with the regional direction for the Eastside Screens, and fails to disclose the adverse effects of regen harvest on LOS conditions and wildlife associated with LOS forests.

Ember Reduction Zone

Efforts toward ember reduction are unsupported by the evidence. Embers can travel very far and it does not take much vegetation to generate embers, so any attempt to address this problem will likely have a big footprint and a small effect. Embers need to be accepted, not managed. If home ignition is a problem, protect the home with home hardening and defensible space. Don't destroy the forest to prevent embers that are inevitable.

Ember reduction zones are novel and silly. Where is the science? If you don't have any, this needs to be dropped. We support focusing fuels treatments in the structure ignition zone of VaR's and working out from there with decreasing aggressiveness out to a reasonable distance. We were encouraged in the field when we believed we heard similar support from timber industry representatives.

While it's important to consider the neighbors, the 96% of the project area that is owned by the American public shouldn't be ecologically damaged to benefit a small number of adjacent landowners. Treatments meant to address their legitimate concerns (fire, elk, etc.) should be appropriately focused. Landowners bear responsibility for fire-safing their own structures and values.

The FS does not need to do aggressive fuel reduction around every private inholding, especially those that do not have any structures on them. If private landowners are particularly concerned then they should have already done their part by maintaining safe fuel conditions on their land. Dense young stands of conifers are a problem from a fuels perspective and the public should not have to accept radically altered habitat and reduced carbon storage on public lands just to protect private tree farms that exhibit irresponsible/un-neighborly fuel conditions. The FS should focus fuel reduction on areas immediately adjacent to homes and communities. We do not need to protect every fence post on private land.

Gibbons P, van Bommel L, Gill AM, Cary GJ, Driscoll DA, et al. (2012) Land Management Practices Associated with House Loss in Wildfires. PLoS ONE 7(1): e29212. doi:10.1371/journal.pone.0029212.http://nature.berkeley.edu/moritzlab/docs/Gibbons_etal_2012_PLoS.pdf ("The typical response to destructive wildfires is to increase the total area of land that is fuel-reduced [10,13]. Our results instead indicate that a shift in emphasis from broad-scale fuel-reduction treatments to intensive fuel treatments close to houses will more effectively mitigate impacts from wildfires on houses. This result is consistent with observations that the density of airborne embers and amount of radiant heat (the principal causes of house loss during wildfires) are greatest closer to the fuel source. This suggests that the actions of private landholders, who manage fuel close to houses, are extremely important when reducing risks to houses posed by fuel.").

Most structures that are burned by wildfire as ignited by surface fires as opposed to canopy fires. U.S. Dep't of Agriculture Forest Service Rocky Mountain Research Station, FOURMILE CANYON PRELIMINARY FINDINGS 69, 90 (Oct. 2011), available at http://www.scribd.com/doc/68850263/Fourmile-Canyon-Fire-Prelim-Report (83% of the homes that burned were ignited by surface fire as opposed to crown fire. This indicates that the "survival or loss of homes exposed to wildfire flames and firebrands (lofted burning embers) is not determined by the overall fire behavior or distance of firebrand lofting but rather, the condition of the Home Ignition Zone (HIZ) - the design, materials and maintenance of the home in relation to its immediate surroundings within 100 feet.")

As noted in our scoping comments [hellip]

"Ember reduction" across 57,000 acres is not a scientifically supported restoration or fuel reduction activity. Embers are natural and unavoidable. The trees that remain in the so-called ember zone can still produce a lot of embers. Trees outside the ember zone can also produce embers. This is not a fruitful focus for forest management. Homes and communities can be made reasonably safe by focusing efforts on the structure-ignition zone. Logging the National Forest to reduce embers is misguided. The stated intent of the ember reduction is not ecologically-based. The ecological integrity of our National Forests should not be compromised for very marginal, very speculative increase in controlling fires that are not a threat to ecosystem values, especially when communities can be reasonably protected with efforts in the structure-ignition zone and without wrecking the forest. "The ember reduction zone is designed to create and maintain vegetation conditions contributing to the following WUI-related goals (Moghaddas and Craggs 2007): increased penetration of retardant to surface fuels, improved visual contact between fire crews, safe access to the main fire, and quick suppression of spot fires." The FS cannot predict future wildfire location, timing or intensity, so these treatments have a very low probability of every being used to meet these stated goals. The fuels will likely regrow long before the ember zone encounters fire. The NEPA analysis needs to clearly describe the trade-offs (including the probability of positive and negative effects) associated with this proposal.

Unroaded Analysis

We strongly support the agency's decision not to propose mechanical treatments in Inventoried Roadless Areas. In addition to comporting with the roadless rule, commercial logging in unroaded landscapes is controversial for good reason. Proposing logging in roadless areas reduces trust, increases conflict, and reduces social license. Thank you for making a wise social and ecological decision.

And, Oregon Wild would not object to the careful hand thinning (without commercial removal) and reintroduction of fire in unroaded areas >1,000 acres.

However, since IRAs are so limited, we need to protect and restore lots more unroaded/ unmanaged habitat in order to restore the conditions that wildlife evolved under. We are disappointed to see that the action alternatives propose mechanical treatment on no less than 16,875 acres (>26 square miles) and as much as 27,515 acres (nearly 43 square miles) of unroaded lands. The EIS needs to disclose how much of that will be commercial logging. While we may be able to support some ecologically appropriate non-commercial thinning and prescribed fire near values at risk, we are concerned that this level of aggressive logging in undeveloped landscapes is not appropriate, and that the trade-offs raised in our scoping comments have not been fully and accurately disclosed.

Alternatives 2 & 5 allow for "the potential loss of 58.2% of the undeveloped lands in the project area." That's moving things dramatically in the wrong direction.

Oregon Wild's scoping comment (and the scientific literature) highlight the values in unroaded areas larger than 1,000 acres, but the EIS does not highlight those values or disclose the effects on that subset of undeveloped lands. From what we can decipher in the DEIS, Oregon Wild is particularly concerned about the 17 undeveloped polygons larger than 640 acres, but the EIS does not appear to provide a map showing where those polygons are located, nor does it describe their key features, such as forest types, topography, unique features, proximity to streams, carbon storage, successional stages, etc. And most importantly, the DEIS does not disclose where the logging units overlap with those large unroaded polygons and what the environmental effects of logging will be in terms of site-specific adverse effects to the special values associated with undeveloped/unroaded areas. To be precise, the DEIS (p 136) says there is 27,515 acres of "thinning and mechanical treatments" in all undeveloped lands, but does not disclose the subset of commercial logging in the subset of large (>1,000 acre) unroaded areas. The entire effects analysis is only a few paragraphs long, extremely general, and not site-specific or resource specific.

The DEIS (p 58) says "The affected environment of undeveloped lands tiers to the descriptions related to other resources described above." And DEIS (p 137) says "For undeveloped lands in which project activities would occur, the cumulative effects to soil, water quality, plant and animal communities, habitat for threatened, endangered, and sensitive species, recreation, and cultural resources are disclosed in the applicable resource sections of the EIS and are not reiterated here." This blurs the disproportionate ecosystem services provided by unroaded areas with the degraded ecosystem services in logged and roaded areas. The EIS needs to take a hard look at the special values in unroaded areas, and the disproportionate adverse effects of logging on those values. Why bother doing an analysis of effects of logging and roads in unroaded areas if the DEIS is just going to say the effects are exactly like the effects of logging and roads logged in roaded areas? For instance, one of the important but under-appreciated values of unroaded areas is the long-term creation and maintenance of dead wood habitat due to the fact that unmanaged areas are where natural processes are allowed to flourish. Unroaded areas are one of the few places where trees are allowed to fulfill their entire "lifecycle" (including their life-giving role as snags, dead wood, and soil builders) in the forest. Korol et al (2002) found that large snag habitat is below historic range of variability across the Interior Columbia Basin and they estimated that even if the agencies apply enlightened forest management on federal lands in the Interior Columbia Basin for the next 100 years, we will still reach only 75% of the historic large snag abundance, and most of the increase in large snags will occur in roadless and wilderness areas. Jerome J. Korol, Miles A. Hemstrom, Wendel J. Hann, and Rebecca

A. Gravenmier. 2002. Snags and Down Wood in the Interior Columbia Basin Ecosystem Management Project. PNW-GTR-181. http://www.fs.fed.us/psw/publications/documents/gtr-181/049_Korol.pdf. Since wilderness and unmanaged areas are the only place that a healthy population of snags is likely to be recruited and maintained over the long term, they represent invaluable and irreplaceable mitigation for all the places where snags are in short supply due to logging, hazard tree removal, and other management efforts designed to control and capture mortality. The EIS needs to take a hard look at this.

The FS needs to recognize that unroaded areas provide disproportionate public values such as clean water, biodiversity, carbon storage, resilience to climate change, recreation, and scenery. Watson et al (2018) -

summarize published evidence that intact forests support an exceptional confluence of globally significant environmental values relative to forests that have experienced those damaging human actions. We show that intact forests are indispensable not only for addressing rapid anthropogenic climate change, but also for confronting the planet's biodiversity crisis, providing critical ecosystem services and supporting the maintenance of human health. We then show that the relative value of intact forests is likely to become magnified as already-degraded forests experience further intensified pressures (including anthropogenic climate change).

[hellip] [I]ntact forest protection can typically secure very high environmental values with often relatively low implementation and opportunity costs, which serves to reinforce the need for their direct inclusion in global environmental accords. [hellip]

[hellip] The increasing significance of intact forests

The differences in important environmental and social values of intact forests relative to degraded forests are likely to become magnified in the future due to two negative processes in degraded areas: progressive anthropogenic damage and reduced resilience to environmental change.

[hellip]Retaining the integrity of intact forest ecosystems should be a central component of proactive global and national environmental strategies, alongside current efforts aimed at halting deforestation and promoting reforestation.

[hellip] An essential first step towards greater success is achieving widespread recognition that rapid loss of forest intactness represents a major threat to sustainable development and human well-being. Policymakers need to understand the challenge that the loss of forest intactness represents for achieving strategic goals outlined in key multilateral environmental agreements, including the Convention of Biological Diversity, the UNFCCC and the UN Sustainable Development Goals139,143, and this recognition needs to be translated into meaningful changes on the ground.

A fundamental constraint to progress is the fact that international definitions of forests have not differentiated among types of forest and, in most policy settings, they treat all forests, regardless of their condition, as equivalent1,144. As such, international policy processes seldom acknowledge the special qualities and benefits that flow from intact ecosystems as compared with those that are degraded.

[hellip] There is evidence that the designation of 'roadless areas' in the USA, for example, has led to an effective expansion in the degree of ecoregional representation under protection and increases in the number of areas big enough to provide refugia for species needing large tracts relatively undisturbed by people.

[hellip]

Conclusion

There are still significant tracts of forest that are free from the damaging impacts of large-scale human activities. These intact forests typically provide more environmental and social values than forests that have been degraded by human activities. [hellip] The practical tools required to address this challenge are generally well understood and include well-located and managed protected areas, indigenous territories that exemplify sound stewardship regulatory controls and responsible behaviour by logging, mining, and agricultural companies and consumers, and targeted restoration. Currently these tools are insufficiently applied, and inadequately supported by governance, policy and financial arrangements designed to incentivize conservation. Losing the remaining intact forests would exacerbate climate change effects through huge carbon emissions and the decline of a crucial, under-appreciated carbon sink. It would also result in the extinction of many species, harm communities worldwide by disrupting regional weather and hydrology, and devastate the cultures of many indigenous communities. Increased awareness of the scale and urgency of this problem is a necessary pre-condition for more effective conservation efforts across a wide range of spatial scales.

Watson, Evans, Venter et al 2018. The exceptional value of intact forest ecosystems. Nature Ecology & Evolution (2018) https://www.nature.com/articles/s41559-018-0490-x

[see image in letter submitted during comment period (Watson et al (2018))]

The NEPA analysis must not blur the distinction between the effect of logging on roaded areas and unroaded areas. The effects of logging unroaded areas are qualitatively different and more significant than logging areas previously affected by roads and logging. The NEPA analysis must clearly disclose the fact that water quality, habitat, scenic values, soil quality, and carbon storage are all better in unroaded areas than roaded areas, and logging will have disproportionately adverse effects on those values.

Natural disturbances such as wildfire are already playing a positive role in maintaining resiliency, making mechanical intervention unnecessary. James D Johnston, John B. Kilbride, Garrett W. Meigs, Christopher J Dunn, and Robert E. Kennedy. In Press, July 2021. Does conserving roadless wildland increase wildfire activity in western U.S. national forests? Environmental Research Letters. https://doi.org/10.1088/1748-9326/ac13ee; https://iopscience.iop.org/article/10.1088/1748-9326/ac13ee/pdf ("Although fire patterns in roadless areas may pose challenges to land managers, the available evidence suggests that the greater extent of fire in roadless areas may confer resilience to these landscapes in the face of climate change").

Large intact expanses of habitat were once quite common but are now rare. Species evolved in the context of the large habitat patches that result from the natural disturbance regime. As just one important example, big game need large patches of security cover which is best provided by large unroaded areas. New science confirms that roads and logging tend to be contagious on the landscape (managed areas beget more management until little remains unmanaged), so to conserve the habitat values associated with wild places we have to prevent the first intrusions. The purpose and need for this project should include protecting and restoring large unroaded areas consistent with the natural range of variability.

Boakes et al (2009) explained why it is important to retain large unroaded areas.

Abstract: Habitat clearance remains the major cause of biodiversity loss, with consequences for ecosystem services and for people. In response to this, many global conservation schemes direct funds to regions with high rates of recent habitat destruction, though some also emphasize the conservation of remaining large tracts of intact habitat. If the pattern of habitat clearance is highly contagious, the latter approach will help prevent destructive processes gaining a foothold in areas of contiguous intact habitat. Here, we test the strength of spatial contagion in the pattern of habitat clearance. Using a global dataset of land-cover change at 50x50 km resolution, we discover that intact habitat areas in grid cells are refractory to clearance only when all neighbouring cells are also intact. The likelihood of loss increases dramatically as soon as habitat is cleared in just one neighbouring cell, and remains high thereafter. This effect is consistent for forests and grassland, across

biogeographic realms and over centuries, constituting a coherent global pattern. Our results show that landscapes become vulnerable to wholesale clearance as soon as threatening processes begin to penetrate, so actions to prevent any incursions into large, intact blocks of natural habitat are key to their long-term persistence.

Elizabeth H. Boakes, Georgina M. Mace, Philip J. K. McGowan and Richard A. Fuller 2009. Extreme contagion in global habitat clearance. Proceedings of the Royal Society B: Biological Sciences. November 25, 2009. doi: 10.1098/rspb.2009.1771.
http://rspb.royalsocietypublishing.org/content/royprsb/early/2009/11/25/rspb.2009.1771.full.pdf

Ibisch et al (2016) said

The planet's remaining large and ecologically important tracts of roadless areas sustain key refugia for biodiversity and provide globally relevant ecosystem services. [hellip] Global protection of ecologically valuable roadless areas is inadequate. International recognition and protection of roadless areas is urgently needed to halt their continued loss.

[hellip]

The impact of roads on the surrounding landscape extends far beyond the roads themselves. Direct and indirect environmental impacts include deforestation and fragmentation, chemical pollution, noise disturbance, increased wildlife mortality due to car collisions, changes in population gene flow, and facilitation of biological invasions (1-4). In addition, roads facilitate "contagious development," in that they provide access to previously remote areas, thus opening them up for more roads, land-use changes, associated resource extraction, and human-caused disturbances of biodiversity (3, 4). With the length of roads projected to increase by >60% globally from 2010 to 2050 (5), there is an urgent need for the development of a comprehensive global strategy for road development if continued biodiversity loss is to be abated (6). To help mitigate the detrimental effects of roads, their construction should be concentrated as much as possible in areas of relatively low "environmental values" (7). Likewise, prioritizing the protection of remaining roadless areas that are regarded as important for biodiversity and ecosystem functionality requires an assessment of their extent, distribution, and ecological quality.

[hellip]

There is an urgent need for a global strategy for the effective conservation, restoration, and monitoring of roadless areas and the ecosystems that they encompass. Governments should be encouraged to incorporate the protection of extensive roadless areas into relevant policies and other legal mechanisms, reexamine where road development conflicts with the protection of roadless areas, and avoid unnecessary and ecologically disastrous roads entirely. In addition, governments should consider road closure where doing so can promote the restoration of wildlife habitats and ecosystem functionality (4).

[hellip]

To achieve global biodiversity targets, policies must explicitly acknowledge the factors underlying prior failures (13). Despite increasing scientific evidence for the negative impacts of roads on ecosystems, the current global conservation policy framework has largely ignored road impacts and road expansion.

[hellip]

In the much wider context of the United Nations' Sustainable Development Goals, conflicting interests can be seen between goals intended to safeguard biodiversity and those promoting economic development (14).

[hellip]

Enshrined in the protection of roadless areas should be the objective to seek and develop alternative socioeconomic models that do not rely so heavily on road infrastructure. [hellip] Although we acknowledge that access to transportation is a fundamental element of human well-being, impacts of road infrastructure require a fully integrated environmental and social cost benefits approach (15). Still, under current conditions and policies, limiting road expansion into roadless areas may prove to be the most cost effective and straightforward way of achieving strategically important global biodiversity and sustainability goals.

Pierre L. Ibisch, Monika T. Hoffmann, Stefan Kreft, Guy Pe'er, Vassiliki Kati, Lisa Biber-Freudenberger, Dominick A. Dellasala, Mariana M. Vale, Peter R. Hobson, Nuria Selva. 2016. A global map of roadless areas and their conservation status. SCIENCE 16 DEC 2016 : 1423-1427. http://science.sciencemag.org/content/354/6318/1423

Our planet is in the midst of a significant extinction event caused by habitat destruction and climate change. Protecting existing wilderness-quality lands will pay huge dividends for biodiversity.

... we model the persistence probability of biodiversity, combining habitat condition with spatial variation in species composition, to show that retaining these remaining wilderness areas is essential for the international conservation agenda. Wilderness areas act as a buffer against species loss, as the extinction risk for species within wilderness communities is[mdash]on average[mdash]less than half that of species in non-wilderness communities.

Di Marco, M., Ferrier, S., Harwood, T.D. et al. Wilderness areas halve the extinction risk of terrestrial biodiversity. Nature 573, 582-585 (2019) doi:10.1038/s41586-019-1567-7.https://www.nature.com/articles/s41586-019-1567-7. See also, Keim, B. 2019. Wilderness areas could reduce extinction risks by more than half. Anthropocene Magazine. October 23, 2019 http://www.anthropocenemagazine.org/2019/10/importance-of-wilderness/

Roadless and unroaded areas also play a significant role in both climate change mitigation (through carbon storage) and climate change adaptation (by facilitating connectivity and resilience to disturbance).

Transportation infrastructure and carbon sequestration

The topic of the relationship of road restoration and carbon has only recently been explored. [and there are presumably similar carbon benefits from conserving unroaded areas and not building roads in the first place.] There is the potential for large amounts of carbon (C) to be sequestered by reclaiming roads.When roads are decompacted during reclamation, vegetation and soils can develop more rapidly and sequester large amounts of carbon. A recent study estimated total soil C storage increased 6 fold to 6.5 x 107g C/km (to 25 cm depth) in the northwestern US compared to untreated abandoned roads (Lloyd et al. 2013). Another recent study concluded that reclaiming 425 km of logging roads over the last 30 years in Redwood National Park in Northern California resulted in net carbon savings of 49,000 Mg carbon to date (Madej et al. 2013, Table 5).

...

Benefits of roadless areas and roadless area networks to climate change adaptation

Undeveloped natural lands provide numerous ecological benefits. They contribute to biodiversity, enhance ecosystem representation, and facilitate connectivity (Loucks et al. 2003; Crist and Wilmer 2002, Wilcove 1990, The Wilderness Society 2004, Strittholt and Dellasala 2001, DeVelice and Martin 2001), and provide high quality or undisturbed water, soil and air (Anderson et al. 2012, Dellasalla et al. 2011). They also can serve as ecological baselines to help us better understand our impacts to other landscapes, and contribute to landscape resilience to climate change.

Forest Service roadless lands, in particular, are heralded for the conservation values they provide. These are described at length in the preamble of the Roadless Area Conservation Rule (RACR)4 as well as in the Final Environmental Impact Statement (FEIS) for the RACR5 , and include: high quality or undisturbed soil, water, and air; sources of public drinking water; diversity of plant and animal communities; habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land; primitive, semi-primitive non- motorized, and semi-primitive motorized classes of dispersed recreation; reference landscapes; natural appearing landscapes with high scenic quality; traditional cultural properties and sacred sites; and other locally identified unique characteristics (e.g., include uncommon geological formations, unique wetland complexes, exceptional hunting and fishing opportunities).

The Forest Service, National Park Service, and US Fish and Wildlife Service recognize that protecting and connecting roadless or lightly roaded areas is an important action agencies can take to enhance climate change adaptation. For example, the Forest Service National Roadmap for Responding to Climate Change (USDA Forest Service 2011b) establishes that increasing connectivity and reducing fragmentation are short and long term actions the Forest Service should take to facilitate adaptation to climate change.6 The National Park Service also identifies connectivity as a key factor for climate change adaptation along with establishing "blocks of natural landscape large enough to be resilient to large-scale disturbances and long-term changes" and other factors. The agency states that: "The success of adaptation strategies will be enhanced by taking a broad approach that identifies connections and barriers across the landscape. Networks of protected areas within a larger mixed landscape can provide the highest level of resilience to climate change."7 Similarly, the National Fish, Wildlife and Plants Climate Adaptation Partnership's Adaptation Strategy (2012) calls for creating an ecologically-connected network of conservation areas.8

Crist and Wilmer (2002) looked at the ecological value of roadless lands in the Northern Rockies and found that protection of national forest roadless areas, when added to existing federal conservation lands in the study area, would 1) increase the representation of virtually all land cover types on conservation lands at both the regional and ecosystem scales, some by more than 100%; 2) help protect rare, species-rich, and often-declining vegetation communities; and 3) connect conservation units to create bigger and more cohesive habitat "patches."

Roadless lands also are responsible for higher quality water and watersheds. Anderson et al. (2012) assessed the relationship of watershed condition and land management status and found a strong spatial association between watershed health and protective designations. Dellasalla et al. (2011) found that undeveloped and roadless watersheds are important for supplying downstream users with high-quality drinking water, and developing these watersheds comes at significant costs associated with declining water quality and availability. The authors recommend a light-touch ecological footprint to sustain the many values that derive from roadless areas including healthy watersheds.

The Wilderness Society. 2014. Transportation Infrastructure and Access on National Forests and Grasslands - A Literature Review. May 2014. https://www.fs.usda.gov/nfs/11558/www/nepa/96158_FSPLT3_3989888.pdf, https://www.sierraforestlegacy.org/Resources/Conservation/ProjectsPlans/ForestPlanRevisions/SFL%20et%20al.%20FPR%20comments%20part%205%20of%205.pdf

The Forest Service defines unroaded areas as any area without the presence of classified roads, and of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition. http://web.archive.org/web/20010729111100/http://roadless.fs.fed.us/documents/feis/glossary.shtml. Unroaded areas greater than about 1,000 acres, whether they have been inventoried or not provide valuable natural resource attributes that must be protected. These include: water quality; healthy soils; fish and wildlife refugia; centers for dispersal, recolonization, and restoration of adjacent disturbed sites; reference sites for research; non-motorized, low-impact recreation; carbon sequestration; refugia that are relatively less at-risk from noxious weeds and other invasive non-native species, and many other significant values. See Forest Service Roadless Area Conservation FEIS, November 2000.

Former Secretary of Agriculture Tom Vilsack recognizes the value of National Forest roadless areas: "Roadless areas preserve essential watersheds and help ensure an abundant supply of clean drinking water. These large areas of undisturbed forests provide diverse habitats for sensitive and endangered wildlife. In addition, roadless areas provide other critical ecological services, such as carbon storage, and operate as effective barriers to invasive species, while also providing social values such as scenic landscapes and a host of recreational opportunities. Let me assure you that USDA and the Forest Service will move forward to conserve and protect these lands and meet all legal obligations." March 11, 2009 letter to Oregon Governor Ted Kulongoski.

The DEIS needs to consider the following Dec. 1999 comments from WWF and CBI on the value of unroaded areas in eastern Oregon:

In eastern Washington and Oregon, from 70 to 95% of the late-successional and old-growth forest that remain cover less than 100 acres. Three national forests (Colville, Wallowa-Whitman, and Winema) in this region have no late seral patches larger than 5,000 acres, and only one of the seven late-successional forests larger than 5,000 acres in three national forests (Malheur, Ochoco, and Umatilla) is protected (Henjum et al. 1994). For these reasons, the Eastside Scientific Society Panel (Henjum et al. 1994) recommended protecting all roadless areas of 1,000 acres or those smaller than 1,000 acres of ecological significance as key to restoring ecological integrity (aquatic and terrestrial) and maintaining the remaining patches of late-seral/old-growth forests across the region. Thus, it is imperative that the EIS recognize the importance of these smaller roadless areas for their contribution in maintaining late-seral forests throughout the nation and particularly in the regions identified above.

Setting Conservation Thresholds (coarse vs. fine filter approaches) - the basic premise of a coarse-filter approach is to protect representative habitats (particularly in redundant sequence) within an ecoregion as a means for minimizing the need and costs of protecting or managing every species. Based on the above review, the supposition that roadless areas act a coarse filter approach to biodiversity is not only plausible but scientifically defensable. In general, large roadless areas are more likely to capture a representative array of habitat types and elevation bands, particularly in highly complex regions, than small roadless areas. However, in many ecoregions (both eastern and western examples provided here) what remains of landscapes with ecological integrity is smaller than the RARE II threshold of 5,000 acres. Consequently, the 5,000 acres threshold is not as ecologically meaningful as 1,000 acres for maximizing the conservation benefits and opportunities to achieve the twin goals of representation and ecosystem restoration. A more defensible threshold would be to use 1,000 acres as the initial starting point, back-filling with fine filter conservation approaches aimed at targeting smaller areas of ecological significance and ecological hot spots such as endemic species foci that operate over smaller spatial scales. This process would more effectively ensure an "adaptive" conservation approach that makes use of coarse and fine filters, achieves representation objectives, and is consistent with recommendations as proposed by the scientific community above and the Eastside Scientific Society (Henjum et al. 1994). To set the threshold at 5,000 acres would increase ecological risks significantly.

http://replay.waybackmachine.org/20060615084657/http://www.worldwildlife.org/wildplaces/kla/pubs/roadscope.pdf.

World Wildlife Fund and the Conservation Biology Institute summarized the important attributes of small roadless areas (1,000-5,000 acres).

Small roadless areas share many of attributes in common with larger ones, including:

[bull] Essential habitat for species key to the recovery of forests following disturbance such as herbaceous plants, lichens, and mycorrhizal fungi

[bull] Habitat refugia for threatened species and those with restricted distributions (endemics)

[bull] Aquatic strongholds for salmonids

[bull] Undisturbed habitats for mollusks and amphibians

[bull] Remaining pockets of old-growth forests

[bull] Overwintering habitat for resident birds and ungulates

[bull] Dispersal "stepping stones" for wildlife movement across fragmented landscapes

DellaSala, Dominick and James Strittholt. 2002. Scientific Basis For Roadless Area Conservation. World Wildlife Fund. Ashland, OR; Conservation Biology Institute. (June 2002 - Updated October 2003) https://d2k78bk4kdhbpr.cloudfront.net/media/reports/files/Scientific_Basis_For_Roadless_Area_Conservation.pdf .

In a 1997 letter to President Clinton, 136 scientists said:

There is a growing consensus among academic and agency scientists that existing roadless areas-irrespective of size-contribute substantially to maintaining biodiversity and ecological integrity on the national forests. The Eastside Forests Scientific Societies Panel, including representatives from the American Fisheries Society, American Ornithologists' Union, Ecological Society of America, Society for Conservation Biology, and The Wildlife Society, recommended a prohibition on the construction of new roads and logging within existing (1) roadless regions larger than 1,000 acres, and (2) roadless regions smaller than 1,000 acres that are biologically significant[hellip]. Other scientists have also recommended protection of all roadless areas greater than 1,000 acres, at least until landscapes degraded by past management have recovered[hellip]. As you have acknowledged, a national policy prohibiting road building and other forms of development in roadless areas represents a major step towards balancing sustainable forest management with conserving environmental values on federal lands. In our view, a scientifically based policy for roadless areas on public lands should, at a minimum, protect from development all roadless areas larger than 1,000 acres and those smaller areas that have special ecological significance because of their contributions to regional landscapes.

Letter to President Clinton from 136 scientists (Dec. 10, 1997).

https://drive.google.com/file/d/0B4L_-RD-MJwrRzhFcm5QcFR0MHM/view?usp=sharing&resourcekey=0-2-sbGMN3bOUBQGGMDBQM1Q

To the list of special values found within unroaded areas must be added carbon storage. European policy leaders consider roadless areas effective for carbon storage and climate mitigation:

[T]he European Parliament has agreed to raise the issue of roadbuilding in intact forests at the UN Climate Change Conference to be held next month in Warsaw (Poland); it calls on parties to use the existence of roads in forest areas as an early negative performance indicator of REDD+ projects, and to prioritise the allocation of REDD+ funds towards road free forests.

Oct 24, 2013 Press release: EUROPEAN PARLIAMENT BACKS THE PROTECTION OF ROADFREE AREAS. http://kritonarsenis.gr/eng/actions/view/european-parliament-backs-the-protection. Federal land managers should recognize the tremendous carbon values in unroaded/unmanaged forests and avoid actions that would threaten these values. See also, William R. Moomaw, Susan A. Masino, and Edward K. Faison. 2019. Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good Front. For. Glob. Change, 11 June 2019 | https://doi.org/10.3389/ffgc.2019.00027;

https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full. See also, Kun, Z., DellaSala, D., Keith, H., Kormos, C., Mercer, B., Moomaw, W.R. and Wiezik, M. (2020), Recognising the importance of unmanaged forests to mitigate climate change. GCB Bioenergy. Accepted Author Manuscript. doi:10.1111/gcbb.12714https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/gcbb.12714. ("The most effective means for keeping carbon out of the atmosphere to meet climate goals is to protect primary forests (Mackey et al. 2020) and continue growing secondary forests to accumulate additional carbon (proforestation) (Moomaw et al. 2019) while reducing emissions from all sources including bioenergy. [hellip] The importance of primary (unlogged) forests lies in the magnitude and longevity of their carbon stock. In order to reverse the decreasing forest carbon stocks in Europe (EEA, 2019), the largest forest carbon stores must be protected and additional forests must be allowed to continue accumulating carbon (proforestation).").

There are tremendous co-benefits from conserving large blocks of unmanaged forests, such as climate mitigation and biodiversity conservation.

Based on the species-area relationship, regarded as one of ecology's few universal laws, protection of [too] little habitat will condemn thousands of species to extinction if habitat outside them is converted, degraded or lost. It is this logic that underpins calls for'Nature Needs Half' [26], together with an understanding that ecosystem processes and services of the scale needed to sustain the well-being of life on Earth require large wildlife populations and huge expanses of intact and restored habitat. ... Climate change adds a new dimension to the question of how much protected area coverage is needed to assure conservation of wild nature. Climate change is already reducing wildlife population sizes and forcing range shifts as conditions alter [28,29]. Protected areas counter such stresses by building up populations, and connectivity of populations and habitats is emerging as a key property in securing species persistence and resilience to rapid change [5]. Hence networked protected areas, especially where embedded within well-managed landor seascapes, provide crucial stepping stones to accommodate range shifts and, where no further movements are possible, refuges of last resort [5]. Analyses suggest that adequate levels of population viability and connectivity can be achieved only with marine protected area coverages of 30% or more [27]. ... [G]iven that many ecosystems are already degraded, ensuring continued provision of ecosystem services requires not only the precautionary protection of currently intact habitats, but also large-scale habitat restoration.

Providing greater space for recovery of intact, vibrant nature is not altruistic conservation, but is, we argue, an indispensable act of self- preservation, roducing a cascade of benefits that will help maintain the habitability of the biosphere as the climate changes, thereby securing the well-being of generations to come.

Roberts CM, O'Leary BC, Hawkins JP. 2020 Climate change mitigation and nature conservation both require higher protected area targets. Phil. Trans. R. Soc. B 375: 20190121. http://dx.doi.org/10.1098/rstb.2019.0121. See also, Soto-Navarro C et al. 2020 Mapping co-benefits for carbon storage and biodiversity to inform conservation policy and action. Phil. Trans. R. Soc. B 375: 20190128. http://dx.doi.org/10.1098/rstb.2019.0128 showing the congruence of high carbon value and high biodiversity value in PNW forests.

In 1994, several scientific societies submitted a report to Congress and the President recommending conservation of roadless areas larger than 1,000 acres. This report is describe by the Interior Columbia Ecosystem Management Project as a "Major Stud[y] of Eastside Ecosystems and Management."

Because roads crisscross so many forested areas on the Eastside, existing roadless regions have enormous ecological value. [hellip] Although roads were intended as innocuous corridors to ease the movement of humans and commodities across the landscape, they harm the water, soils, plants, and animals in those landscapes. [p 6]

[hellip]

4. Do not construct new roads or log within existing (1) roadless regions larger than 1000 acres or (2) roadless

regions smaller than 1000 acres that are biologically significant.

Roadless regions constitute the least-human-disturbed forest and stream systems, the last reservoirs of ecological diversity, and the primary benchmarks for restoring ecological health and integrity. Roads fragment habitat; alter the hydrological properties of watersheds; discharge excessive sediment to streams; increase human access and thus disturbance to forest animals; and influence the dispersal of plants and animals, especially exotic species, across the landscape. Because many forested areas in eastern Oregon and Washington are heavily dissected by roads, the ecological value of existing roadless regions is especially high. [pp 8, 202]

[hellip]

Our analysis defined a roadless region as any region where all points within an LS/OG stand were at least 100 meters from a road or trail.

[hellip]

What remains of ponderosa pine and Douglas fir LS/OG is the least protected today. In the four national forests within the Blue Mountains, 48% of the land base above 6000 feet lies in wilderness areas, whereas only 10% of the land below 6000 feet, where ponderosa pine occurs, receives such protection [hellip] [p 110]

[hellip] Fifth, roads, whose impact on aquatic and terrestrial resources is well documented, are widely distributed in eastside forests. Road densities in western Colville, Winema, and Ochoco National Forests average 2.5, 3.5, and 3.7 miles per square mile, respectively. Densities reach 8.8 and 11.9 miles per square mile in some watersheds. In the national forests of Oregon's Blue Mountains (Table 5.2), less than 10% of roadless regions on slopes steeper than 60% are now protected, less than 15% on slopes of 30-60%. Moreover, roadless regions, like LS/OG patches, are extensively fragmented. In northern Ochoco National Forest, nearly one-third (38,882 acres) of 128,140 acres of roadless region consists of patches smaller than 1000 acres. (RARE II surveys underestimated total roadless area in this region [45,700 acres] because they considered only areas larger than 5000 acres.) [p 110]

[hellip]

CONCLUSIONS

Watersheds outside wilderness and roadless regions in eastern Oregon and Washington are highly degraded. Without an intensive restoration effort on federal and private lands, many native aquatic stocks and species risk extinction. [p 160]

[hellip]

Because the distribution of many native fishes in Oregon's national forests has receded into steep headwater areas, USPS has a vital role in protecting the few remaining watershed refugia and preventing further damage to already degraded habitats downstream. Critical to securing eastside [aquatic diversity areas] ADAs as aquatic refugia are the remaining roadless regions, sources of large wood from LS/OG forests, and the integrity of riparian corridors on national forestlands. [p 168]

[hellip]

7. High road densities harm many forms of wildlife.

The ecological integrity of existing LS/OG patches and other roadless regions can only be maintained if these sites are not disturbed by the construction of roads. Roadless regions serve as critical refuges for terrestrial wildlife sensitive to human disturbance. Road densities in LS/OG patches that already have roads should be reduced to less than 1 mi/mi2. Achieving this goal is vital to rehabilitation of eastside fisheries and terrestrial resources. [p 197]

Henjum, M.G., J.R. Karr, D.L. Bottom, D.A. Perry, J.C. Bednarz, S.G. Wright, S.A. Beckwitt and E. Beckwitt. 1994. Interim Protection for Late-Successional Forests, Fisheries, and Watersheds: National Forests East of the Cascade Crest, Oregon and Washington. A Report to the Congress and President of the United States. Eastside Forests Scientific Society Panel.

The forthcoming Parkers Mill Project needs be included in the Cumulative Effects Analysis.

Snag Habitat Analysis

Both Oregon Wild and EPA asked that the Ellis EIS disclose effects of logging on snags and dead wood habitat. Unfortunately, the DEIS does a poor job. Logging has an significant and long-lasting adverse effect on snag recruitment. Logging across a large fraction of a large landscape has especially significant adverse impacts. The Wildlife Report compares the reference and existing snag habitat, but fails to clearly show the effects of widespread logging that decimates the population of live trees from which snags are recruited. The DEIS (p 92) makes implausible assertions without any analysis to support them, such as "there may be a slight decline in snags in some areas in the short term. In the long term, since thinning treatments may move trees into larger size classes, it is expected that green tree replacement (future large snags) will increase." This conclusion is unsupported by any evidence or analysis and is soundly refuted by every quantitative analysis which takes into account the fact that logging significant reduces in the population of green trees from which snags are recruited, AND the fact that unthinned trees continue growing. The DEIS fails to provide a quantitative analysis of the effects on logging on long-term snag recruitment over time, such as the graph below is from the Curran Junetta Thin EA. It shows that thinning prescriptions delays by more than 60 years the attainment of habitat objectives for large snags (i.e. mid-point of the gray band representing 30-80% tolerance level). [see comment letter for graphic]http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/32805_FSPLT2_053506.pdf. The Ellis DEIS says logging will promote larger trees, but it does not account for the fact that it will promote far fewer large trees, because so many trees will be exported from the forest and sent to the mill, especially in Alternative 5. The DEIS makes no distinction between Alt 2 and Alt 5, even though Alt 5 will remove existing large trees so they can never be recruited as large snags.

The Wildlife Report does show that there is a severe shortage of large snags in the project area, but it does not provide an accurate analysis of the adverse effects of logging, which would show that logging will make a bad situation worse, and contradict the conclusion that "in the long term there will be beneficial impacts through an increase in large snags and down wood". You simply can't recruit more snags from fewer trees, and when those fewer trees. [see comment letter for supporting graphic]

Since snags are an important component of LOS forests, large-scale logging that causes a significant reduction in snag recruitment over a large landscape likely violates the Eastside Screens requirement to manage toward LOS.

The snag analysis in the Wildlife Report is formatted in such a way that it is impossible to read many of the graphs that spill off the bottom of the page and disappear, such as: [see comment letter for graphic]

The FS failed to recognize the trade-offs inherent in this kind of restoration. Enhancing one aspect of LSO forests

(park-like stands of large trees) will have adverse effects on other aspects of LOS forests (abundant snags and down wood). Modelling shows that [hellip]

"Sixty-four thinning treatments were simulated for four rotation intervals (260, 180, 100, and 80 years) starting with a 40-year-old managed Douglas-fir stand. [hellip] In general, heavy thinning of existing stands at ages 40 and 60 years promoted rapid development of large boles, vertical diversity, and tree-species diversity, but provided the least amount of extracted volume and required artificial creation of dead wood. [hellip] Natural recruitment of snags was related to thinning densities (fig. 3A). In general, the amount of time to satisfy the snag criterion decreased with decreasing thinning densities in the first entry. This was due to faster development of large boles at lower stem densities and thus a greater potential for recruitment of large snags. Also, the amount of time to satisfy this criterion decreased with increasing thinning densities in both the second and third entry. This simply reflected the tendency for more stems to die with increasing stem densities. [hellip] Snag density at stand age 260 generally increased with increasing thinning density in the first entry and somewhat with increasing thinning density in the subsequent two thinning entries. This reflected the greater source of potential snags with increasing stem density. [hellip] Developmental trends for log mass (fig. 4) were similar to those for snag density. Leaving fewer stems in the first entry but more subcanopy stems in the second and third entries generally resulted in faster accumulation of log mass. [hellip] Artificial snag recruitment was important for maintaining snag densities when thinning to 62 TPH in the last entry or 99 TPH in the second entry (fig. 7A). These thinning treatments resulted in lower rates of natural mortality of large boles and required the artificial creation of two to four snags per hectare (figs. 7B through 7D) to satisfy the snag criterion at about the same time as live criteria (fig. 6G). [hellip] Treatments providing the most rapid attainment of live, late-successional conditions (i.e., all-[le]297-[ge]186) required artificial creation of up to six snags per hectare to satisfy the snag criterion at about the same time as the live criteria (figs. 13A through 13D). Thinning to 99 TPH at stand age 60 or to 62 TPH at age 80 tended to delay the development of large snags [hellip] Log mass tended to be limiting (fig. 17A). Even with the addition of 15 Mg/ha of logs, the log-mass threshold level could not be satisfied by age 100 in the heavy thinning regimes [hellip] The stand age when the log-mass criterion was satisfied also differed among initial stand conditions. Starting with fewer but larger canopy stems delayed satisfying the log-mass criterion by up to two decades [hellip]

Management Implications

Results of this study illustrated two important relations between rapid development of late-successional attributes and long-term stand conditions. First, treatments that promote rapid development of an attribute will not necessarily produce the highest levels of the attribute over the course of a rotation. In this study, treatments providing rapid development of live, late-successional attributes generally produced relatively lower densities of shade-tolerant stems, lower amounts of Douglas-fir basal area, and fewer snags and logs over a rotation compared to other treatments."

Garman, Steven L.; Cissel, John H.; Mayo, James H. 2003. Accelerating development of late-successional conditions in young managed Douglas-fir stands: a simulation study. Gen. Tech. Rep. PNW-GTR-557. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 57 p. http://andrewsforest.oregonstate.edu/pubs/pdf/pub2722.pdf.

The DEIS and the Wildlife Report provide no basis for the assertion that logging will have no effect on the viability of three-toed woodpecker and pileated woodpecker, both of which will be severely impacted by logging and reduces the population of green trees from which snags are recruited. In addition there is no basis for reaching any conclusion about the viability of populations depended on dead wood because the LRMP standards for dead wood habitat are scientifically discredited and the FS has not adopted new stands that account for the significant new information indicating that wildlife need more dead wood for a wider variety of life functions (than recognized in the existing and flawed potential population methodology). See Rose, C.L., Marcot, B.G., Mellen, T.K., Ohmann, J.L., Waddell, K.L., Lindely, D.L., and B. Schrieber. 2001. Decaying Wood in Pacific Northwest Forests:

Concepts and Tools for Habitat Management, Chapter 24 in Wildlife-Habitat Relationships in Oregon and Washington (Johnson, D. H. and T. A. O'Neil. OSU Press. 2001) http://web.archive.org/web/20060708035905/http://www.nwhi.org/inc/data/GISdata/docs/chapter24.pdf.

The DEIS makes a generalize rosy (though inaccurate) conclusion about the effects of each alternative, but the DEIS need to disclose that many of the treatment types will have direct adverse impacts on snag habitat recruitment, including: Alt 5 which removes large trees; mistletoe treatments that remove "dominant trees" in the stand; and regen prescriptions that remove so many trees there are too few left to ensure recruitment of future snags in the stand.

The Eastside Screens interim wildlife standard recognizes that maintaining healthy wildlife populations requires abundant dead wood and that past practices have depleted the dead wood resource:

Snags, Green Tree Replacements and Down Logs:

INTENT STATEMENT - Most (if not all) wildlife species rely on moderate to high levels of snags and down logs for nesting, roosting, denning and feeding. Large down logs are a common and important component of most old and late structural forests. Past management practices have greatly reduced the number of large snags and down logs in managed stands.

The Screens call for application of the following MINIMUM standards with respect to snag habitat [hellip]

100% potential population levels of primary cavity excavators. This should be determined using the best available science on species requirements as applied through current snag models or other documented procedures.

Unfortunately, the Eastside Screens still rely on the discredited potential population method. The Forest Service has numbers for meeting 100% potential population levels and strives to meet targets that are known to be inadequate. Even if the agency aims for a target above 100% potential population levels, the agency is still using an invalid reference point that does not belong in the NEPA analysis. The best available science has not been incorporated into the standards. The agency lacks the "documented procedures" for meeting snag habitat requirements called for in the Eastside Screens.

The Forest Service cannot provide any assurance that its plans and projects will assure viable populations of native wildlife that depend on dead trees. The Forest Service does not know how many snags are necessary to support viable populations of cavity associated species. The Forest Service has provided no credible link between DecAID tolerance levels, potential population levels, and/or viable populations. The Forest Service has also failed to reliably quantify existing and projected habitat for snag associated species.

The federal forest agencies now recognize that current methods and assumptions concerning snag habitat standards are outdated, and the old snag standards do not ensure enough snags to meet the intent of the standard, yet the agencies have not adjusted their management plans to account for this new information nor have they developed new standards that are consistent with the latest scientific information.

As explained on the DecAID website:

Why is DecAID needed?

National Forest LRMP standards and guidelines for management of snags and down wood in the Pacific Northwest were based on wildlife species models and tools that were developed in the 1970s and 1980s (Thomas et al. 1979, Neitro et al. 1985, Marcot 1992, Raphael 1983). New information about the ecology, dynamics, and management of decayed wood has been published since then, and the state of the knowledge

continues to change. Rose et al. (2001) report that results of monitoring indicate that the biological potential models are a flawed technique (page 602). There has been an evolution from thinking of large woody material as habitat structures, to thinking of decaying wood as an integral part of complex ecosystems and ecological processes.

This paradigm shift has made the management of dead wood a much more complex task. We can no longer expect to go to our LRMPs or the biological potential model to get one number for the amount or size of snags and down wood that we can apply to all projects and to all acres. We are directed to use the best available science to manage ecosystems, and the best available science simply will not support business as usual for managing dead wood.

Region 6 - USDA Forest Service. A Guide to the Interpretation and Use of the DecAID Advisor. June, 2006. http://www.fs.fed.us/r6/nr/wildlife/decaid-guide/

A few of the problems with the old standards are:

* They failed to account for the fact that the number of snags needed for roosting, escape, and foraging can exceed the number of snags needed for nesting;
* They failed to recognize that the number of snags needed to support viable populations of secondary cavity users may exceed the needs of primary cavity excavators;
* The old standard failed to account for the size height of snags favored by some species;
* In applying the old standards the agencies often fail to account for rates of snag fall and recruitment;
* The old standards fail to recognize non-equilibrium conditions in our forests, i.e. some species rely on the natural large pulses of snags associated with large disturbances;
* The old standards fail to account for the differential use of space and population density of different species;
*
The old standards ignore other important habitat features of dead wood, e.g. loose bark, hollow trees, broken tops, etc

The Forest Service recognizes that -

Forest Plan standards were based on a model that did not account for snags required for foraging (EA p. 68 and Appendix K p. 45). There is general consensus in the scientific and professional community that using the biological potential model (which was used in developing the Forest Plan standard) is flawed and does not provide adequate nesting, roosting, or foraging structure for cavity excavating birds [hellip]

North Fork John Day RD, Umatilla NF. 2011. Mirage Vegetation Management Project DN. http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/53012_FSPLT2_055455.pdf.

Bull et al. (1997) states current direction for providing wildlife habitat on public forest lands does not reflect the new information available, which suggests that to fully meet the needs of wildlife, additional snags and habitat are required for foraging, denning, nesting, and roosting. Rose et al. (2001) suggests that calculation of numbers of snags required by woodpeckers based on assessing their "biological (population) potential" is a flawed technique (Rose et al. 2001) due to the fact that empirical studies are suggesting that snag numbers in areas used and selected by some wildlife species are far higher than those calculated by this technique. There is general consensus that the biological potential model does not provide adequate nesting, roosting, or foraging structure for cavity excavating birds (Bull et al. 1997, Johnson and O'Neil 2001). This suggests the current direction of

managing for 100 percent population levels of primary excavators may not represent the most current knowledge of managing for cavity nesters.

North Fork John Day RD, Umatilla NF. 2011. Mirage Vegetation Management Project EA, Appendix K - Terrestrial Wildlife Specialist Report. p K-45. http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/53012_FSPLT2_055426.pdf.

Effects Analysis is Imprecise and not Site Specific

The DEIS makes lots of conclusions about logging under the different alternatives being beneficial to snags and other resources, which is patently incorrect and misleading when considered at the stand scale where prescription are applied. Describing effects at the scale of each alternative (which involves a variety of treatments across more than 100,000 acres) is misleading and blurs the mix of potentially positive and negative effects of different treatment sin different forest types. The DEIS needs to describe the effects of each treatment type in each forest type, within each alternative. That is the only way for the public and the decision-maker to understand that regen logging, large tree removal, and removal of "dominant trees" will unquestionably adverse to snag habitat.

Fuel Breaks Analysis

The proposal to create fuels breaks 300-500 feet wide along 273 miles (up to 28,829 acres) is too much. EA p 11 says "Treatments would result in tree spacing levels that have low susceptibility to crown fire." This is not a good idea. Thinning the canopy to prevent the rare occurrence of crown fire will stimulate the growth of surface and ladder fuels and actually increase risks associated with relatively more likely occurrence of surface fires, AND it will dramatically increase the expense associated with maintaining the fuel breaks. The correct approach is to create "shaded fuel breaks" that maintain relatively high canopy cover which maintains cool-moist fuel conditions and a less windy fire climate, and helps suppress the growth of surface and ladder fuels. The EIS needs to clearly and accurately disclose these trade-offs.

RHCA/Aspen/Meadows

We urge the FS to avoid logging RHCAs of any class except for very specific circumstances, such as cutting small young conifer trees around an aspen stand and leaving the cut trees on the ground to ensure new aspen are less likely to be browsed.

Aspen and meadows can coexist with conifers. It is simply not necessary or desirable to remove "most encroaching conifer trees within and 150 feet from the outermost edge of aspen stands" especially not with heavy equipment that will damage moist soils associated with these unique ecosystems. The FS should have considered an alternative that would hand fell small conifer trees <12" dbh and girdle a significant portion of young trees 12-21" dbh. This would enhance both aspen and snag habitat. We support the use of jackstraw felled trees as natural barriers to livestock browse around aspen trees. We object to excluding springs and ponds from aspen enclosures. Those features need more protection. The EIS needs to consider the risk that these riparian/aquatic habitat will face increased livestock use if livestock are excluded from other nearby aspen areas.

The EIS should consider retaining more conifers in a variety of sizes around aspen, so that there is a source of non-old growth "sacrifice trees" for replacing the jackstraw browse barriers in the future.

Cumulative Effects Analysis

Since this project proposes to treat a large fraction of a large landscape there are serious concerns about

cumulative effects. These treatments involve a lot of commercial log removal and road construction. These cumulative effects will be most pronounced on resources such as carbon, snag habitat, soil and water resources, and values associated with unroaded/unmanaged areas. The EIS needs to better address cumulative effects.

Range Effects, Alternatives, and Analysis

The DEIS rightly acknowledges that all the action alternatives will affect grazing conditions. However, none of them propose any changes to USFS managed grazing. At an absolute minimum, the impacts of the changes to grazing brought by the Ellis Project need to be analyzed and disclosed.

Juniper Analysis

The FS needs to stop treating native juniper as a weed. It is not necessary or desirable to run heavy equipment all over to remove juniper. Doing so will harm fragile native ecosystems, degrade soil, cause erosion and spread weeds. The EIS needs to consider an alternative that would hand cut a portion of young encroaching juniper trees.

Avoid Uniform Tree Spacing.

Thinning to 18-20 foot tree spacing (or any other prescription that isolates individual trees) is not ecologically desirable. Natural forest are clumpy, patchy, and gappy. All tree cutting should be designed to retain clumps of trees. See Churchill, D.J., M.C. Dalhgreen, A.J. Larson, and J.F. Franklin. 2013. The ICO approach to restoring spatial pattern in dry forests: Implementation guide. Version 1.0. Stewardship Forestry, Vashon, Washington, USA.
https://web.archive.org/web/20130330181038/http://www.cfc.umt.edu/ForestEcology/files/ICO_Manager_Guide.pdf.

Small forest products. Keep Equipment on Roads.

These efforts should be carefully designed to protect soils. Trucks and equipment should not be allowed off roads.

Steep Slopes Analysis

We understand the agency is under pressure to log steep slopes. Doing so requires much more detailed analysis of the effects of each of the specific possible logging systems. The different impacts of new logging systems such as tethered logging are speculative at best. They should not be used on public lands until the effects are better understood on private lands, and until the effects can be fully and accurately disclosed through NEPA analysis. Even then, they should not be used initially in places with important values that we know are compromised by steep slopes logging of any kind. Given that many of the new logging systems are heavily subsidized, the economics of each system and their cost to the public should be analyzed separately and thoroughly.

The EIS should consider the value of steep slopes as "accidental refugia" that provide much needed habitat for species that need more cover and dead wood and carbon storage.

Invasive Species / Ventenata

The DEIS needs to consider and disclose that the landscape level of soil and vegetation disturbance contemplated by this project will likely exacerbate the spread of invasive species such as Ventenata grass. These effects are enhanced due to the cumulative effects of extensive ground-based activities, lots of road construction and use, and landscape fire.

Danger Tree Removal

The EIS needs to more carefully disclose the cumulative effects of removing danger trees (including commercial old growth trees and wildlife trees/snags) along almost 650 miles of roads. The FS should prohibit commercial removal of old growth trees, because doing so creates a perverse incentive to exaggerate hazards for corrupt purposes. This risk is reduced if hazard trees can't be sent to the mill and turned into money, and there is no arguing that there is a landscape shortage of large deadwood habitat.

Landscape Burning

This is a welcome activity, but we have several concerns. We have not seen evidence that the agency is really committed to this activity. It is probably not going to be adequately funded. The burn windows might never emerge. The agency is too risk averse to do burning at scale. The agency will likely insist that all mechanical/commercial fuel treatments are done first, and there is only a narrow window between the time that activity fuels are treated and before surface fuels will start to regrow. The EIS lacks a compelling description of how all this work will be sequenced.

Burning should be done when it best mimics natural disturbance patters. This means don't do so much in the spring. Do more in the fall.

The effects of the "no action" alternative must be accurately portrayed.

The agency is not permitted to present a biased description of the no action alternative. The agency is not permitted to saddle the no action alternative with a worst-case-scenario in terms of future fire. The NEPA document describes the no-action alternative in terms of its inherent high risk of intense future fire, but the NEPA document lacks any recognition: (a) the probability of high severity fire is far less than certain, (b) if a high severity fire does occur during hot-dry-windy conditions, the environmental effects will be similar whether the area is treated or not, and (c) that during favorable conditions of weather and fuel moisture a low-severity or mixed-severity fire could occur in the project area and such as fire would likely accomplish much of what this project is attempting to accomplish without all the adverse consequences from ground disturbance. This shows a strong bias against the no-action alternative.

Leaving forests unlogged allows natural successional processes to flourish. This typically results in higher-quality combination of habitat features with fewer trade-offs. For instance, allowing trees to grow unharvested, results in natural tree mortality which not only frees up resources (light, moisture, nutrients, growing space) for residual trees to be grow larger, but also creates valuable snags and down wood habitat, and opens small canopy gaps that stimulate understory development and new tree cohorts. The benefits of allowing natural succession to occur in older stands is summarized by Eugene BLM:

As dominant trees continue to grow, they would gain late-successional habitat features like large diameters, deeply fissured bark, deep crowns, large branches, broken tops, and cavities. As individual dominant trees die, they would become large snags or down wood. As large trees or snags fall, they would knock over other trees and branches, creating growing space. This growing space would release understory conifers and hardwoods, allowing them to grow into dominant trees, and stimulate growth of shrubs and herbaceous vegetation. The overall effect of these successional processes would create a mosaic of tree ages, species composition, and latesuccessional habitat features in the stands. Additionally, patches of overstory trees would continue to suffer mortality from sporadic processes such as root rot or other disturbance such as windthrow. This would create larger areas of growing space for surviving overstory trees, hardwoods, conifer regeneration, shrubs, and herbs to occupy. Therefore, habitat in the project area would primarily develop late-successional characteristics, with patches of early- or midsuccessional habitat throughout.

McKenzie Landscape EA, No. DOI-BLM- OR060-2013-0005-EA. https://eplanning.blm.gov/epl-front-office/projects/nepa/69610/91093/109561/2016_11_23_McKenzie_Landscape_EA__and_Preliminary_FONSI.pdf

See also, Lutz. J.A. 2005. The Contribution of Mortality to Early Coniferous Forest Development. MS Thesis. University of Washington. http://faculty.washington.edu/chalpern/Lutz_2005.pdf. This MS Thesis looked at long-term transect data from young forests in Western Oregon and found that non-competitive mortality and gap forming processes are very much in operation in dense young planted stands. This indicates that in young stands the homogenizing influence of stand growth and competitive mortality is significantly counter-balanced by non-competitive mortality that tends toward heterogeneity and structural diversification. This means that if young stand management is to effectively mimic natural patterns and processes, that variable density treatments must be the rule, and the scale of the mosaic must be very fine scale. Note: The study sites were located in the HJ Andrews Experimental Forest and were not naturally regenerated, so it is likely that in young stands that are naturally regenerating after disturbance such as fire, the heterogeneity and gap-forming processes would be even more pronounced. See also Lutz & Halpern 2006. Tree Mortality During Early Forest Development: A Long-Term Study Of Rates, Causes, And Consequences. Ecological Monographs, 76(2), 2006, pp. 257-275. http://cfr501.jamesalutz.com/Lutz_Halpern_Mortality_EM_2006.pdf and Franklin, J. F., T. A. Spies, R. Van Pelt, A. B. Carey, D. A. Thornburgh, D. R. Berg, D. B. Lindenmayer, M. E. Harmon, W. S. Keeton, D. S. Shaw, K. Bible, and J. Chen. 2002. Disturbances and structural development of natural forest ecosystems with silvicultural implications, using Douglas-fir as an example. Forest Ecology and Management 155:399-423. http://www.fs.fed.us/pnw/pubs/journals/pnw_2002_franklin001.pdf; Franklin, Jerry F.; Mitchell, Robert J.; Palik, Brian J. 2007. Natural disturbance and stand development principles for ecological forestry. Gen. Tech. Rep. NRS-19. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 44 p. https://www.nrs.fs.fed.us/pubs/gtr/gtr_nrs19.pdf.

Among the benefits of not logging is growth of strong wood that may eventually create more persistent snags.

Slower diameter growth develops stronger wood with a higher proportion of heartwood compared to faster growth, [hellip]. Heartwood is generally stronger and more decay resistant than sapwood, so a higher percentage of heartwood with smaller growth rings tends to result in [hellip] more durable dead wood which persists longer in the forest stand.

NW Oregon BLM. 2016. Hole-in-the-Road EA. https://eplanning.blm.gov/epl-front-office/projects/nepa/53390/91260/110166/HTR_EA_final_Nov282016_508.pdf

Climate and Carbon

We have appreciated the District's candor regarding the lack of expertise and direction to do a more robust carbon analysis. However, that is not an excuse to abdicate the agency's legal responsibility to fully and accurately disclose the effects of a large-scale logging project such as this. The climate crisis is here and we are nearing irreversible tipping points that will do far more harm to civilization and ecosystems than any fire. There is no time to wait. The agency must conduct a robust carbon analysis for this project at this time.

The DEIS makes some acknowledgement that climate change will affect this project area, but this is insufficient. The FS needs to consider and disclose the effects of climate change (as exacerbated by GHG emissions caused by this project) on resources beyond the project area. Where we look at the impacts of climate change on these areas, we also need to consider more than fire. Please analyze how these forests and associated values/functions will recover or change after logging in a hotter and drier climate. Please also consider how things like thermal refugia that dense forests provide will be affected.

Most importantly, the agency must consider not just the effect of climate change on our forests, but also the effects of forest management on climate change. The logging industry is Oregon's largest carbon polluter[1]. Even in large fires, the majority of carbon stays on site. However, only a small fraction of the carbon in logged forests is preserved when trees are turned into "wood products" and then for a much shorter period of time. Most of the carbon in logged forests is put on an accelerated path to the atmosphere. The EIS needs to disclose the consequences of that.

The Purpose and Need Should Address The Unmet Need for Carbon Storage

The agency typically says one of the purposes of this project is to provide a supply of wood products to the public. The agency should reconsider timber targets in light of the fact that the public needs carbon storage to reduce global climate change much more than they need wood products. The NEPA analysis also needs to account for the fact that managing forests for water quality, water quantity, quality of life, and carbon storage for a stable climate will contribute far more to community stability than propping up the timber boom-bust industry with subsidized logging.

The agency must recognize that wood products are already under-priced and over-supplied due to "externalities" (costs that are not included in the price of wood, so those costs are shifted from wood product producers and consumers to the general public who suffer the consequences of climate change without compensation from those who profit from logging related externalities). Ecosystem carbon storage on the other hand is under-supplied because there is not a functioning market for carbon storage and climate services. The agency is in a position to address these market imperfections by focusing on unmet demand for carbon storage instead of offering wood products that are already oversupplied.

Land protection, both public and private, provides substantial ecological benefits by avoiding conversion of natural systems to intensive, developed uses. These benefits include carbon sequestration, watershed functioning, soil conservation, and the preservation of diverse habitat types (e.g., Daily 1997, Brauman et al. 2007, Kumar 2012, Watson et al. 2014). Land protection also solves a key market failure: private markets tend to underprovide socially beneficial land uses such as natural forests, agricultural lands, or managed timberlands. The reason for this failure is that many of the benefits of these lands go to the public in general, not individual landowners. When private values and market transactions determine land uses, less land will be devoted to socially beneficial uses than if citizens could collectively determine use on the basis of social values (e.g., Angelsen 2010, Tietenberg and Lewis 2016).

Katharine R.E. Sims, Jonathan R. Thompson, Spencer R. Meyer, Christoph Nolte, Joshua S. Plisinski. 2019. Assessing the local economic impacts of land protection. Conservation Biology. 26 March 2019 https://doi.org/10.1111/cobi.13318, https://harvardforest.fas.harvard.edu/sites/default/files/Sims_et_al-2019-Conservation_Biology.pdf.

Maintaining and increasing carbon storage in ecosystems on public lands is also required to meet LRMP desired future conditions and standards & guidelines. Carbon emissions from logging and other land management activities exacerbate global climate change and drive ecosystem changes that diverge from desired future conditions, such as uncharacteristic drought, fire, insect outbreaks, vegetation and wildlife mortality, species range shifts, low summer stream flows, unfavorable stream temperatures, extreme precipitation and peak flows and erosion, uncertainty related to vegetation recovery post-disturbance, uncertainty about the ability to provide a predictable, sustainable supply of forest products, etc. The agency should identify a purpose and need that recognizes the necessity of avoiding carbon emissions from logging and optimizing carbon storage to fulfill the promises in the LRMP.

Do not rely on the flawed boilerplate climate analyses

The Ellis DEIS (p 137) provides virtually no meaningful analysis of climate change and the fact that widespread logging increases carbon emissions and makes the global climate crisis worse. Nor does the DEIS address the trade-offs between efforts to increase climate resilience (by reducing stand density and building fire breaks) versus the fact that reducing stand density increases carbon emissions and exacerbates climate change. The DEIS does not even mention the words "carbon" or "greenhouse gases," let alone quantify these effects of logging and describe their likely effects on climate change. This is a gross oversight given that we are in the midst of the global climate crisis, forests are integral part of the global carbon cycle, and logging will make a bad situation worse.

If the FS plans to fix the deeply flawed DEIS carbon/climate analysis by adopting the Regional office's standard boilerplate, they should reconsider that approach. As explained below, the Forest Service's standardized NEPA language regarding carbon and climate change fails to take a hard look as required by NEPA. The analysis makes several highly misleading statements about managing forests for carbon storage, climate resilience, and the effects on climate change. The analysis inappropriately mischaracterizes the role of individual logging projects in the cumulative problem of global GHG emissions. The analysis misstates the effects of logging related carbon emissions that are not related to "deforestation." The analysis grossly misstates the climate effects of logging intended to reduce disturbance. The analysis misleadingly implies that logging benefits the climate by increasing forest productivity.

The NEPA analysis should consider the adverse climate consequences of GHG emissions caused directly and indirectly by logging. The Forest Service should not rely on the boilerplate NEPA language from the regional office which is flawed in many ways. Instead the Forest Service:

* Must recognize the cumulative nature of the GHG emissions and climate problems. It does not matter that this project is small in the global scheme because all emissions matter when the causation is global and cumulative.
* Cannot credibly assert that this project is harmless because it's not causing deforestation. This is immaterial. All GHG emissions, regardless of the source or how it is labelled, are part of the problem and cause the same climate impacts.
* Cannot credibly assert that thinning for forest health justifies or mitigates emissions from logging. Logging does not increase the capacity for growing trees. To the contrary, logging harms soil and reduces site productivity. Storing carbon in wood products is not preferable to storing carbon in forests. Evidence shows that forests are a more secure way of storing carbon. If this forest is not logged, or if more green tree are retained in situ, the agency cannot conclude that natural mortality will be greater than logging mortality. In fact, it is quite easy to predict that logging causes significantly more mortality than natural processes.
* Must not compare carbon before and after logging. That is an improper framework for NEPA analysis. The proper NEPA framework is to compare the effects of different alternatives(over time), so the agency must describe the carbon emissions and carbon storage in the forest over time with logging and without logging.
* Logging to reduce fire effects does not result in a net increase in forest carbon storage. The agency cannot predict the location, timing, or severity of future wildfires, so most fuel treatments will cause carbon emissions without any offsetting benefits from modified fire behavior. Studies clearly show that the total carbon emissions from logging (plus unavoidable wildfire) are greater than carbon emissions from wildfire alone.
* Cannot credibly assert that carbon storage in wood products is a useful climate strategy. Logging kills trees, stops photosynthesis, and initiates decay and combustion, with the end result being a significant transfer of carbon from the forest to the atmosphere. In stark contrast, an unlogged forest continues to grow and transfer more carbon from the atmosphere to the forest. Carbon emissions caused by logging far exceed the small fraction of carbon transferred to wood products. Carbon accounting methods that attempt to account for substitution of wood for other high-carbon building materials are fraught with uncertainty and too often represent maximum potential substitution effects rather than lower realistic estimates.

Cumulative Impacts of GHG Emissions Must not be Minimized

The NEPA analysis must avoid minimizing this project's contribution to carbon emissions and global warming by saying the effects of this project would be negligible on a global scale. This is not an appropriate framework. Global climate change and ocean acidification are the result of the cumulative effects on the global carbon cycle which is spatially distributed. There is no single culprit, nor is there a silver bullet solution. All emissions are part of the problem, and all land management decisions must be part of the solution. Since the global carbon cycle is spatially distributed, carbon storage and carbon emissions will always we spread out around the globe, and the carbon flux at any given place and time may appear small, but cumulatively they help determine the temperature of our climate and the pH of our oceans. Given the current carbon overload in the atmosphere and oceans, the carbon consequences of every project must be carefully considered (rather than dismissed as negligible).

The agency may argue that logging a few small patches of forest won't make a difference in the global scheme of the climate problem, but as Voltaire said, "No snowflake in an avalanche ever feels responsible." The NEPA analysis must recognize that global warming will not be solved by one miraculous technological fix or by changing one behavior or one economic activity. The whole global carbon cycle must be managed to reduce carbon emissions and increase carbon uptake. Recent evidence supports the conclusions that all net emissions of greenhouse gases are adverse to the climate. None can be considered de minimus. "We show first that a single pulse of carbon released into the atmosphere increases globally averaged surface temperature by an amount that remains approximately constant for several centuries, even in the absence of additional emissions. We then show that to hold climate constant at a given global temperature requires near- zero future carbon emissions. Our results suggest that future anthropogenic emissions would need to be eliminated in order to stabilize global-mean temperatures. As a consequence, any future anthropogenic emissions will commit the climate system to warming that is essentially irreversible on centennial timescales." H. Damon Matthews and Ken Caldeira. 2009. Stabilizing climate requires near-zero emissions. Nature Vol 455 | 18 September 2008 | doi:10.1038/nature07296.

Every ton of CO2 emitted to the atmosphere contributes to global climate change and ocean acidification. There is a single global carbon budget for cumulative GHG emissions for the period from the present to the end of the carbon economy which (because we have been slow to act) must occur in the next few decades. Those budgets require significant reductions in carbon emissions and an eventual end to GHG emissions. See Richard Millar, Myles Allen, Joeri Rogelj, Pierre Friedlingstein. 2016. The cumulative carbon budget and its implications. Oxford Review of Economic Policy, Volume 32, Issue 2, SUMMER 2016, Pages 323-342, https://doi.org/10.1093/oxrep/grw009; http://pure.iiasa.ac.at/id/eprint/12738/1/The%20cumulative%20carbon%20budget%20and%20its%20implications.pdf. "The carbon budget is a key concept in the climate-policy sphere. It arises directly from the finding that the increase in global mean surface air temperature is proportional to cumulative CO2 emissions over time. This finding is far from trivial, and together with the long-lived nature of CO2 as a greenhouse gas leads to two simple but powerful conclusions: 1. We need to cut emissions to zero in order to stop the increase in global temperature. 2. The amount of CO2 that can be emitted globally in order to a stay within a certain warming limit is finite - the carbon budget." CONSTRAIN, 2019: ZERO IN ON the remaining carbon budget and decadal warming rates. The CONSTRAIN Project Annual Report 2019, DOI: https://doi.org/10.5518/100/20; https://constrain-eu.org/wp-content/uploads/2020/02/CONSTRAIN-Zero-In-On-The-Remaining-Carbon-Budget-Decadal-Warming-Rates.pdf. The agency has no basis for concluding that emissions from logging are more important than (and belong in the constrained cumulative carbon budget) than other activities that emit GHG. When the agency says that emissions from logging are minimal or infinitismal on a global scale, it is effectively saying that its emissions belong outside the budget rather than inside the budget. This is fatally wrong. All GHG emissions are part of the cumulative emissions from all sources. None are outside the budget.

Former D.C. Circuit Judge Wald wrote in a 1990 dissenting opinion, which was recently quoted with unanimous approval by the Ninth Circuit in Center for Biological Diversity v. NHTSA:

[W]e cannot afford to ignore even modest contributions to global warming. If global warming is the result of the cumulative contributions of myriad sources, any one modest in itself, is there not a danger of losing the forest by closing our eyes to the felling of the individual trees?

538 F.3d at 1217. Similarly, the U.S. Supreme Court's decision in Massachusetts v. EPA noted that one cannot avoid responsibility to reduce and mitigate the climate problem by attempting to minimize the scale of one's contribution to the problem. ("While it may be true that regulating motor-vehicle emissions will not by itself reverse global warming, it by no means follows that we lack jurisdiction to decide whether EPA has a duty to take steps to slow or reduce it.... In sum, [hellip] [t]he risk of catastrophic harm, though remote, is nevertheless real. That risk would be reduced to some extent if petitioners received the relief they seek." 127 S.Ct. 1438, 1455 (2007) http://web.archive.org/web/20080610172128/http://www.supremecourtus.gov/opinions/06pdf/05-1120.pdf)

[The Prime Minister] claims that we [Australians] are responsible for just 1.3% of global carbon dioxide emissions, as if we are irrelevant. ...

...

Even though Scott Morrison's logic for climate inaction has been debunked many times, let's do it again, ...

...

The "too small to matter" argument is logically absurd, but it is also morally bankrupt and economically reckless.

We all know that throwing one piece of litter out the window wouldn't ruin the environment, but if all did we'd soon be surrounded by rubbish.

How about voting? It is a foundation of our democracy that nobody's voice is so small as to be meaningless.

Likewise, if any one taxpayer stopped paying tax we all know it wouldn't make a measurable difference to the government's bottom line, but if everyone stopped paying tax it would smash consolidated revenue.

Simon Holmes [agrave] Court 2020. When it comes to emissions, the 'too small to matter' argument is absurd, reckless and morally bankrupt. The UK Guardian 8 Jan 2020. https://www.theguardian.com/australia-news/2020/jan/09/when-it-comes-to-emissions-the-too-small-to-matter-argument-is-absurd-reckless-and-morally-bankrupt?CMP=twt_a-environment_b-gdneco.

The responsibility to reduce emissions no matter how small is recognized in international law such as the European Convention on Human Rights.

The fact that the amount of the Dutch emissions is small compared to other countries does not affect the obligation to take precautionary measures in view of the State's obligation to exercise care. After all, it has been established that any anthropogenic greenhouse gas emission, no matter how minor, contributes to an increase of CO2 levels in the atmosphere and therefore to hazardous climate change.

Urgenda Foundation v. The State of the Netherlands. Hague Court of Appeal. October 9, 2018. https://uitspraken.rechtspraak.nl/inziendocument?id=ECLI:NL:RBDHA:2015:7196.

CEQ draft guidance on NEPA and climate change recognizes that disclosure of the incremental nature of GHG emissions attributable to any given project is merely a restatement of the nature of the climate problem itself and NEPA does not allow agencies to avoid disclosure and consideration of alternatives and mitigation.

CEQ recognizes that many agency NEPA analyses to date have concluded that GHG emissions from an individual agency action will have small, if any climate change effects. Government action occurs incrementally, program-by-program and step-by-step, and climate impacts are not attributable to any single action, but are exacerbated by a series of smaller decisions, including decisions made by the government. Therefore, the statement that emissions from a government action or approval represent only a small fraction of global emissions is more a statement about the nature of the climate change challenge, and is not an appropriate basis for deciding whether to consider climate impacts under NEPA.

Moreover, these comparisons are not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations. This approach does not reveal anything beyond the nature of the climate change challenge itself: The fact that diverse individual sources of emissions each make relatively small additions to global atmospheric GHG concentrations that collectively have huge impact.

77 Fed. Reg. 77802, 77825. (Dec. 24, 2014).

Agency NEPA analyses often say that the "Literature, however, has not yet defined any specifics on the nature or magnitude of any cause and effect relationship between greenhouse gases and climate change. [and] it is currently beyond the scope of existing science to identify a specific source of greenhouse gas emissions or sequestration and designate it as the cause of specific climate impacts at a specific location."? The agency should stop saying this. Such statements are obviously part of the agency's dismissive boilerplate about climate change but they add nothing to the analysis, but they imply that things are far more uncertain than they are, and that logging-related GHG emissions can't be connected to the crime of global climate change, which is nonsense. What we know is that climate change is caused by cumulative effects. All GHG emissions become globally distributed in our well-mixed atmosphere, so all emissions are related to all harms and effects of global climate change. These effects are set forth in great detail in the scientific literature and IPCC reports. So, GHG emissions are bad and CO2 uptake by forests is good, and the agency's logging program increases GHG emissions and reduces CO2 uptake.

Because individual contributions to climate change are so small, but the cumulative problem is so large, meaningfully disclosing the impact of greenhouse gas emissions requires some tool beyond merely identifying physical changes in the environment attributable to an individual project's emissions.

Climate change is the quintessential cumulative impact problem, and a good way to disclose the incremental effects of individual contributions to the cumulative problems is to monetize the effects using tools that quantify the social cost of carbon dioxide emissions. Social Cost of Carbon 2010, https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/foragencies/Social-Cost-of-Carbon-for-RIA.pdf.

Individual physical changes that will result from any particular action will inevitably appear insignificant. Just as the public and decisionmakers "cannot be expected to convert curies or mrems into such costs as cancer deaths," the EIS's readership cannot be expected to understand whether an individual project's miniscule marginal increase contribution to increased temperature, sea levels, etc. is cause for concern. Natural Res. Def. Council, Inc. v. U. S. Nuclear Regulatory Comm'n, 685 F.2d 459, 487 n.149 (D.C. Cir. 1982) rev'd on other grounds sub nom. Baltimore Gas & Elec. Co. v. Natural Res. Def. Council, Inc., 462 U.S. 87, 106-107 (1983).

Estimates of the social cost of carbon dioxide emissions are based on reasonable forecasts of the actual physical effects that each incremental unit of greenhouse gas emissions will have on the environment, including temperature, sea level rise, ecosystem services, and other physical impacts, together with assessments of how these physical changes will impact agriculture, human health, etc. The social cost protocol identifies the social

cost imposed by a ton of emissions' pro rata contribution to these environmental problems. This either amounts to an assessment of physical impacts or the best available generally accepted alternative to such an assessment; either way, the tool is appropriate for use under NEPA. 40 C.F.R. [sect] 1502.22(b)(4).

Any assertion that it is impossible to discuss the impact or significance of the Project's greenhouse gas emissions is arbitrary. Agencies must use available generally accepted tools to address the impact of these emissions, 40 C.F.R. 1502.22, and employ reasonable forecasting in its analysis. The agency's refusal to use available modeling tools, such as the estimates of the social cost of carbon and other greenhouse gases, violates NEPA.

Harmonize climate change mitigation and adaptation

"It is, therefore, the policy of [the Biden] Administration to listen to the science; to improve public health and protect our environment; to ensure access to clean air and water; [hellip] to reduce greenhouse gas emissions; to bolster resilience to the impacts of climate change; [hellip] To that end, this order directs all executive departments and agencies (agencies) to immediately review and, as appropriate and consistent with applicable law, take action to address the promulgation of Federal regulations and other actions during the last 4 years that conflict with these important national objectives, and to immediately commence work to confront the climate crisis."

Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis. JANUARY 20, 2021 https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-protecting-public-health-and-environment-and-restoring-science-to-tackle-climate-crisis/.

The President has established a clear policy mandate to minimize and mitigate impacts of federal land use:

Section 1. Policy. It shall be the policy of the Departments of Defense, the Interior, and Agriculture; the Environmental Protection Agency; and the National Oceanic and Atmospheric Administration; and all bureaus or agencies within them (agencies); to avoid and then minimize harmful effects to land, water, wildlife, and other ecological resources (natural resources) caused by land- or water-disturbing activities, and to ensure that any remaining harmful effects are effectively addressed, consistent with existing mission and legal authorities. Agencies shall each adopt a clear and consistent approach for avoidance and minimization of, and compensatory mitigation for, the impacts of their activities and the projects they approve.

[hellip] Sec 2. Definitions [hellip] (f) "Mitigation" means avoiding, minimizing, rectifying, reducing over time, and compensating for impacts on natural resources. As a practical matter, all of these actions are captured in the terms avoidance, minimization, and compensation. These three actions are generally applied sequentially, and therefore compensatory measures should normally not be considered until after all appropriate and practicable avoidance and minimization measures have been considered.

[hellip]

Sec. 3. Establishing Federal Principles for Mitigation. [hellip] (b) Agencies' mitigation policies should establish a net benefit goal or, at a minimum, a no net loss goal for natural resources the agency manages that are important, scarce, or sensitive, or wherever doing so is consistent with agency mission and established natural resource objectives. When a resource's value is determined to be irreplaceable, the preferred means of achieving either of these goals is through avoidance, consistent with applicable legal authorities. Agencies should explicitly consider the extent to which the beneficial environmental outcomes that will be achieved are demonstrably new and would not have occurred in the absence of mitigation (i.e. additionality) when determining whether those measures adequately address impacts to natural resources.

Presidential Memorandum: Mitigating Impacts on Natural Resources from Development and Encouraging

Related Private Investment. Nov 3, 2015. https://www.whitehouse.gov/the-press-office/2015/11/03/mitigating-impacts-natural-resources-development-and-encouraging-related In the context of climate change this means that greenhouse gas emissions should be avoided and that the climate forcing effects of any emissions that do occur must be mitigated.

Climate change adaptation is the discipline that focuses on addressing these impacts. In contrast, climate change mitigation addresses the underlying causes of climate change, through a focus on reductions in greenhouse gas concentrations in the atmosphere. Confronting the climate crisis requires that we both address the underlying causes of climate change and simultaneously prepare for and adapt to current and future impacts. Accordingly, adaptation and mitigation must be viewed as essential complements, rather than as alternative approaches. Because greenhouse gas emissions and concentrations will dictate the type and magnitude of impacts to which we will need to adapt, the ability to successfully accomplish adaptation over the long term will be linked to the success of climate mitigation efforts (Warren et al. 2013).

[hellip]

Climate-smart conservation strategies must also take climate mitigation considerations into account. Although adaptation is about addressing the impacts of rapid climate change, adaptation actions should not aggravate the underlying problem of global warming. Indeed, minimizing the carbon footprint of adaptation actions can help society avoid the "worst-case" scenarios for climate change, which would make successful adaptation in human and natural systems difficult, if not impossible, to achieve. Ideally, adaptation efforts should contribute to meeting climate mitigation goals both by minimizing or reducing the greenhouse gas emissions from project operations, including from any construction and ongoing maintenance, as well as by managing natural systems in ways that sustain or enhance their ability to cycle, sequester, and store carbon.

[hellip]

Some of the most obvious synergies between adaptation and mitigation are those aimed at enhancing carbon stocks in natural forests, [hellip] Strategies for increasing the capture and storage of forest carbon include: avoiding deforestation; afforestation (i.e., establishment of trees in areas have not been forests or where forests have not been present for some time); decreasing forest harvest; and increasing forest growth (McKinley et al. 2011). Managing natural systems to provide carbon benefits must be carefully balanced, however, with other conservation and adaptation goals. [hellip] Recent research, however, indicates that old trees "do not act simply as senescent carbon reservoirs" but actively fix larger amounts of carbon than smaller trees (Stephensen et al. 2014). This recognition highlights the important role that biodiversity-rich old-growth forests can play in sequestering carbon.

[hellip]

It is not always obvious, however, when conservation and climate mitigation efforts might be in alignment or in conflict. [hellip] Although there are clear synergies between adaptation and mitigationfocused activities, managers will also need to carefully consider any trade-offs.

Stein, B.A., P. Glick, N. Edelson, and A. Staudt (eds.). 2014. Climate-Smart Conservation: Putting Adaptation Principles into Practice. National Wildlife Federation, Washington, D.C. https://www.nwf.org/~/media/PDFs/Global-Warming/2014/Climate-Smart-Conservation-Final_06-06-2014.pdf.

Sometimes climate change mitigation and adaptation are in complete harmony, such as protecting riparian forests that both store carbon and buffer streams from hydrological extremes caused by climate change. See Justice et al. 2017. Can stream and riparian restoration offset climate change impacts to salmon populations? Journal of Environmental Management 188 (2017) 212e227 https://www.critfc.org/wp-

content/uploads/2017/01/JournalPost_Justice_etal2017.pdf. However, there are also times when efforts directed at climate change adaptation conflict with climate change mitigation goals. For instance, some people argue that we should reduce the density of federal forests so they are more resilient to soil-water stress caused by global warming. However, forest density reduction will accelerate the transfer of carbon from the forest to the atmosphere where it will contribute to global climate change.

Federal agencies must strive to harmonize climate change mitigation (carbon storage or avoided emissions) and climate change adaptation (making ecosystems more resilient to climate change). For example, if the agency uses climate change adaptation as a rationale for forest thinning, they must not only fully disclose the increased GHG emissions caused by their proposal, they must also consider alternatives that harmonize these competing goals, such as by thinning very lightly and retaining all of the medium and large trees that store most of the carbon.

There may be climate benefits from thinning but there will also be climate trade-offs in the form of carbon emissions, unless thinning is done very early in stand development. Schaedel et al (2017) said --

Thinning in second growth forests is often suggested as a climate change adaptation strategy (Bradford and D'Amato, 2012; Churchill et al., 2013), because thinning can be used to promote the development of complex stand structures resilient to disturbances and drought. However, these climate change adaptation outcomes attainable with thinning generally require a tradeoff with climate change mitigation objectives: most studies have shown decreased forest C storage in thinned stands (Bradford and D'Amato, 2012).

...

We found that: (1) fifty-four years after PCT total aboveground C is similar across treatments, due primarily to the increase in mean tree C of trees grown at lower stand densities; (2) deadwood legacies from the pre-disturbance forest still play an important role in long-term C storage 62 years after current stand initiation, accounting for approximately 20-25% of aboveground C stores; and (3) given enough time since early thinning, there is no trade-off between managing stands to promote individual tree growth and development of understory vegetation, and maximizing stand level accumulation of aboveground C over the long term. We infer that early PCT can be used to simultaneously achieve climate change mitigation and adaptation objectives, provided treatments are implemented early in stand development before canopy closure and the onset of intense intertree competition.

Michael S. Schaedel, Andrew J. Larson, David L.R. Affleck, R. Travis Belote, John M. Goodburn, Deborah S. Page-Dumroese. 2017. Early forest thinning changes aboveground carbon distribution among pools, but not total amount. Forest Ecology and Management 389 (2017) 187-198. https://www.fs.fed.us/rm/pubs_journals/2017/rmrs_2017_schaedel_m001.pdf. There are actually conflicting results on pre-commercial thinning ...

... precommercial thinning (PCT) when the thinned trees have no commercial value, show inconsistent results. Some PCT studies of this type found that decreasing stand density decreased total forest C stores (Skovsgaard et al., 2006; Jim[eacute]nez et al., 2011), while others noted that the increased growth rate of trees grown at lower densities can maintain or increase live tree C (Hoover and Stout, 2007; Dwyer et al., 2010), especially in the case of longer-term responses to thinning (Horner et al., 2010). Short-term studies of PCT effects on aboveground C have shown consistent decreases in aboveground C (Campbell et al., 2009; De las Heras et al., 2013; Jim[eacute]nez et al., 2011; Dwyer et al., 2010), indicating that low densities of small trees do not fully occupy the site (Turner et al., 2016). Given these conflicting results, it is still unclear whether PCT is compatible with the climate change mitigation goal of forest C storage (Jim[eacute]nez et al., 2011).

This is important because, even if thinning provides climate benefits in future decades, short-term carbon emissions conflict with climate policy priorities. The next few decades are critical to achieving goals related to

decarbonizing our economy. Delayed climate benefits should be strongly discounted because we should have decarbonized our economy by then, so future effects are not nearly as important as near-term effects. If thinning causes a short-term pulse of GHG emissions, that's a problem.

The Oregon Global Warming Commission's Roadmap to 2020 (https://www.keeporegoncool.org/roadmap-to-2020/) guides the state's efforts to meet its legislatively mandated GHG emissions reduction goals, including broad objectives for increasing carbon storage in Oregon forests.

The Roadmap also set out general strategies for dry forests east of the Cascade Mountains versus moist west of the Cascades. Based on improved understanding of the carbon storage capacity of the state's forests, the 2017 Global Warming Commission Report explained that, "The Roadmap sees 'Eastside forests . . . managed primarily for ecosystem restoration, safety and climate adaptation with a minimum of incurred carbon (loss). West-side forests (are) managed . . . to increase carbon storage . . . private forestlands (are) managed primarily for production of timber and wood products . . . ' with carbon stores remaining stable or increasing".

Fain, S.J.; Kittler, B.; Chowyuk, A. Managing Moist Forests of the Pacific Northwest United States for Climate Positive Outcomes. Forests 2018; 9(10):618. https://www.mdpi.com/1999-4907/9/10/618. Following this strategy will require the agencies to retain all medium and large trees that store carbon and that do not pose a substantial fire hazard.

The agencies often claim that density reduction treatments are expected to increase the resiliency of treated stands to the projected effects of climate change. But this small increase in resiliency comes at a tremendous cost. The NEPA analysis needs to disclose and consider the fact that logging will result in greenhouse gas emissions that make climate change worse. Think about that trade-off. Logging might make a small area more resilient to climate change while making climate conditions (and ocean acidification) worse for ecosystems all over the rest of the world. This significant trade-off needs to be carefully evaluated in the NEPA document.

Even well-intentioned logging also has impacts that make ecosystems less resilient to climate change. For instance, (i) roads and soil degradation make watershed less resilient to the expected effects of the amplified hydrologic cycle; (ii) reduction of complex forest structure and dense forest conditions makes certain species populations less resilient to climate change, including species associated with relatively dense forests and species associated with snags and dead wood. These species are already stressed by the cumulative effects of non-federal land management and fragmentation caused by past and ongoing management on federal lands; (iii) Also, "High overstory density can be resilient" when ladder fuel are absent and there is a gap between surface and canopy fuels. Terrie Jain (2009) Logic Paths for Approaching Restoration: A Scientist's Perspective, from Workshop: Restoring Westside Dry Forests - Planning and Analysis for Restoring Westside Cascade Dry Forest Ecosystems: A focus on Systems Dominated by Douglas-fir, Ponderosa Pine, Incense Cedar, and so on. May 28, 2009. http://ecoshare.info/projects/central-cascade- adaptive-management-partnership/workshops/restoring-westside- dry-forests/. New information indicates that El Ninos will likely become stronger even if we are able to limited warming to 1.5 degrees C. Guojian Wang, et al. 2016. Continued increase of extreme El Ni[ntilde]o frequency long after 1.5[thinsp][deg]C warming stabilization. Nature Climate Change (2017). doi:10.1038/nclimate3351.https://www.nature.com/nclimate/journal/vaop/ncurrent/full/nclimate3351.html. A bet-hedging strategy should retain trees of all sizes and stands of various densities. "Removal of most small trees to reduce wildfire risk may compromise the bet-hedging resilience, provided by small trees and diverse tree sizes and species, against a broad array of unpredictable future disturbances." William L. Baker and Mark A. Williams. 2015. Bet-hedging dry-forest resilience to climate-change threats in the western USA based on historical forest structure. Front. Ecol. Evol., 13 January 2015 | doi: 10.3389/fevo.2014.00088. http://journal.frontiersin.org/Journal/10.3389/fevo.2014.00088/full.

Forests are already highly adaptable to climate change. The temperate forest environment is and has always been highly dynamic. Forest species evolved over long periods that include significant changes in climate. The

large and complex genomes of forest species may include the memory of which genes to turn on or off to increase survival during climate stress. Forest disturbance can take many forms and almost always creates new opportunities for better-adapted species to establish and thrive. Mortality from any cause thins the forest, reducing total demand for light, water, and nutrients, and increasing availability of those resources to surviving trees. Several mechanisms can trigger forest vegetation to adjust stomatal opening and use water more efficiently, e.g., due to CO2 enrichment of the atmosphere (Law, B.E., Waring, R.H. 2015. Review and synthesis - Carbon implications of current and future effects of drought, fire and management on Pacific Northwest forests. Forest Ecology and Management 355 (2015) 4-14. http://people.forestry.oregonstate.edu/richard-waring/sites/people.forestry.oregonstate.edu.richard-waring/files/publications/Law%20and%20Waring%202015.pdf), and due to chemical signaling of drought conditions. Xu, B., Long, Y., Feng, X. et al. GABA signalling modulates stomatal opening to enhance plant water use efficiency and drought resilience. Nat Commun 12, 1952 (2021). https://doi.org/10.1038/s41467-021-21694-3; https://www.nature.com/articles/s41467-021-21694-3.pdf. For all these reasons, it is wise to focus on climate mitigation by conserving forests and allowing them to store more carbon. Climate adaptation will take care of itself. Forests are self-organizing systems that adapt to changing conditions without the need for logging.

Also, wildfire is mostly climate driven, not fuel driven, and the actual effects of fuel reduction on the spatial extent of wildfires is highly variable and fairly modest. "Analysis of simulation results from the 14 wildfires indicates that fuels treatments reduced the average size of any given wildfire by an estimated 7.2%, with amount of change correlated with the proportion of the landscape treated (Spearman's correlation p=0.692, n=14; P=0.008)." M. A. Cochrane, C. J. Moran, M. C. Wimberly, A. D. Baer, M. A. Finney, K. L. Beckendorf, J. Eidenshink, and Z. Zhu. 2012. Estimation of wildfire size and risk changes due to fuels treatments. International Journal of Wildland Fire. http://dx.doi.org/10.1071/WF11079. http://www.publish.csiro.au/?act=view_file&file_id=WF11079.pdf. This raises a serious question whether the modest increase in resilience really justifies the adverse effects of landscape fuel treatments on climate, wildlife, soil, water, etc.

When all these trade-offs are considered, we feel that climate change mitigation should receive emphasis over climate adaptation on federal land management (especially when adaptation efforts come with significant trade-offs). When climate change mitigation and adaptation may be in conflict, the agency needs to focus on reducing GHG emissions (or maintaining carbon stores). These mitigation actions are more important because (i) mitigation is shown to be more challenging (institutionally) and it is perennially under-achieved, (ii) mitigation has global benefits, and (iii) mitigation ultimately reduces the need for adaptation. An emphasis on mitigation is in accord with international law, e.g. the European Convention on Human Rights:

The court emphasises that the [State's duty of care] first and foremost should concern mitigation measures, as adaptation measures will only allow the State to protect its citizens from the consequences of climate change to a limited level. If the current greenhouse gas emissions continue in the same manner, global warming will take such a form that the costs of adaptation will become disproportionately high. Adaptation measures will therefore not be sufficient to protect citizens against the aforementioned consequences in the long term. The only effective remedy against hazardous climate change is to reduce the emission of greenhouse gases.

Urgenda Foundation v. The State of the Netherlands. Hague Court of Appeal. October 9, 2018. https://uitspraken.rechtspraak.nl/inziendocument?id=ECLI:NL:RBDHA:2015:7196

"According to a recently published analysis, increasing carbon storage could lead to more favorable conditions for northern spotted owls, pileated woodpeckers, olive-sided flycatchers, Pacific marten and red tree voles. These species may benefit from management policies that favor less intensive logging and longer periods between tree harvests." Nick Houtman 2016. Storing more carbon in western Cascades forests could benefit some wildlife species, not others. Phys.org News. November 17, 2016. http://phys.org/news/2016-11-carbon-western-cascades-forests-benefit.html, http://onlinelibrary.wiley.com/doi/10.1002/eap.1358/abstract

Stenzel et al (2021) highlighted the complex nature of the trade-offs between climate adaptation (density reduction/drought tolerance) and climate mitigation (maintaining carbon storage/reducing carbon emissions) in the context of thinning.

Carbon balance tradeoffs between reduced biomass density and increased forest resilience to disturbance are uncertain in large part due to the uncertainty of future natural disturbances occurring in treated areas. Our simulated mass mortality scenarios indicated that 2050 thinning emissions approximately equaled the 2050 emissions from stand mortality events greater than 75% and occurring after 2035. In these experiments, the gradual decomposition of large pools of killed biomass remaining on site highlighted that the emissions consequences of near-term natural disturbances will in part be realized beyond current GHG reduction timelines (e.g., 2035 or 2050, IPCC, 2018). Thus, when managing for forest carbon storage, the timing and magnitude of potential carbon gains or losses, which may be offset in time from disturbance events, must be considered. In our simulations, the near-parity in carbon emissions from thinning and high natural disturbance late in the simulation period occurred at the stand level. However, at the landscape level, the encounter rates between treatments and disturbance are typically low (J. L. Campbell et al., 2012). Greater areas of forest must therefore be treated than will encounter a disturbance, in turn increasing any carbon cost to benefit ratio estimated at the stand scale. Due to the infeasibility of landscape level treatment experiments, landscape level predictions of disturbance impacts are generally simulated with earth systems models (Buotte, Levis, et al., 2020), which remain limited in their ability to represent stochastic disturbance such as wildfire

Stenzel, J. E., Berardi, D. B., Walsh, E. S., & Hudiburg, T. W. (2021). Restoration thinning in a drought-prone Idaho forest creates a persistent carbon deficit. Journal of Geophysical Research: Biogeosciences, 126, e2020JG005815. https://doi.org/10.1029/2020JG005815. The agency needs to take a hard look at these trade-offs and develop alternatives that harmonize divergent climate goals in light of the evidence for (and against) benefits on both sides of the adaptation/mitigation ledger.

Read And Respond To The Mistletoe Science.

Mistletoe is a native species that provides valuable ecosystem services such as landscape diversity (between stands), structural heterogeneity (within stands), as well as food and shelter for diverse wildlife. Efforts to remove mistletoe are generally ineffective. The agency should strive to work with instead of against natural disturbance agents like mistletoe.

This project involves attempted "treatment" of mistletoe infection. The DEIS alternatives and analysis of effects need to be adjusted to reflect the best available science on mistletoe and its ecological role in the forest. Please review and respond to the mistletoe science, including but not limited to:

Pollock, Michael M., Ph.D. Kieran Suckling. 1995. An Ecologically Integrated Approach to Management of Dwarf Mistletoe (Arceuthobium) in Southwestern Forests. Southwest Forest Alliance May 5, 1995.

http://web.archive.org/web/20070823194845/http://www.sw-center.org/swcbd/Programs/science/mistltoe.html

Conklin, David A., 2000. Dwarf Mistletoe Management and Forest Health in the Southwest. USDA Forest Service, Southwest Region.
http://web.archive.org/web/20030809021433/http://www.forestpests.org/diseases/pdfs/dwarfmistletoe.pdf; http://www.forestpests.org/acrobat/dwarfmistletoe.pdf

Pennings, Steven C., and Ragan M. Callaway. 2002. Parasitic plants: parallels and contrasts with herbivores. Oecologia.

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These sources indicate that:

1. While dwarf mistletoe has traditionally been viewed as a forest pest because of reducing in timber volume, we suggest that in areas where management goals are not strictly focused on timber production, control of dwarf mistletoe may not be justified, practical, or even desirable. Our data suggest that dwarf mistletoes may have positive influences on wildlife habitat. Consequently, we suggest that eradication efforts be reconsidered given that dwarf mistletoes have been a part of these forest ecosystems for thousands, and possibly millions, of years.
2. Forest insects and pathogens are increasingly being recognized as important agents in shaping the structure and composition of forests. Besides their interaction with fire described above, mistletoes affect the forest canopy, landscape pattern, and tree species mix.
3. These plants are integral part of forested ecosystems, and have existed as part of the coniferous forests of North America since the Miocene.
4. Dwarf mistletoe is important to the ecology of these systems. The fruit, foliage and pollen of dwarf mistletoe are a food source for numerous bird, mammalian and insect species. Dwarf mistletoe alters the growth patterns of infected trees, creating structural complexity within forests in the form of witches brooms and snags, both which are used by numerous wildlife species for nesting, roosting and cover.
5. The witches' brooms and higher snag densities in infected areas enhance habitat values for birds and other wildlife. In considering the beneficial aspects of dwarf mistletoe infection, it seems reasonable to assume that it is the large infected trees[mdash]particularly those with large witches' brooms[mdash]which have the greatest ecological value.
6. Land use activities (grazing, logging, and fire suppression) have encouraged the spread of dwarf mistletoes.

Many of the silvicultural challenges created by these parasites are exacerbated by ecologically insensitive land management policies such as fire suppression, livestock grazing, and inappropriate silvicultural techniques.
7. In general, dwarf mistletoe only becomes a problem when land managers attempt to create highly productive forests or tree farms to grow timber far in excess of historical production rates.
8. Probably the most significant forest health problem in the Southwest is that there are too many trees[mdash] primarily small and medium-sized trees[mdash]over vast areas. Thus, efforts to improve forest conditions should focus on areas that can benefit the most from thinning.
9. The damaging effects of mistletoe can best be minimized, and their ecological benefits maximized, by recreating forest stands with age, size and density distributions similar to the original, presettlement forests.
10. There is an urgent need for the Forest Service to reevaluate its current strategy for managing dwarf mistletoe, and to adopt an integrated ecosystem perspective that manages for forest ecosystem integrity, rather than waging a war against dwarf mistletoe.
11. An integrated management strategy that restores some of the fundamental components and processes that historically existed in these systems would largely eliminate the mistletoe problem. We refer to this strategy as integrated because the components are interrelated. All components need to be incorporated into an overall management plan for any one of them to work correctly. Such an integrated strategy would include the following fundamental components: 1. No cutting of large diameter trees and snags. 2. Thin understory trees to create stand structure and densities that approximate presettlement conditions. 3. Reestablish regular surface fires in order to minimize seedling survival and to prevent the accumulation of fuel. 4. Reduce livestock densities to a level that will allow a relatively continuous ground cover of herbs and grasses to develop where light, soil and moisture conditions would normally support such vegetation. Once forests are thinned and opened up, they will simply return to their pre-thinning densities if livestock remain to prevent the reestablishment of ground cover.
12. In none of the aggressively treated research plots was dwarf mistletoe eliminated. After treatments had reduced the parasite to undetectable levels, populations inevitably began to rise in these experimental areas.
13. Foresters are often surprised to see considerable infection in treated areas thought to be rid of dwarf mistletoe.
14. when stands are opened up by selective harvest or thinning, dwarf mistletoes are stimulated. Latent infections are more apt to develop shoots; existing shoots grow more rapidly and produce more seed. This is probably a result of both improved tree vigor[mdash]which provides more water and nutrients to the parasite[mdash]and increased light. Unlike many forest insects and pathogens that are often associated with weak or slow-growing trees, dwarf mistletoes actually do better on vigorous trees.
15. dwarf mistletoes are well-adapted for survival and are remarkably persistent. They infect all ages and sizes of trees; moreover, a very significant proportion of infected trees have no visible shoots. Although these parasites spread slowly, trees grow slowly. Dwarf mistletoe populations can double several times during the length of a rotation.
16. Dwarf mistletoes tend to do better on vigorous trees. Since a primary goal of silviculture is to promote vigorous trees, it can indirectly promote the parasite.
17. Because of the typical patchy, concentrated distribution of the parasite, the removal of all visibly infected trees usually results in stands having understocked areas that contain mostly small trees. Except in very lightly infected stands, this type of treatment can greatly alter stand structure and have significant visual impact. Moreover, even when attempts are made to remove all infected trees, considerable infection remains in most treated areas, due to latent infection. Follow-up treatments (before the next scheduled entry) are often difficult to justify economically, except in very young stands. While cutting all visibly infected trees can provide better disease control than a less vigorous approach, the practice can fall short when other factors[mdash] especially aesthetic and ecological ones[mdash]are considered.
18. the most vigorous dominant and codominant trees should be retained. Selection of "leave trees" should be based on overall tree qualities rather than just mistletoe. A lightly infected dominant or codominant tree is usually a better choice for retention than an intermediate or suppressed tree without visible infection.
19. Entering a stand to remove only the more heavily infected trees is usually not an effective way to manage dwarf mistletoe or to improve forest conditions. In most cases, stand infection levels would rebound to even higher levels before the next entry and become progressively more severe over time. Infection should generally

be reduced as much as possible without sacrificing the best trees in the stand.
20. Group selection has also been perceived and used recently as a tool for treating dwarf mistletoe. However, its efficacy for control of mistletoe is largely untested, and opinions and perspectives vary.
21. the creation of small openings can be very favorable to dwarf mistletoes over the long run, leading to heavy losses. In many cases, the regeneration that develops within the openings will be exposed to infected trees on the edges[mdash]and, in some cases[mdash]from infected trees within the openings. The parasite can penetrate small (1- to 4-acre) openings relatively quickly.
22. Underburning may well be a good ecological approach for managing dwarf mistletoes on many ponderosa pine and mixed conifer sites. Often a combination of mechanical thinning and burning can be used to reduce infection levels and improve overall stand conditions. Fire can be used to help maintain infection at or below a desired level, perhaps allowing longer intervals between mechanical treatments. Significant amounts of crown scorch are probably needed to provide a controlling effect.
23. Prescribed fire will be more effective in reducing infection levels when crews can "shape" the fire (increase intensity) within infected areas. Fires covering relatively small areas (certainly no more than a few hundred acres at a time) should provide better results than larger fires, since crews generally have more control over coverage and intensity.
24. Mistletoe presence, incidence, and severity may not be good indicators themselves of wildlife habitat value. Wildlife species are probably responding in a complex way to special features such as brooms and snags, to vertical crown structure, to canopy gap pattern, and other factors affected by mistletoes.
25. Mistletoes are also valuable as mistletoes themselves and as members of a biotic community.
26. Mistletoes possess aesthetic, scientific, and intrinsic values.
27. Forests are not only managed for the resources they produce but also to sustain and protect forest health and ecosystem values. Dwarf mistletoes are important disturbance agents with distinct ecological functions. They contribute to natural diversity structurally and biologically.
28. An important consideration in the design of a silvicultural entry is whether dwarf mistletoe treatment is necessary. In many cases the presence of dwarf mistletoe poses no threat to stand objectives.
29. Because the spread and intensification of dwarf mistletoe in uneven-aged, multistory strands can be quite rapid, management of these stands is a serious challenge.
30. larger trees tolerate more dwarf mistletoe infection without deleterious effects,
31. One of the major challenges for management of infested uneven-aged stands is the dispersal of dwarf mistletoe seed from infected overstory trees to the understory. Although the predominant opinion has been that dwarf mistletoe intensifies rapidly after a partial cutting or disturbance such as windthrow.
32. In view of the uncertainties and potential adverse effects from selection and partial cutting in infected stands, use of the appropriate criteria for selecting and retaining trees is especially important. Overcutting reduces growing stock and possibly accelerates spread of dwarf mistletoe; undercutting and leaving more infected trees allows severe damage and unacceptable impacts.
33. Where wildlife habitat is an important consideration, it may be desirable to maintain or encourage features resulting from mistletoe infections, such as snags and witches' brooms. The same factors that can be manipulated to reduce mistletoe spread, intensification, and effects can also be used to enhance these processes and produce a continuing supply of dead and diseased trees.
34. From certain perspectives and in some situations, dwarf mistletoe infestations have beneficial impacts for associated species and communities. In old-growth forests, dwarf mistletoes may exert a different set of effects on infected trees and display different dynamics. Special management strategies and silvicultural treatments for infested stands are required where the objectives are to maintain and enhance wildlife habitat, old-growth character, and other ecosystem values.
35. They suggest greater bird diversity is associated with increased mistletoe infestation (24 of 28 species positively associated); the key limiting resource for the birds in this situation may be snags. Parker (2001) reports a similar study in a northern Arizona ponderosa pine forest. He finds, however, a more complex situation with four species positively associated with mistletoe (cavity-nesting birds), five species with a negative association (avoiding infested areas), and seven with no relation (indifferent). Fairweather (1995) and Parks and others (1999b) describe mistletoe control treatments in which infected trees were killed but left standing for

woodpeckers and other cavity-nesting animals. Although these snags are used, they remained standing for only a few years. Studies of broom use by wildlife include work by Parks and others (1999a), Hedwall (2000), and Garnett (2002). These studies identify which birds and mammals use witches' brooms, how they use it (for nesting and roosting), and what kinds of brooms are preferred. This information is useful to determine if retaining certain brooms is a potential benefit for a favored species. Information still lacking is knowledge of how the number and distribution of snags and brooms relates to levels of mistletoe infestation and to wildlife populations and the dynamics (rates of generation and loss) of these features.
36. The lack of a significant relationship between dwarf mistletoe-infected trees and associated bark beetles.
37. It was concluded that much more research is needed to quantify the interactions of bark beetles and dwarf mistletoes in tree killing. Dwarf mistletoe intensity, not just presence or absence of the parasite, should be determined. Studies under endemic beetle conditions are particularly needed.
38.
The attraction of bark beetles to mistletoe-infected trees depends on the species combination (mistletoe-tree-insect) and severity of infection. Hawksworth and Wiens (1996) review the combinations for which mistletoe infection appears to increase, decrease, or be unrelated to bark beetle attack.... An intermediate hypothesis to explain aggressive bark beetle (for example, mountain pine beetle) attraction to infected trees suggests that there would be no difference in beetle attack between similar sized trees that are uninfected or lightly infected (DMR 1 or 2), greater attack for moderately infected trees (DMR 3 or 4), and reduced attack for severely infected trees (DMR5 or 6).

In particular Conklin (2000) said:

This practice, focusing on the removal of "high risk" trees, salvaged most of the merchantable infected trees that would die during the next 20-year cutting cycle, reducing the volume killed by the disease, but did little toward limiting the spread of mistletoe (Pearson 1950). Concern was expressed by pathologists (Gill and Hawksworth 1954, Hawksworth 1961) that the approach would not provide effective control and could even cause the disease to intensify. By now, numerous observations had indicated that dwarf mistletoe was stimulated in the remaining trees after harvest and thinning. The standard practice[mdash]often referred to as "pick and pluck"[mdash]undoubtedly favored the build-up of mistletoe on many sites. On the other hand, it was a conservative approach that left a good proportion of the larger trees in most stands. Most foresters were reluctant to reduce stocking levels and residual volumes to the extent that cutting all of the visibly infected trees entailed.

...

[T]he idea that heavily infected stands would "collapse" if not treated in a timely manner, which was used in the early models, is sometimes questionable and open to interpretation.

...

Foresters are often surprised to see considerable infection in treated areas thought to be rid of dwarf mistletoe. Monitoring of several ponderosa pine stands in Arizona and New Mexico in which all, or at least most, of the visibly infected trees were cut indicates that stand infection levels return to pretreatment levels in about 20 years (Geils, unpublished data).

...

A century of experience has demonstrated that it is virtually impossible to eliminate dwarf mistletoes through partial cutting. Latent infections[mdash]infections that have not yet produced visible mistletoe shoots are a major reason. Roughly speaking, for every 100 trees that are visibly infected, another 50 or so have latent (or very inconspicuous) infections in lightly to moderately infected stands (Hawksworth and others 1977, Knutson and Tinnin 1980, Merrill and others 1988).

... [W]hen stands are opened up by selective harvest or thinning, dwarf mistletoes are stimulated. Latent infections are more apt to develop shoots; existing shoots grow more rapidly and produce more seed. This is probably a result of both improved tree vigor[mdash]which provides more water and nutrients to the parasite[mdash]and increased light (Korstian and Long 1922, Hawksworth 1978a, Parameter 1978). Unlike many forest insects and pathogens that are often associated with weak or slow-growing trees, dwarf mistletoes actually do better on vigorous trees.

...

In one sense, dwarf mistletoes should be relatively easy to control, since they require a living host. Removing infected trees destroys the mistletoe. However, dwarf mistletoes are well-adapted for survival and are remarkably persistent. They infect all ages and sizes of trees; moreover, a very significant proportion of infected trees have no visible shoots. Although these parasites spread slowly, trees grow slowly. Dwarf mistletoe populations can double several times during the length of a rotation (Parmeter 1978).

Conklin, David A., 2000. Dwarf Mistletoe Management and Forest Health in the Southwest. USDA Forest Service, Southwest Region.
http://web.archive.org/web/20030809021433/http://www.forestpests.org/diseases/pdfs/dwarfmistletoe.pdf.

Mistletoe in a tree acts to thin around it and provide it with growing space, by sending out in a ten foot radius a vector that can suppress competing trees around it. Forestry schools have focused on tree production in tree farms, and have taught that mistletoe is bad and had to be cut out if timber production was the goal.

However, in a natural forest, mistletoe is normal, a thinning strategy the forest uses much like fire or bugs to maintain space between trees. Trees live for a very long time with mistletoe infection. Instead of being bad, mistletoe is fine, a part of forest function. It has been noted in fact that mistletoe is beneficial and important to many species of birds and wildlife. As the agency's mission has evolved toward wildlife protection, the perspective on mistletoe has evolved too.

Newer research and a more enlightened view of the ecological function of former pests has shown us the value of mistletoe, and in fact the crucial nature of mistletoe to a functioning forest.

It is time for this agency to take the more enlightened view of mistletoe and realize that mistletoe in the trees is not bad.

Mistletoe Treatments Will Not Be Effective; Best Learn To Live With It.

The NEPA document assumes that the proposed mistletoe treatments will be effective. This is false. The mistletoe treatment will not be effective. The only way to effectively treat mistletoe is to remove the infected hosts over large areas so that the regeneration grows up faster than the mistletoe can invade from the edges. Mother Nature kept mistletoe in check through occasional large stand replacing fires. The only way for the agency to control mistletoe would be to prescribe large stand replacing fires or do large clearcuts. Small clearcuts won't be effective, and any form of partial cutting won't be effective, because residual trees, even if they are not visibly infected, they may in fact be infected, and they will spread infection to the regenerating stand. Blowing your nose does not cure a cold.

Widespread large-scale clearcuts are unacceptable ecologically and politically. Since mistletoe does not kill trees quickly and since it has many ecological benefits, the best course is to set our expectations a little lower in terms of tree growth and just to learn to live with Mistletoe.

Moist Forest Restoration Alternatives, Effects, Analysis

There is great deal of agreement on restoration treatments in many dry forest types. Too often we see the agency and industry oversimplify and treat other forest stands in Eastern Oregon as dry. Please continue to keep in mind that even when moist mixed conifer and other forest types exist in a dry context, they need to be analyzed and treated differently. As complicated as it is to understand and apply, science shows that the natural diversity found in these types of forests are driven more by the randomness of disturbance regimes rather than some sort of average as we may see in other forest types. Further, we don't believe there is consensus on the science or social agreement on a need for restoration via aggressive commercial logging in moist and cold forests. A more precautionary approach that retains much higher basal area and all large trees (>21" dbh) is therefore warranted. Where there will be logging in these forests, the agency needs to make a more compelling case for why commercial logging is the right thing in the right place and that there aren't better alternatives (including natural disturbance), especially when commercial logging has significant trade-offs on carbon storage, snag habitat, and adverse effects of road construction. Proximity to a value at risk is not a sufficient justification outside the structure ignition zone. It is important to consider future conditions and recognize/analyze the reality that opening up such stands will likely be counterproductive - especially over time.

HRV

* HRV analysis does not provide a sufficient ecological justification for logging. While it is simple and convenient, the practice is rightly getting increased scrutiny. This HRV only looks at tree species and densities. What is the HRV of roads/unroaded? Fisher habitat? Lynx habitat? Cows? Snag habitat?
* Choosing a specific moment in time is somewhat arbitrary in fire-adapted forests that have constantly been in flux since the end of the last ice age, and are now subject to changing conditions due to climate change, ongoing drought, increasing development/use, and other factors.
* The agency has relied on the John Marshal project (funded in part by the timber industry) that compared photos from recent years to USFS photos in the 1930's. We understand the appeal, but there were specific factors and activities that created the conditions captured in the reference photographs. Among them, much of the west had experienced recent fires that make more recent "uncharacteristic" and "catastrophic" fires seem tame by comparison. The area had been settled by white colonialists about 80 years before with the forests being aggressively logged (high-graded) and overgrazed. Further, indigenous management had been phased out after as much as 16,000 years. 1935 may create a very unique and inaccurate snapshot in what is a very long movie.

Matching the Purpose and Need with the proposed action

P&N: Increase forest health and vigor

* Please consider that healthy vigorous forests are not composed only of healthy vigorous trees. They include dead, dying, and decaying trees. They include natural processes including bugs, disease, fire, snags, decadent trees and stands, mistletoe, and more.
* In presentations, it has been stated that insect and disease outbreaks are being seen more frequently and on a bigger scale. Is that true here? Over what timeframe? Can you provide evidence that is the case? Please recall that even if true, that may not be a bad thing, and in fact is good and necessary for some values. To the extent it is a problem, logging is often not the solution. Further, natural disturbance may lead to many of the same beneficial with less negative impacts.
* If fire suppression and logging have created the restoration need, then it's always hard to understand how more fire suppression and logging will solve the problem. On many projects, the Forest Service has promoted the idea of "setting up the landscape to receive fire". It seems that the logging always happens, but the fire and other restoration activities often do not. This erodes trust and leads to worse long-term outcomes for the forest. Fire use planning (prescribed fire and allowing some natural fires to burn) would be well within the scope of this

project. If that is not done, the analysis should consider the impacts of only doing the commercial logging of each alternative.
* Reducing tree density through logging may have benefits to forest health and vigor in some places. To the extent that is a legitimate purpose and need, consider other tools besides logging including hand-thinning, induced mortality, fire use, and letting natural disturbances play their role. Also please consider leaving as much material on site as possible for its value to wildlife, soils, carbon sequestration, water retention, nutrient recycling, and more.
* Achieving this goal can be met by focusing on removal of small trees; it does not require cutting large and/or old trees or entering unroaded landscapes with roads and commercial logging.

P&N: Enhance unique plant communities such as shrub steppe, dry & wet meadows, and aspen.

* These are laudable goals. However, many of them can best be achieved through means other than logging. Further, while conifer encroachment may be a threat to some of these values, others need to be addressed as well. Please consider, analyze, and implement other activities such as fencing, reducing ungulate grazing (this is fully within the scope of this project), encouraging native carnivores, fire use, and leaving downed trees on site to create barriers to browsers and maintain moisture and nutrients on site.
* Aspen restoration has to go beyond killing "encroaching" conifers and building fences. There must be a plan for maintaining fences. Where conifers are cut, to aid successful recruitment they should be dropped and not removed. The agency also needs to get serious about grazing reform, promotion of native carnivores, and other restoration tools if there is to be continued broad public trust and support for chainsaw restoration.
* Hydrological function is critical to the enhancement and protection of these habitat types, especially wet meadows and aspen stands. This can best be addressed by addressing grazing, and roads, and may require maintaining high densities of trees in the watershed (especially near small creeks, tributaries, etc.). Please analyze the effects of logging in the watershed on these values, not just on the site.
* If the project is successful in keeping more elk on the forest for longer periods of time, and the agency does not meaningfully address livestock grazing (as currently proposed), there will be an increased forage demand on all sorts of species from grasses and shrubs to hardwoods. This may include sensitive species in sensitive habitats with other values. Please analyze this.

P&N: Improve wildlife habitat

* We understand that the focus on elk is based on the premise that vegetation management and road management will help improve forage quality, quantity, and diversity as well as elk security thereby encouraging elk to use public lands instead of adjacent private lands. We agree that there is some logic and science behind this and support some of the activities that flow from it. However, we also believe there are some limitations.
* We strongly support road decommissioning. Notably, the definition of elk security used by the Forest Service in this project defines it as areas of [ge]250 acres [ge]1/2 mile from a road making up [ge]30% of an area. All three parts of that definition are critically important, and without one, the proverbial stool falls over. None of the alternatives achieves elk security on 30% of the landscape. To meet the purpose and need of this project, the agency must develop and implement an alternative that reduces road densities so at least 30% of the project area is secure for elk.
* Elk security can also be enhanced with leave patches, and dense areas between roads and "interior" elk security areas. Consider lighter touch thinning, leave patches, and some high density near roads. Please also ensure that roadside thinning to create fuel breaks does not negatively affect elk security.
* Diversity can be created by natural disturbance. While logging may increase forage for a period of time, please consider that it can also dry out stands and make them hotter. Further, stand initiation may create stands that are even denser and less beneficial for forage in a relatively short period of time. That state may persist for a long period of time. Please clarify how any short-term benefit to forage will be maintained in the long-term.
* We are pleased to see wildlife connectivity corridors being identified up front. We support them being treated with as light a touch as possible including where they intersect with fuel breaks.

* Any treatment is likely to have a suite of winners and losers. Elk are a popular and relatively common species. Treatments that benefit elk will benefit some other species, however, they will also have adverse effects on other species and values. Please consider and articulate what effects this will have on species such as goshawk, marten, hare, lynx, flying squirrels, great gray owls, and mule deer.
* Mule deer are in steep decline across the west. Cows (livestock) tend to displace elk which tend to displace mule deer making them more vulnerable to car collisions, poaching, legal hunting, and other threats. How will the alternatives impact mule deer in the short and long term?
* Temporary roads and any road that is not obliterated should be considered a road when it comes to elk security. Roads that are simply closed, seasonally closed, or "put into storage" are frequently used and only closed on paper. To satisfy the project's purpose and need, far more than 13 miles of road need to be fully decommissioned and unusable to motorized traffic. We also support scarification and other efforts to hide closed roads from those that remain open. Further, given that fire suppression has been identified as the cause of the restoration need, roads do not need to be left open to make fire suppression easier.
* We support converting some of the roads to trails. However, bicycles can have a significant impact on elk and other wildlife. To a lesser extent hikers may too. We encourage you to analyze the impacts of bikes and consider closures or seasonal closures to bikes where appropriate.
* We understand there is some evidence from a Wallowa Whitman Project that supports the notion that thinning on public lands may increase the number of elk using the thinned area. Did it also result in less use on adjacent private lands? Is there additional evidence that the treatments proposed actually work? How does thinning interplay with road closures? Is there a monitoring plan to learn from this project? We'd certainly encourage considering such monitoring, especially given the increase in funding for monitoring and that this has become a popular justification for thinning.
* While we are sympathetic to the legitimate concerns of adjacent private land owners, landowners are a privileged group of people who benefit from conversion of what was once elk habitat to other uses. We support the protection and enhancement of wildlife habitat for all native wildlife on our public lands. Management to help private landowners at the expense of other public values on public lands is inappropriate. Further, there are certainly some private landowners who appreciate having elk on their property, and elk historically would have used those landscapes. The agency is not responsible for continuing an unnatural condition that benefits a few on private lands by sacrificing public values on public lands.

P&N: Protect values at risk including public and firefighter safety.

* We understand this is predicated on the assumption that the forest is vulnerable to "uncharacteristic wildfire" putting property, infrastructure, and other human values at risk, as well as the assertion that conditions do not allow for "effective response to wildfire" or the use of beneficial wildfire. Further, we understand the agency feels that current fuel breaks and ingress/egress routes are non-existent or ineffective.
* While some of these assumptions may be true, they require evidence and we believe some are inaccurate or exaggerated. Even "uncharacteristic" wildfire meets many of the stated objectives of this project and almost always leaves behind a mosaic. We must have the humility to understand that we cannot replicate the effects of natural and indigenous fire to which these landscapes have adapted through anything other than the use of fire.
* The safest way to improve firefighter safety is simply not to send them into dangerous situations. Given that fire suppression is the fundamental reason for the restoration need, the agency would be wise to come up with a fire use plan that would allow some natural fires to burn, and implement prescribed fire in areas where that is not possible. Doing so also saves a tremendous amount of money, reduces the carbon footprint of the project, and creates other benefits to wildlife, plants, and other values. Fire creates diversity, openings, habitat, and meadows. If there is no fire use plan, this is simply a logging plan.
*
We can't help but notice that most of the identified VaR's are in moist and cold mixed conifer forests. We want to reiterate that if this is being billed as a restoration project, ecological needs must be prioritized. The right things need to be proposed in the right places. The further that treatments are proposed from the VaR's the less credibility they have. Further, in some of these forest types, logging can actually increase the fire risk. Even in the

best-case scenario, the window of time in which the treatments effectively reduce fire risk is likely to be quite short. Looking at past treatments in this landscape, it is clear that is the case.

* This landscape is already a mosaic of forest and grassland and does not require aggressive logging to make fuels heterogeneous.

P&N: Enhance public and traditional land uses through vegetation management and habitat improvement. Enhance and monitor culturally significant resources, improve and maintain recreational values, provide forest products, and support local communities.

* The P&N calls out a need for monitoring, however there is no monitoring plan. Attached, please find a rough memo we have provided in other circumstances to R6 Forest Service staff regarding the type of monitoring that we believe is warranted here. In particular, where the agency is proposing to do controversial logging such as opening up moist stands in dry landscapes, the agency would do well to study the impacts that are of greatest concern such as soil moisture and temperature compared to untreated stands over time. Doing so will build trust, reduce conflict, and better inform future management.
* This is an inappropriate Purpose & Need. Vegetation management (generally logging) is not a purpose or need. It is a tool that may be used to satisfy a purpose and need. Prematurely choosing that tool to accomplish these goals through logging closes the door to some of the most effective, cost efficient, safest, and least controversial ways of achieving otherwise laudable goals.
* Many people value these landscapes because of their "wildness" and "messiness". There are plenty of landscapes that are heavily managed, thinned, logged, and roaded. From hunters and hikers to birders, bushwhackers, and gatherers, the value of "unmanaged" forests here are prized and should be considered as no less important than those who like to see heavily manipulated forests that can be found far more easily.
* Behind this project is a specious assumption that logging to create forest products will support local communities. However, the economics analysis must reflect the reality that - the timber industry notoriously booms and busts, and primarily due to mechanization, union-busting, and consolidation - timber volume has been largely decoupled from jobs and local economic benefit. Dollars that go to timber executives in Portland and Boise (or investors in New York and Los Angeles) do not provide local benefit.
* Economic benefits can be a byproduct of good restoration. However, we have seen time and time again, that when they are considered co-equal in planning, they become primary in implementation. That tends to come at the expense of other values that benefit far more people in many more ways. Given the influx of money coming into the forest directed at logging, this concern is especially significant. Also, once a project is implemented, the agency tends to leave out stakeholders that do not have a financial interest. Further, many stakeholders lack the resources to be as involved as they would like to be at this stage and count on good decisions being made during planning.
* The economic analysis should more thoroughly look at the non-commercial activities of the project. Road obliteration / maintenance, prescribed fire, fish passage, and other such activities support family-wage jobs the benefits of which are far more likely to stay local than industrial logging. Those benefits should be considered no less seriously than commercial activities that send most of the economic benefit outside the local community.
* We support appropriate thinning of small trees and imminent hazard trees in and around campgrounds. The agency does not need to pre-emptively remove large trees that do not pose a present hazard.
* Protecting values at risk through vegetation management must start by thinning small trees in the ignition zone (measured in yards or meters) of those values and work their way out (while reducing the aggressiveness of that thinning) from there.
* We support turning some of the roads into hiking trails which could also have economic benefits to local communities. Please see our caution about bikes.

Roads Analysis, Effects, Alternatives

* The science on elk security and roads is sound and overwhelming. We understand some interests don't like

what it means in terms of management implications, but the analysis based upon the Starkey and other road/elk science is sound.
* Similarly, we understand some vocal interests object to any road closures due to their preferred type of recreation. Our National Forests are heavily roaded, as is the rest of the landscape. There is no lack of opportunity for road-related recreation and access. Unroaded areas are valuable for many reasons, including to many other recreationists and forest users. Unroaded landscapes should be maintained in that condition, and opportunities to "create" them should be seized upon. If anything, this project should close and decommission more roads.
* We support the use of fire on the landscape and understand that creating PODs and other strategic fuels breaks may increase the likelihood that managers will choose to allow fire to burn as well as create other possible benefits such as human safety. However, without a fire use plan, it's harder to support such activities or see them as anything more than logging. Further, creating fuel breaks along roads makes it more likely those roads will remain on the landscape in perpetuity and increase their significant negative impacts - some of which (like elk security and poaching) run counter to the goals of this project. The agency must analyze the impacts that roadside thinning will have on increased poaching risk, tree poaching, fire risk, sedimentation, habitat fragmentation, wildlife disturbance, introduction and exacerbation of noxious weeds, etc., along roads.
* Roadside fire breaks and other aggressive logging including creating gaps means new and enlarged canopy openings. It is likely that in many circumstances, small fuels will quickly grow in and create an increased fire risk unless the agency is willing to fund and concurrently plan for regular maintenance. Without that, these treatments need to be re-analyzed (including their impact over time) and reconsidered.
* We encourage the Forest Service to emphasize to the public that road closures are beneficial for more than just elk security, but also hydrology, fire danger, weeds and more.

Implementation

* In projects like Big Mosquito, the Lostine, and others in the region, we have seen the very trees that restoration projects seek to retain, protect, and enhance end up being cut as danger and hazard trees due to the very thinning that sought to protect them. In doing so (and subsequently defending the decisions), the Forest Service and associated collaborative groups have lost a great deal of credibility and trust. In addition to placing landings and designing sales to minimize the impact on such hazard or danger trees that would otherwise not be categorized as such, the agency must create conditional implementation plans to ensure this does not occur. That's even more so if the agency gives in to industry demands for creating vagueness around logging systems. For instance, before a unit is logged, hazard and danger trees must identified. If they go over a certain amount, the logging systems must be changed, and if they cannot successfully retain sufficient snags and other trees, the unit should be dropped.
* The late Tim Lillebo was known for his reminder to keep things gappy, patchy, and clumpy where appropriate - which is a much more fun way to talk about the ICO approach. Too often, the agency focuses on the gappy part, and we were disappointed to see several interest groups focus on large gaps (clearcuts) and seek to minimize (or even eliminate) skips and clumps. Clumps and skips are just as - if not more - important to achieving many of the projects stated goals.
* We understand the timber industry has asked for vagueness in contracts and implementation including logging systems. Too often though we have seen this lead to bad outcomes, controversy, and distrust in the agency. Given the range of impacts that different logging systems and practices can have, all possible logging systems must be fully analyzed. It would be a much better use of limited resources for the agency to decide in advance (and with input from all specialists) what systems are appropriate. If not, all specialists and specialties involved in the project development should be consulted on each timber sale to ensure there are no unanalyzed negative effects due to the implantation-phase bias towards economic interests.

Economics

* With access to CFLRP money, the FS should develop more alternatives that do not rely on timber receipts to

fund restoration activities.
* The economic analysis should disclose the non-market economic values of ecosystem services provided by forests, including the incremental additional value of higher basal area, high carbon storage, better snag habitat, less disturbed soil, fewer weeds, higher water quality, the intrinsic value of undeveloped areas, etc.
* The agency traditionally disregards climate and species-specific concerns because the project area is seen as insignificant at the scale of the climate or a species range. We believe this project area is big enough to matter. We also find a double standard when it comes to the economic focus on "local" communities. By the agency analysis, the five surrounding counties (which includes population centers hours away) are home to just 4% of the state's population and just 0.045% of the public that own these forests. Of that number, less than 5% are engaged in the forestry-related sector. Meanwhile tourism supports 21% of the jobs. Tourism is not supported by logging projects. Further, the population here is not representative of the broad public. The agency's economic focus on an unrepresentative 5% of the 0.045% of the population is inappropriate.
* The DEIS failed to disclose the social cost of carbon dioxide emissions which is a useful way to compare the economic benefits of incremental supply of wood products to the economic costs of incremental increase in greenhouse gas emissions caused by logging.

Fish & Wildlife Analysis, Effects, Alternatives

*
While we understand there is a focus on elk, elk are a relatively common species, so it was no less important to minimize negative impacts and give serious consideration to other native wildlife including currently extirpated species.

*
The EIS should have put more effort into analyzing the effects to species most likely to be harmed by this project such as those associated with snags and dead wood. The DEIS analysis is not only wrong by degree, it's wrong in the direction of effects, claiming that dead wood species will benefit, when in reality they will be harmed.

* Great gray owls are present in the area. Surveys should be conducted and effects on the species should be analyzed. A recent judicial decision found that Great grays are a "precarious species subject to high public interest" and that tiering it to other analysis without site-specific analysis was inappropriate.
* We have addressed some of our concerns on roadside fuel breaks in other sections, and want to note here that we appreciate the agency creating skips, feathers, etc. That is especially true around wildlife corridors. We encourage you to be sure to buffer these corridors so as to ensure they continue to function as such. In a similar way that elk security is created by distance from a road, for some species, wildlife connectivity corridors will only be effective if they have interiors that are sufficiently buffered.
* In ODFW's scoping comments (that incorrectly noted that the "Forest Plan is still under litigation"), we noted the agency has been working with the Forest Service to keep elk off wintering areas and available for hunters on public lands with salt blocks and other attractants. While we have no objection to optimizing hunter opportunity where it is appropriate, we do not support keeping elk off wintering areas when elk should be in wintering areas. Further, baiting elk is unethical and, in all its activities, the agency should seriously consider the impacts of aggregating elk as Chronic Wasting Disease continues its march towards the Umatilla National Forest.
* Given the focus on wildlife, and the agency's description of this as a "kitchen sink" project, it is not out of the scope of this project to replace barb wire fence with wildlife-friendly fence. Doing so would build trust with the public and has meaningful environmental benefits.
* With logging and roadside thinning, there will likely be a massive increase in edge habitat. That will create winners and losers. Please consider, analyze, and disclose what species will benefit and suffer from this.
* Similarly, improving habitat for species that prefer open stands will come at the expense of other species that prefer more dense forests, such as pileated woodpecker, three-toed woodpecker, goshawk, lynx, marten, etc. The latter affects must be analyzed and given no less attention than the former. However analysis seems to be biased towards a focus on the "winners." NEPA is about disclosure of trade-offs. Please do additional analysis on

the likely "losers."
* We urge the FS to design prescription with a clear intention to benefit Freshwater mussels and native mollusks (both aquatic and terrestrial).
* We urge the FS to design prescription with a clear intention to benefit native pollinators.

Consultation Needed for ESA Listed Fish

The project area has approximately 85.7 miles of Designated Critical Habitat (DCH) for the ESA-listed Middle-Columbia River steelhead. A project of this scope and scale with treatments affecting a large fraction of a large landscape, often with heavy equipment, often associated with road construction and road use, and some of the logging in RHCAs, will almost certainly adversely affect vegetation, water quality, peak and low flows, large wood, and aquatic habitat conditions supporting listed fish. This requires consultation. The DEIS erred by concluding that the cumulative effects of all the logging and roads is not Likely to Adversely Affect listed fish.

Other Comments

* We appreciate that the agency put a wildlife biologist in the position of the project lead. Projects driven by silviculture and fuels tend to lead to bad ecological outcomes and generally do not meet restoration goals. We'd also be remiss not to note that Elizabeth Berkley in particular has demonstrated herself to be trustworthy, well-liked, and widely respected. While we understand the constraints placed upon the agency, simply put, we need more "-ologists" generally and in these positions specifically.
* Given the five proposed alternatives, we appreciate your recognition that the agency need not choose one complete alternative over another. There is no need to pair the maximum road closures with maximum logging or vice versa. We'd encourage pairing ecologically appropriate thinning (generally less) with ecologically appropriate road closures and fire use (generally more).
* To the extent our National Forests belong to anyone, they belong to all of us, equally. While the focus on local interests is understandable, our National Forests were created in large part to reduce the disproportionate impact of provincial interests. The costs, benefits, and interests of interested parties should not be weighted based on their zip codes or other arbitrary criteria. Efforts should be made to protect against unintentional and intentional bias.
* Since "values at risk" justifies much of the proposed logging and thinning that would not happen occur, the agency must commit to efforts to stop putting in new values that will be at risk in the future. Or, at least, make them adjacent to what's already there.
* The agency has argued that addressing grazing is outside the scope of the project while also calling this a "kitchen sink" project. That feels disingenuous and political. If the agency is not going to address grazing in this project, in addition to analyzing and adjusting the project to mitigate changes to grazing, the agency must commit to immediately reviewing current grazing decisions and reassess them based on a changed condition.
*
We understand and appreciate the stated sentiment that decision-makers are trying to approach this with an open mind. However, we are a bit concerned that scoping was intentionally generalized and now there is no preferred alternative due to a change in staffing. Given that, we'd encourage as much public engagement as possible between the time when comments are considered and a proposed alternative is developed/promulgated. Doing so would honor the tremendous amount of time and effort stakeholders like our organization have put into this project. It is also what we understood would occur based upon discussions with District Rangers in the fall of 2019.

* About 4% of the project area is private. It is always concerning when a major driver on 96% of a public lands project area is driven by a desire to address the privately owned 4%. The EIS should consider alternatives that focus more on ecological goals on public lands, not modifying habitat on public lands to protect small private inholdings, many of which no one lives on.

Each substantive issue discussed in these comments should be (i) incorporated into the purpose and need for the project, (ii) used to develop NEPA alternatives that balance tradeoffs in different ways, (iii) carefully analyzed and documented as part of the effects analysis, and (iv) considered for mitigation.

Note: If any of these web links in this document are dead, they may be resurrected using the Wayback Machine at Archive.org. http://wayback.archive.org/web/

[see also letter with the following attachment: Kalvin's memo with suggestion for meaningful monitoring]

[1]https://www.hcn.org/issues/50.11/climate-change-timber-is-oregons-biggest-carbon-polluter