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24 June 2022

TO: Forest Supervisor (Reviewing Officer), Deschutes National Forest
Attn: Sasha Bertel
VIA: objections-pnw-deschutes@usda.gov

Subject: 36 CFR 218 objection of the Green Ridge Landscape Restoration Project

Dear Forest Service:

In accordance with 36 CFR 218, Oregon Wild hereby objects to the project described below.

DOCUMENT TITLE: Draft Decision Notice and Finding of No Significant Impact for the Green Ridge Landscape Restoration Project

PROJECT DESCRIPTION: Alternative 3-modified involves:

Alt 3 Modified Treatment Type	Acres
Dispersal Habitat Maintenance (PST); Min. 50% Canopy Cover Retained	297
Dispersal Habitat Maintenance (RGF); Min. 50% Canopy Cover Retained	85
Dispersal Habitat Maintenance (RGF/RDF); Min. 35% Canopy Cover Retained	2,818
Future Dispersal Habitat UMZ Treatment (PST) Min. 40% Canopy Cover Retained	107
Future Dispersal Habitat UMZ Treatment (RGF) Min. 35% Canopy Cover Retained	94
Green Ridge Trail	314
Hand Thin	263
Mixed Conifer Restoration (RGF)	2,283
Plantation Restoration (PP/RDF)	1,898
Plantation Restoration (RGF/PST)	3,893
Plantation Restoration (PST); Min. 40% Canopy Cover Retained	1,088
Plantation Restoration (PST); Min. 50% Canopy Cover Retained	15
Plantation Restoration (RGF); Min. 35% Canopy Cover Retained	13
Ponderosa Pine Restoration (PP/RDF)	3,122
Prairie Farm Restoration	37
Risk Reduction (Ladder fuel reduction)	1,349
Total Treatment Acres	19,437

Timber yield = 5.25 mmbf

PROJECT LOCATION (Forest/District): Sisters Ranger District, Deschutes National Forest, Jefferson County, Oregon

NAME AND TITLE OF RESPONSIBLE OFFICIAL: Ian Reid, District Ranger, Sisters Ranger District, Deschutes National Forest

LEAD OBJECTOR: Oregon Wild

REQUEST FOR MEETING TO DISCUSS RESOLUTION: Oregon Wild hereby requests a meeting to discuss potential resolution of the issues raised in this objection.

NARRATIVE DESCRIPTION OF THOSE ASPECTS OF THE PROPOSED DECISION ADDRESSED BY THE OBJECTION:

1. We object to logging native stands over 80 years when it is not at all clear that such logging will clearly result in greater assurance of habitat maintenance.
2. We object to removal of large trees, including large trees infected with mistletoe because they contribute to ecological goals, especially in LSR, riparian reserves, and critical habitat.
3. We object to logging in riparian reserves to meet upland timber prescriptions.
4. We object to logging that will add the cumulative build-up of greenhouse gases in the atmosphere, especially when the FS makes no effort to consider alternatives that intentionally harmonize climate change mitigation and adaptation.

SUGGESTED REMEDIES THAT WOULD RESOLVE THE OBJECTION:
Oregon Wild respectfully requests that the Forest Service withdraw the recommended project and —

1. Retain mature native forests in LSR, except where the FS can make a compelling findings that "(1) the proposed management activities will clearly result in greater assurance of long-term maintenance of habitat, (2) the activities are clearly needed to reduce risks, and (3) the activities will not prevent the Late-Successional Reserves from playing an effective role in the objectives for which they were established."
2. Retain all large trees >20" dbh in LSR, riparian reserves, and critical habitat. Outside those areas, follow the Deschutes Forest Collaborative Recommendations for retention of large mistletoe trees when they occur in groups;
3. Avoid commercial logging in riparian reserves except where clearly needed to attain ACS objectives. Design prescriptions to focus on ACS objectives (both aquatic and upland habitat, including abundant dead wood), and buffer suitable and occupied habitat for Northern Waterthrush;
4. Use best available science to retain more green trees to ensure long-term recruitment of adequate snag and down wood habitat;
5. Retain more green trees to harmonize climate change mitigation and adaptation; or
6. Prepare a new EIS to address the significant impacts and unresolved conflicts and fully complies with the requirements of NEPA and the CEQ regulations and addresses the specific concerns expressed below.

DESCRIBE HOW THE OBJECTIONS RELATE TO PRIOR COMMENTS:
Oregon Wild comments on the draft EA raised concerns about trade-offs associated with logging in LSRs, removal of mistletoe-infected trees, logging in riparian reserves, and the contribution of carbon emissions from logging to global climate change.

SPECIFIC ISSUES RELATED TO THE PROPOSED ACTION:

Logging Natural Stands in the LSR Violates Standards for Risk Reduction in LSRs

The EA/DN fail to conduct the required analysis to support the decision to log older stands in LSRs for purposes of risk reduction. Logging in natural stands over 80 years in LSRs in the East Cascades Province may be allowed for purposes of "risk reduction" based on the following language in the Northwest Forest Plan ROD.

> "While risk-reduction efforts should generally be focused on young stands, activities in older stands may be appropriate if: (1) the proposed management activities will clearly result in greater assurance of long-term maintenance of habitat, (2) the activities are clearly needed to reduce risks, and (3) the activities will not prevent the Late-Successional Reserves from playing an effective role in the objectives for which they were established."

1994 NWFP ROD p C-13. This requires an evaluation and finding that is not found in the EA. Finding that "activities will clearly result in greater assurance of long-term maintenance of habitat" is difficult to make because commercial logging is very likely to degrade late successional habitat, while fire is unlikely to encounter fuel reduction treatments. So, late successional wildlife would much rather take their chances with fire than accept the certain harms of logging. See Heiken, D. 2010. Log it to save it? The search for an ecological rationale for fuel reduction logging in Spotted Owl habitat. Oregon Wild. V 1.0. May 2010.
https://www.dropbox.com/s/pi15rap4nvwxhtt/Heiken_Log_it_to_save_it_v.1.0.pdf?dl=0

Oregon Wild's comments on the draft EA urged the FS to document how the logging would meet the "clearly needed" and "greater assurance" standards for risk reduction in LSRs. The final EA and draft DN do not meaningfully address this comment. EA Appendix D – Response to Comments says LSR standards will be met by following Metolius LSRA, without any particular review of LSR standards & guidelines.

> "Treatments in LSR will follow the management direction outlined in the Metolius Late Successional Reserve Assessment (LSRA) to ensure that LSR objectives are met. The objectives stated in the Metolius LSRA include managing stand densities to reduce the loss of trees due to overstocked conditions, managing for late-successional habitat conditions in fire climax stands that allow for low intensity/severity prescribed or natural fires, and using treatments such as commercial thinning, precommercial thinning, salvage, pruning, release and/or prescribed fire to develop late-successional habitats and large tree characteristics (Metolius LSRA Pg. 65)."

This does not explain how the risk reduction standards are met. The requirement to prepare an LSR Assessment is a separate from the requirement to ensure that risk reduction treatments will "clearly result in greater assurance of long-term maintenance of habitat". The FS cannot meet the risk reduction standard by simply following the LSR Assessment. That would be analogous to meeting the speed limit by using your turn signal when changing lanes.

Vague tables in the Metolius LSRA (p 136) says that "understory thinning" is a risk reduction treatment "necessary to protect potential habitat" but the LSRA and the EA provide no analysis to support that conclusion. The word *necessary* appears to address the "clearly needed" prong of the LSR risk reduction standards, but without any supporting analysis. And the "greater assurance" prong is not addressed at all. Dismissing detailed public comments by merely asserting that risk reduction is recommended in the LSRA is not good enough. In particular, making the required finding that logging will "clearly result in greater assurance" requires weighing the probability of unpredictable adverse natural disturbance events versus the near certain probability of adverse effects from logging that removes large trees and reduces snag recruitment. Furthermore, this assertion of necessity is contradicted by the Metolius LSRA which describes fire risk in *Management Strategy Area H* as "Low risk of fire occurrence with moderate to high fuel loading. Fires will probably be high intensity, stand-replacement in nature." This says that fire risk is low, but if wildfire does occur the natural fire regime we lead us to expect stand replacing fire. It is not at all clear that risk reduction is necessary given those conditions.

It's important to note that logging that reduces forest density will adversely affect spotted owl dispersal, and needs to be carefully weighed against the alleged benefits of fuel reduction for long-term habitat maintenance. We recognize that very high stand densities may not be sustainable in this landscape, nonetheless, the FS needs to be wary of relying on outdated science suggesting that 40% canopy cover represents effective owl dispersal habitat. New information indicates that spotted owl dispersal habitat should be managed for "at least 80%" canopy cover. See Stan G. Sovern, Eric D. Forsman, Katie M. Dugger, Margaret Taylor. 2015. Roosting Habitat Use and Selection By Northern Spotted Owls During Natal Dispersal. The Journal of Wildlife Management 79(2):254–262; 2015; DOI: 10.1002/jwmg.834. https://osu-wams-blogs-uploads.s3.amazonaws.com/blogs.dir/2742/files/2016/09/Sovern-et-al.-2015.pdf ("**Roost Site Selection**. In contrast to the assumption that stands with relatively open canopies provide suitable dispersal habitat for spotted owls, our results suggest that dispersing juveniles selected stands for roosting that had relatively high canopy closure (x = 66 ± 2%). … Two hypotheses could explain why dispersing owls selected closed-canopy stands. First, several researchers (Barrows 1981, Forsman et al. 1984, Weathers et al. 2001) have shown that temperature and precipitation appear to influence selection for roost trees and attributes within a roost tree, such as perch height and percent overhead cover. … Second, juvenile northern spotted owls may have selected for closed-canopy forest because their preferred prey were most abundant … **Landscape Scale Selection**. … [O]ur mean estimate of canopy closure from plots at roosts (66%), which was likely an underestimate of canopy cover, was considerably higher than the minimum values recommended by Thomas et al. (1990) [i.e. 50-11-40]. … **Management Implications**. … Based on our study, we recommend that managers should pursue a strategy that exceeds the canopy cover guidelines recommended by Thomas et al. (1990) when managing dispersal habitat for spotted owls. Based on our estimate of mean canopy closure (66%), and our estimate of mean canopy cover from overlaying a dot grid on the same areas (approx. 14% larger), we recommend that the target for canopy cover in stands managed for dispersing spotted owls should be at least 80%.")

In describing *Management Strategy Area H* (where this project overlaps with the LSR) the Metolius LSRA emphasizes several important factors that do not appear to be clearly accounted for in the EA, such as the severe shortage of large trees in the LSR, the low fire hazard, and expectation of stand-replacing fire if it does occur, the silvicultural need for thinning from below in young stands (and the absence of a silvicultural need to log older stands), and the lack of any mention of mistletoe as a forest health concern. Management of the LSR is supposed to be guided by the LSR Assessment, but that is not well documented here.
See Metolius LSRA (pp 116-118) Management Strategy Area H

> "Landscape Patterns: … The area is still predominately in the small timber size class (74% of the stands are 9-21" dbh), but most stands are dominated by trees on the small end of the scale, almost all of the large trees having been removed. Less than 1% of the area is in stands containing med/large trees. … [M]ost overstory trees are less than 21"."
>
> "Fire Risk: Low risk of fire occurrence with moderate to high fuel loading. Fires will probably be high intensity, stand-replacement in nature."
>
> "MSA Goals - Manage for late-successional habitat that is primarily sustainable fire climax vegetation with patches of climatic climax stands. Manage forested stands to provide healthy dispersal habitat and habitat for other LS/OG species. This area is the eastern most fringe of mixed conifer habitat and may be especially important to species on the edge of their normal range."
>
> "Management Objectives - Short term: Reduce stand densities and fuel loads to lower risk of high intensity disturbance, and to promote development of larger trees. Long term: Manage plantations to develop LS/OG habitat as quickly as possible to reduce the effects of fragmentation."
>
> "Silviculture opportunities: Emphasize thinning from below to develop young stands into late successional habitats, and to reduce the risk of catastrophic disturbances."
>
> "Insect and Disease Condition: Moderate to high risk from stress induced root rots, beetles and engraver. Primarily low to medium insect and disease damage with patches of high forest damage and tree mortality." [no mention of mistletoe]
>
> "Snags and Coarse Woody Debris: Maintain pockets of l/4 to several acres of snags and the largest available coarse woody debris. Maintain snags and coarse woody debris evenly distributed across the MSA in sufficient numbers to provide 100% MPP for black-backed woodpeckers."

In addition, since the LSRA is not a NEPA document, the Green Ridge EA need to conduct NEPA analysis of the LSRA recommendations and alternatives, especially if the FS is going to deviate from those recommendations (by for instance logging large mistletoe trees).

Removal of Large Mistletoe Trees is Inconsistent With Ecological Priorities and Requirements for LSR, Riparian Reserves, and Critical Habitat.

Removal of large trees in LSRs, riparian reserves, and critical habitat is impermissible because their retention is required to meet important goals for each of those areas. The EA and the draft DN provide confusing and conflicting descriptions of how mistletoe infected trees will be managed. The draft DN describes the mistletoe strategy as "referenc[ing]" the Deschutes Forest Collaborative recommendations "particularly in LSR." Recognizing the ecological and social value of large trees, regardless whether they are infected with mistletoe, the DFC recommendations offer a compromise that focuses on retaining large mistletoe-infected trees, especially when those large trees occur in clumps, while providing some flexibility to create snags from large mistletoe infected trees when those trees are isolated and treatment could slow the spread of mistletoe. See DFC Recommendations here:
https://web.archive.org/web/20220119183902/https://www.fs.usda.gov/nfs/11558/www/nepa/85680_FSPLT3_1467558.pdf.

The proposed treatment descriptions in Table 5 of the EA (p 37) do not specifically reference the DFC recommendations. They state that "[some] overstory dwarf mistletoe-infested ponderosa pine or Douglas-fir may be selected for removal. Treatments would favor retention of groups of large and/or very large trees, regardless of mistletoe infection levels. However, very large trees … may be selectively removed to slow the spread …" The first part appears relatively consistent with the DFC recommendations, but the last sentence is a big loophole allowing removal of large trees that should be retained to honor the DFC recommendations, meet objectives for LSR, riparian reserves, and critical habitat.

EA (p 95) admits that mistletoe helps create complex habitat and is beneficial to wildlife, saying "Canopy gaps and snags are created as a result of dwarf mistletoe infection centers, thus contributing to structural diversity. Mistletoe brooms can also provide habitat and forage for wildlife (Bull and Henjum 1990, Parks et al. 1999, Tinnin and Forbes 1999)." Yet prescriptions will target removal of large mistletoe infected trees based on the misguided rationale that "mistletoe can impede recruitment of LOS" (e.g., EA p 37).

BLM has said, "The benefits of dwarf mistletoe as wildlife habitat and a food source are well known. Not only does the presence of mistletoe contribute to stand diversity through the creation of gaps, structural irregularity and contribute to the accumulation of snags and down wood, it also serves as habitat for a variety of mammals, birds and arthropods. In particular, … large Witch's brooms serve as nest platforms for spotted owls and raptors." Medford BLM, Ashland Resource Area, Rio Climax EA. June 2011, page 3-83. http://www.blm.gov/or/districts/medford/plans/files/Rio_Climax_EA.pdf.

The ecological benefits of mistletoe should not be under-estimated. For example, it has been suggested that mistletoe is a "keystone species" in many vegetation communities.

The abundance and diversity of birds is correlated with the degree of mistletoe occurrence, and avian vectors seem to prefer infected hosts. See Aukema, J.E. 2003. Vectors, viscin, Viscaceae: Mistletoes as parasites, mutualists, and resources. Frontiers in Ecology I(3): 212-219. and Watson, D.M. 2001. Mistletoe — A keystone resource in forests and woodlands worldwide. Annu Rev Ecol Syst 32: 219-249.

Green Ridge EA (Figure 18) shows that significant portions in the northern and western part of this project area are designated as critical habitat for the threatened northern spotted owl. This means that large trees (including those infected with mistletoe) need to be retained to meet the goals of Spotted Owl conservation and recovery. USFWS principles for dry forest restoration treatments from the Recovery Plan (USFWS 2011, III-34 to III-35) (USFWS 2012, pg. 71910) include: "(4) Retain and restore key structural components, including large and old trees, large snags, and down logs;" Even outside of nesting habitat, large trees provide significant benefits to spotted owls as part of roosting, foraging, and dispersal habitat. Large trees provide cover. Large trees provide thermal buffering. Large trees provide habitat for a wide variety of species that could serve as prey for spotted owls.

As noted above, the Metolius LSRA description of *Management Strategy Area H* (this project area) does not identify mistletoe as an issue, nor does it identify removal of large mistletoe trees as a silvicultural opportunity.

Even outside of reserves and critical habitat the FS should retain large trees to mitigate for the loss of large trees due to past logging and the increasing uncertainty of maintaining large trees in the face of global climate change.

The Project Relies on an Improper Rational for Logging in Riparian Reserves

The Northwest Forest Plan (TM-1, p C-31) prohibits logging in riparian reserves unless needed to attain ACS objectives. The EA (p 44) relies on an improper rationale for logging riparian reserves, stating -

> "Silvicultural treatments in Riparian Reserves are based primarily on the upland treatment in which the reserve is located. Resource Protection Measures would be applied to ACS values. Thinning - Grow large trees more quickly to provide inputs of coarse woody debris to increase stream complexity ..."

This fails to recognize that riparian reserves are a separate land allocation with different goals than uplands, and specific standards for logging, yet FS is not following these requirements.

Because upland logging prescriptions include removal of large mistletoe trees that directly conflicts with goals to maintain and restore Aquatic Conservation Strategy Objectives for large wood recruitment, thermal buffering, structural complexity, and biodiversity conservation, etc. These ACS objectives extend throughout the full extent of the riparian reserves, not just within a small buffer along the streams. Riparian reserves were designated to conserve a wide diversity of different wildlife species, including upland species that depend on large trees, large snags, and abundant dead wood.

In addition, the EA failed to take a hard look at the effect of logging riparian reserves on the extremely rare Northern Waterthrush that prefers densely shaded forests near water. The EA says that logging will benefit this species without providing any disclosure or weighing of the trade-offs from logging that significantly opens the canopy. Logging is also likely to reduce nesting habitat because stumps are less likely to tip and form tangled root wads compared to intact trees.

The EA Failed to Take a Hard Look at the Effects of Commercial Logging on Snag Habitat

The EA/DN fail to follow the process described in the LSRA to ensure provision of adequate habitat for snag-associated wildlife, and failed to address significant new information indicating that wildlife need more snags than current standards provide.

The Metolius LSRA (p 66) says "Numbers of snags and amounts of coarse woody material necessary to provide 100% MPP will be determined at the project analysis level and should be consistent with the current peer reviewed literature discussed in Appendix 2."

Black-backed woodpeckers require large numbers of snags to meet their habitat requirements. The Green Ridge EA does not provide an analysis to show that goals for black-backed woodpecker are being met, especially in light of the fact that the 100% potential population methodology is outdated and discredited. The EA fails to consider and disclose the significant new information indicating that wildlife need more snags and down wood for a greater range of life functions than is accounted for by the outdated methodology.

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/

The authors of DecAID describe some of the limitations of the old methods of managing snag habitat.

> **Limitations of Existing Approaches for Assessing Wildlife-Dead Wood Relations.**
> Models of relationships between wildlife species and snags in the Pacific Northwest typically are based on calculating potential densities of bird species and expected number of snags used per pair. This approach was first used by Thomas et al. (1979). Marcot expanded this approach in Neitro et al. (1985) and in the Snag Recruitment Simulator (Marcot 1992) by using published estimates of bird population densities instead of calculating population densities from pair home range sizes. This approach has been criticized because the numbers of snags suggested by the models seem far lower than are now being observed in field studies (Lundquist and Mariani 1991, Bull et al. 1997). In addition, the models provided only deterministic point values of snag sizes or densities and of population response ("population potential") instead of probabilistic estimates that are more amenable to a risk analysis and risk management framework.
>
> In addition, existing models have focused on terrestrial vertebrate species that are primary cavity excavators. Thomas et al. (1979) and Marcot (1992) assumed that secondary snag-using species would be fully provided for if needs of primary snag-excavating species were met. However, McComb et al. (1992) and Schreiber (1987) suggested that secondary cavity nesting birds may be even more sensitive to snag density than are primary cavity excavators.
>
> Furthermore, existing models do not address relationships between wildlife and down wood, nor do they account for species that use different types of snags and partially dead trees, such as hollow live and dead trees used by bats (Ormsbee and McComb 1998, Vonhof and Gwilliam 2007), Vaux's swift (*Chaetura vauxi*) (Bull and Hohmann 1993), American marten (*Martes americana*) (Bull et al. 2005), and fisher (*Martes pennanti*) (Zielinski et al. 2004).

Bruce G. Marcot , Janet L. Ohmann, Kim L. Mellen-McLean, and Karen L. Waddell. Synthesis of Regional Wildlife and Vegetation Field Studies to Guide Management of Standing and Down Dead Trees. Forest Science 56(4) 2010. http://www.fs.fed.us/pnw/pubs/journals/pnw_2010_marcot002.pdf

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.

Logging will capture mortality and make a bad situation worse for wildlife such as black-backed woodpecker, pileated woodpecker, marten, and others that need abundant large wood. The graph below is from the Curran Junetta Thin EA (on the Cottage Grove Ranger District). It shows that thinning 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).

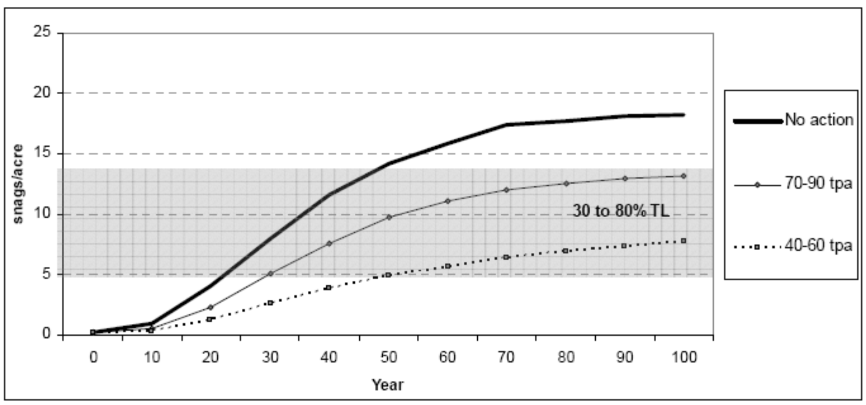

Figure 15. Short and long-term changes to ≥20" dbh snags.

http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/32805_FSPLT2_053506.pdf. The Green Ridge EA failed to provide this kind of quantitative analysis to show the *costs* of thinning versus the alleged benefits of a few large trees faster.

The EA makes the repeated assertion that logging will benefit snag habitat by growing large trees faster, but the EA fails to present a balanced analysis that weighs the alleged benefits of a few larger trees against the significant and long-lasting trade-offs from removing large numbers of green trees (including some large mistletoe trees) that can never be recruited as snags and down wood.

The EA Failed to Consider Alternatives that Harmonize Climate Change Mitigation and Adaptation, and Failed to Take a Hard Look at this Projects Contribution to the

Cumulative Buildup of Greenhouse Gases in the Atmosphere.

The EA repeatedly highlights the fact that climate change is making conditions more stressful for forests, but the EA fails to recognize that logging under this project will emit greenhouse gases that makes global climate change worse instead of better.

The EA analysis of carbon and climate change relies on a series of misleading misconceptions and tropes that minimize the effects of logging as a contributor to global climate change. Oregon Wild described a number of these problems in our comments on the EA, but the Response-to-Comments entirely failed to address them.

Causing GHG emissions that make global climate change worse appears to be in direct conflict with the purpose and need to "facilitate terrestrial and aquatic ecosystem sustainability, resilience, and health under current and future conditions in the Green Ridge planning area." This is precisely why the FS needs to consider alternatives that intentionally harmonize climate change mitigation and adaptation, which the FS failed to do.

The EA/DN failed to follow the current policies of the Biden Administration:

> "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; … to reduce greenhouse gas emissions; to bolster resilience to the impacts of climate change; … 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/.

Science tells us that climate change adaptation and mitigation can sometimes be in conflict, and wise land management requires harmonizing these competing factors.

> 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).
> …
> 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.
> …
> Some of the most obvious synergies between adaptation and mitigation are those aimed at enhancing carbon stocks in natural forests, … 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. … 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.
> …
> It is not always obvious, however, when conservation and climate mitigation efforts might be in alignment or in conflict. … Although there are clear synergies between adaptation and mitigation focused 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.

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.

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 significant 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; Jiménez 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; Jiménez 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 (Jiménez 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 Niño frequency long after 1.5 °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 signaling 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

The EA/DN failed to Respond to our comments which stated in part:

> … the Forest Service's standardized NEPA language regarding carbon and climate change fails to take a hard look that NEPA requires. 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.

We also asked the FS to quantify GHG emissions and use a tool such as the "social cost of carbon dioxide emissions" in order to help the public and the decision-maker weigh and consider the costs and benefits of logging. The FS failed to respond to these comments.

Sincerely,

Doug Heiken