PO Box 11648
Eugene, OR 97440
(541) 344-0675
WWW.OREGONWILD.ORG
Portland Eugene Bend Enterprise

12 Nov 2026

TO: Whitman Ranger District
VIA: https://cara.fs2c.usda.gov/Public/CommentInput?Project=446982

Subject: Whitman Post-fire Recovery Project — comments

Please accept the following comments from Oregon Wild concerning the Whitman Post-fire Recovery Project, https://www.fs.usda.gov/r06/wallowa-whitman/projects/446982. 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).

This proposal involves:

- Emergency determination, so no alternatives of objection
- 7-day comment period.
- Tiered to National Post-fire EA.
- Comment is on a "proposed action"
- Project encompasses approximately 7,400 acres and is located primarily within the footprints of the Anthony, Olive Butte, and McCully burn areas. These fires occurred within the Elkhorn Mountains, extending from approximately one mile south of Granite to areas approximately 17 miles west of North Powder.
- Needs/Actions identified:
    - 755 ac Salvage dead and dying trees;
    - Mitigate tree hazards along roadways;
    - 6942 ac - Reforest fire-impacted areas with native tree species;
    - 12 miles trail maintenance,
    - Reduce hazardous fuel accumulations;
    - 34 miles - Reconstruct and repair roads as needed;
    - 0.9 miles temporary road construction, and
    - 4 miles - Restore stream function and stability to help minimize downstream impacts to water resources.

Contents

The public process is flawed 2

Emergency declaration is unwarranted 3

Consider alternatives that harmonize competing objectives 5

Reliance on the National Post-fire Recovery EA is unjustified 7

Conditions-based management lacks site-specificity 14

Plan conformance is not properly documented 16

Significant effects require an EIS 19

Salvage will retard attainment of RMOs in violation of PACFISH/INFISH. 30

Conserve Unroaded Areas 30

Cumulative impacts are significant 43

Snag habitat needs better conservation 44

Hazardous fuels are made worse by salvage logging and replanting 51

Conserve large trees to meet legal requirements 54

Modify site prep and replanting to meet multiple objectives 58

Danger tree removal and fuel removal are excessive 60

Avoid road construction, and minimize road impacts 67

Conserve big game 68

Reduce carbon emissions and address climate change 71

Whitebark pine 74

Avoid and minimize weeds 74

Consult with tribes 76

The public process is flawed

Both the public involvement process and the NEPA process are deeply flowed.

The 7-day comment period is grossly inadequate and a slap in the face of people that cares deeply about management of our public lands. The 7–day period includes 2 weekend days, and maybe the FS forgets that people have lives and schedules that extend beyond the Forest Service planning process. There are also other Forest Service NEPA projects within the state that have comment deadlines during the 7-day comment period.

The ability to provide informed comment is frustrated by the lack of a clear description of the affected area, lack of information about the affected land allocations and relevant standards & guidelines, lack of site-specific effects analysis, lack of alternatives that balance competing values, etc. The only site-specific document we are offered to comment on is a “proposed action”

which is just a small subset of a complete NEPA document. The Forest Service should draft a more informative NEPA document and provide a 30-day comment period.

With such a short comment period, and with almost 300 pages of new analysis in the National Post-fire Recovery EA, and with significant gaps in the NEPA analysis, and no meaningful site-specific analysis, we remind the Forest Service that it is unreasonable to expect the public to identify every issue and concern with this proposal. Appropriately, the courts recognize that "It is the agency, not an environmental plaintiff, that has a 'continuing duty to gather and evaluate new information relevant to the environmental impact of its actions,' even after release of an [EA]."[1] The 9th Circuit said:

> "Were we to agree with the district court that a NEPA Plaintiff's standing depends on "proof" that the challenged federal project will have particular environmental effects, we would in essence be requiring that the plaintiff conduct the same environmental investigation that he seeks in his suit to compel the agency to undertake. Compliance with NEPA is a primary duty of every federal agency; fulfillment of this vital responsibility should not depend on the vigilance and limited resources of environmental plaintiffs. It is the federal agency, not environmental action groups or local government, which is required by NEPA to produce an EIS."[2]

The documentation for this project is sorely lacking. There is basically just a so-called "proposed action" (really a Determination of Analysis Reliance), some Project Design Criteria (PDCs), a few maps, and the National Post-fire EA. There is nothing resembling a NEPA analysis. The DAR (p 1) says that this project is considered in an EA (separate from the National EA), but there is no EA on the project website for the public to review and comment upon. This falls far short of the site-specific hard look analysis required by NEPA. The documentation does not even disclose what land allocations are affected or how this project conforms to the LRMP and other legal requirements. As explained below, the National Post-fire EA does not fulfill the requirements of NEPA for individual salvage projects.

Emergency declaration is unwarranted

The Forest Service declared an emergency that creates more procedural shortcuts, in terms of NEPA alternatives and public opportunity to object to the draft decision. The emergency is unwarranted.

The Infrastructure Investment and Jobs Act (IIJA) provides that an emergency situation exists only where "immediate implementation" of authorized emergency actions are necessary to provide "[r]elief from hazards threatening human health and safety" or mitigate "threats to natural resources on National Forest System land or adjacent land."[3] The Secretary's Memo 1078-006 on Increasing Timber Production and Designating an Emergency Situation on

---

1 *Friends of the Clearwater v. Dombeck*, 222 F.3d 552, 559 (9th Cir. 2000) (modification added) (quoting *Warm Springs Dam Task Force v. Gribble*, 621 F.2d 1017, 1023 (9th Cir. 1980).

2 *City of Davis v. Coleman*, 521 F.2d 661, 670-671 (9th Cir. 1975).

3 16 U.S.C. § 6592c(a)(2)(A) & (B).

National Forest System Lands fails to establish a valid emergency nor does it meaningfully address the issues it identifies. The Secretary's Memo is therefore invalid and cannot be relied upon to circumvent proper decision-making processes.

Pursuant to the IIJA, an emergency situation determination "shall be based on an examination of the relevant information."[4] With the Secretary's Memo, however, the ESD was based not on information relevant to "hazards threatening human health and safety" or "threats to natural resources," but is based instead on the primary desire to increase domestic timber production.

The alleged urgency to capture economic value and reduce fuels must be weighed against countervailing factors. Based on the evidence in these comments and those on the National Post-fire Recovery EA there is …

- no urgent need to remove important snag habitat that is already in short supply;
- no urgent need to degrade big game cover habitat and increase existing barriers to movement across roads;
- no urgent need to increase fire hazard by moving fine fuels from the canopy to the ground and establish dense young stands of conifers;
- no urgent need to build roads that increase fire ignition risk;
- no urgent need to disturb soil, increase erosion, spread weeds, and reduce woody biomass that nourishes soil and stores water, with logging, roads, site prep, fuel work;
- no urgent need to increase emissions of greenhouse gas that will exacerbate global climate change,
- no urgent need to remove danger trees that have a low probability of hitting roads, e.g., trees more than 100 feet from roads, or trees along low standard ML1 roads;

The Natural Resource Impacts Analysis Report for The National Post-fire Recovery EA says of all the National Forests burned annually only "about 30,000 acres (2 percent of the burned area) are treated for harvest (including hazard tree removal, salvage, and sanitation cuts …"[5] The Forest Service provides no compelling rationale why it is urgent to commercially exploit such a large fraction of this fire area?

The FS has time to prepare an informative NEPA document and provide better public involvement, including a 30-day comment period and an objection opportunity. Just because the Forest Service think they have the authority to use emergency authority does not mean it is the right thing to do. Consideration of NEPA alternatives and informed public comments help the Forest Service make better, informed decisions. The FS cannot rely on the emergency declaration which only authorizes actions that conform to the existing plan requirements, but the documentation for this project do not provide any analysis showing compliance with substantive requirements.

---

[4] 16 U.S.C. § 6592c(b)(1)(C).

5 USFS 2026. National Post-fire Recovery EA.
https://app.box.com/s/7sqtkwmabhz3z5n6uyrq87v25m5s8v58/file/2417675941613

Consider alternatives that harmonize competing objectives

There are strong public policy reasons to consider alternatives and provide an opportunity for meaningful public comment on an informed site-specific NEPA analysis and provide for public objections.

The National Post-fire EA says "the agency does not anticipate any unresolved conflicts concerning alternative uses of available resources that would warrant consideration of additional alternatives. Given that the purpose of this condition-based environmental assessment is to expedite the analysis of a suite of actions that are common to post-fire recovery so that future site-specific analysis can be more efficient, it is reasonable to analyze in detail one proposed action alternative …" This is an absurd statement. It basically says that since the purpose of this exercise is to expedite analysis of post-fire activities, then it's better not to consider more than one alternative.

This fails to recognize that the agency is engaged in managing dynamic, complex ecosystems for multiple, often conflicting objectives. Every tree removed to meet the purposes of timber, safety or fuels diminishes the co-equal purpose of forest restoration. A careful analysis of mitigation alternatives and environmental effects is needed to find a proposed action that harmonizes competing values and hopefully avoids significant effects.

The scientific literature is rife with findings that salvage logging is ecologically harmful and recommendations to limit the scope of salvage logging and retain more than the minimum levels of dead wood. The National Post-fire EA does not adopt a process to find the sweet spot in terms of limiting the scope and intensity of post-fire tree removal. The EA instead punts many of the more challenging steps in the analysis to local decision-makers who must analyze effects to wildlife and identify suitable mitigation to avoid significance. That has not happened here.

The Forest Service should develop and consider a reasonable alternative to the proposed action that better harmonizes all of the public values affected by this proposal, including:

- Avoid road construction. Focus treatments on areas that are accessible from existing roads.
- Narrow the width of hazard tree logging. Trees more than 100 ft from roads are unlikely to pose a safety hazard because they are not that tall and because most of the directions they can fall will not hit the road.
- Do not remove trees adjacent to low use ML1 roads. These are not danger trees because people are rarely present.
- Allow natural successional processes to develop complex habitat. Recognize the value of precocious mature and old habitat where young stands with abundant legacies can harbor late successional species.[6]

6 Daniel C. Donato, John L. Campbell & Jerry F. Franklin 2011. Multiple successional pathways and precocity in forest development: can some forests be born complex? Journal of Vegetation Science. (2011) http://onlinelibrary.wiley.com/doi/10.1111/j.1654-1103.2011.01362.x/pdf.

- Plant diverse conifer species patchy and low density. Conifer dominance is normally a slow process which allows time for diverse non-conifer vegetation and associated wildlife to thrive.
- Design treatments to benefit big game cover and forage in the near term and long term. Retain more dead trees for cover. Adjust the roadside hazard tree felling to facilitate big game movement.
- Retain all green trees, all large trees (live or dead) and more medium-sized dead trees to mitigate the snag habitat gap caused by wildfire, logging, and hazard tree removal. Legacy snag habitat should be retained both scattered and in patches. Manage for species that need abundant snags and dead wood. Avoid making a bad situation worse for snag habitat.
- Avoid and minimize weeds by limiting ground disturbance.

There is some scientific support for removal of a portion of the uncharacteristic fuels. The only fuels that would be "uncharacteristic" are the small trees that grew up as a result of fire suppression. If the tree was there before fire suppression, than it should remain after a stand replacing fire. Only small fuels should be removed. This intent is clear from Jerry Franklin's work on The Klamath Tribes' Forest Management Plan.

> Specific principles to guide removal of trees, snags, and logs from burned sites are as follows:
> …
> 2) Trees (live and dead) and down wood will be retained in sufficient quantities to provide for wildlife and ecological needs, including long-term structural enrichment of the site.
> However, this goal does have to be evaluated in the context of whether the post-fire levels of snags and down wood are within the characteristic range for the plant association; i.e., where pre-burn stands had uncharacteristic stand densities for that plant association. General guidelines for retention of trees (live and dead) and down wood within the wildfire area are as follows: Retain amounts and distributions of trees as would be characteristic of the pre-burn (historical) landscape …
> …
> Large snags persist for the longest period, and are most difficult to replace. Consequently, snag and log retention will focus on the largest (21"+ DBH) pieces in the post-burn landscape.
> …
> The retention standards should be checked to make sure that they will provide amounts and distributions of snags and down wood that will meet requirements for species at risk, sensitive species, and other species of special interest to the Tribes (such as mule deer). If they will not meet the species requirements, adjust the retention standards accordingly. There is an important caveat: this may not be done if providing for a particular species requires maintaining uncharacteristic levels of post-fire fuels over a significant portion of the burned landscape.
>
> As noted above, proposed levels of snag and down wood retention will be evaluated to determine that they will not result in fuel loadings that are above characteristic levels for the plant association. Where they do, the goal will be to adjust retention to characteristic levels. In such a case retention of the large snags and down wood will be the standard since these structures contribute less to fuels on a cubic foot basis, persist longer, and provide habitat for more species.

(emphasis added)[7]

Reliance on the National Post-fire Recovery EA is unjustified

The Determination of Analysis Reliance (DAR) says the agency "may rely on a previous analysis where the nature of the proposal, the potentially affected environment, and the anticipated effects are substantially the same for the current proposal being considered." The problem is that the National Post-fire EA did not have a clear proposed action or effected environment because it was not based on any real project in any real place.

The FS can only rely on the national EA to the extent that the two projects are similar and they are not similar. The national post-fire EA has no site-specific affected environment, nor a particularized proposed action with particularized site-specific effects analysis.

- "Lands primarily within the perimeter of a wildfire" (DAR p 4) is just too generic to fulfill the purposes of NEPA. That's akin to saying that all diets are similar if they enter the body through the mouth. Even within fire perimeters, there are numerous relevant different resource conditions and likely different environmental effects. For instance, different elevation, site productivity, slope, aspect, tree species, forest type, management history, natural disturbance history, burn severity on soil and vegetation, proximity to streams and other unique habitats, wildlife species presence, proposed logging prescriptions (what is removed, what is retained), existing road access, whether there is road construction, particulars of site preparation, replanting, fuel treatments, etc. Within the perimeter of a wildfire does not guarantee the similarity of environmental effects. Not at all.
- The similarity of environmental effects is purportedly established by this statement in the DAR: "All resource areas have reviewed the PFREA and have determined that the analysis previously completed adequately describes the same anticipated environmental effects. Resource specialist input has been compiled and provided for the responsible official's consideration and site-specific Project Design Criteria (PDC's) have been developed to meet current LRMP requirements." (DAR p 4). This 2-sentence description indicates there was a closed-door process of specialist input that has not been subject to public disclosure or review. All we get is the final PDCs themselves, with no analysis explaining why individual PDCs were needed and why these PDCs were chosen, and why alternative PDCs were rejected. Nowhere in the public-facing administrative record is there any meaningful site-specific description of the affected environment or environmental effects of applying these PDCs in particular places with particular environmental conditions and particular disturbance histories.

The DAR does not pass the laugh test.

Significantly, the FS is inappropriately relying on the generic analysis in the National Salvage Environmental Assessment that we have never seen before the start of the 7-day comment

---

7 K. Norm Johnson, Jerry Franklin, Debora Johnson. The Klamath Tribes' Forest Management Plan. Dec 2003. http://web.archive.org/web/20040103034821/http://www.klamathtribes.org/forestplan.htm pp 108-109.

period for this project. This National Post-fire Recovery EA, plus two supporting analysis documents, total almost 300 pages. It is patently unreasonable to expect the public to meaningfully comment on this avalanche of new text in such a short amount of time.

The FS received public scoping comments on the National Post-fire Recovery EA but has not invited, accepted, or responded to public comment on the final EA or supporting analyses. The FS claims to have "released" the Natural Resource Analysis related to the National Post-fire Recovery EA on June 25, 2026, but the agency did not notify the public, and failed to common courtesy of notifying those who provided scoping comments on the EA.

Public scoping comments on the national EA made clear that: salvage logging is controversial; that there are significant trade-offs associated with salvage logging, roads, and replanting; that site-specific analysis of effects is necessary to support informed decisions about whether, where, and how to conduct salvage logging.

- The National EA is based on hypotheticals, saying "The following describes conditions (affected environment) that *may* exist after a fire."
- The final EA lists "Substantive Issues Considered for Analysis" but provides only summary/conclusory statements, not backed by any site-specific analysis of actual environmental effects of actual salvage logging prescriptions on actual landscapes with actual management history, and actual environmental characteristics. This "substantive" analysis does not pass the laugh test.
- The Response-to-Comment tacked onto the end of the National Post-fire Recovery final EA very general, thematic rather than analytic, and fails to meaningfully respond to the detailed comments submitted by the public. The Forest Service has yet to take a hard look at the significant site-specific adverse effects of salvage logging, road work, and replanting; weigh the trade-offs; and consider reasonable opposing viewpoints supporting the conservation and natural recovery of burned landscapes.

We incorporate by reference our comments on the National Post-fire Recovery EA, submitted January 26, 2026 via Regulations.gov with Tracking Number: mkv-oqok-kegw, as well as the extensive compilation of supporting scientific papers. These comments and attachments address in more detail many of the issues and impacts discussed briefly in these comments.

Our initial review of the Natural Resources Impacts Analysis Report for the National Post-fire Recovery EA reveals several flaws, including but not limited to:

- The air quality analysis fails to address GHG emissions caused by salvage logging and associated activities.
- The analysis of soils and hydrology lack site-specificity. The report says that soil are more sensitive following fire, but fails to disclose the cumulative effects of wildfire, plus salvage logging and associated activities.
- The Report says that burned landscapes are highly variable and the effects of post-fire activities are also variable. The Report says "The effects of the proposed salvage operations and subsequent planting would therefore depend strongly on site-specific

conditions …" but provides no method of analysis to bring those variables and site-specific factors into clearer focus in this project area.

- The report acknowledges the diversity of forest ecosystems and wildlife affected by wildfire and salvage logging, but the analysis does not do justice to the severe adverse effects of salvage logging on forest development and the needs of wildlife that require abundant snags and deadwood.
- The analysis focuses largely on wildfire as a disturbance process, while short-changing the effects of post-fire activities like logging, roads, and converting wild forests to sterile plantations.
- The Report acknowledges that "studies suggest that naturally regenerating stands can provide landscape complexity benefits similar to old-growth forests (Donato et al. 2012). The large volume of dead wood generated by fire can have a variety of positive impacts on forest ecosystem functioning, including providing key habitat for wildlife (snags) and promoting soil stabilization." And "Post-fire reforestation activities (typically following salvage logging) can potentially cause greater fire severity and extent if the area reburns, as young, planted stands (for example, plantations) can be highly flammable (Huff et al. 1995, Thompson et al. 2007)." However, the Report does not provide a framework to make decisions that harmonize these factors (and other benefits of natural recovery after fire) against the agencies self-serving desire for commercial exploitation via salvage logging that requires destructive heavy equipment, roads, site prep, and replanting.
- The Report draws completely unfounded conclusions such as "The proposed [post-fire] activities are not expected to significantly negatively impact forest vegetation based on the analysis of the potentially affected environment and degree of effects. The proposed action is consistent with applicable laws, regulations, and policies for vegetation management." And "The proposed activities are not expected to significantly, negatively impact fire and fuels management, based on the analysis of the potentially affected environment and the degree of effects." Making this conclusions would require clear information about the specific post-fire actions proposed, and the site-specific effects of those actions. This is not provided in the National Post-fire Recovery EA or supporting analyses.
- The Report says "Forest Service at-risk species, including Regional Forester's sensitive species and species of conservation concern, are discussed in a separate biological evaluation and white paper, respectively." These documents are not on the National Post-fire EA website, have not been distributed to the public, and are not part of the record for this project, and cannot be relied on by the agency in approving this project. The 9th Circuit held, "tiering to a document [Port Orford Cedar Management Guidelines] that has not itself been subject to NEPA review is not permitted, for it circumvents the purpose of NEPA."[8] Important parts of the NEPA analysis cannot be buried in specialists reports and appendices, especially if they were not made available to the public: "The Court finds that the Forest Service violated NEPA by failing to make the Specialist Reports accessible to the public. The Forest Service's failure to include the Specialist Reports in the appendices of the draft EIS accompanied by its refusal to disclose during

8 *Kern v. Bureau of Land Management*, 284 F.3d 1062 (9th Cir. 2002).

the comment period material on which it relied in the draft EIS is contrary to the spirit of NEPA and the letter of the CEQ regulations."[9]

- The Report punts wildlife compliance and wildlife effects analysis to subsequent project level planning, but that analysis is missing here. "Under either alternative, land management plans (and associated project-level activities) shall comply with the National Forest Management Act and planning regulations to meet these [wildlife] requirements to the extent feasible within Forest Service authority and consistent with the inherent capability of the plan area (36 CFR 219.9)."
- The Report makes an unsupported assertion that not logging may threaten wildlife population viability. "Depending on the life history characteristics of the species, leaving the post-fire affected environment to recover naturally (without the proposed activities) may take longer than certain species can tolerate and may result in a loss of viability for at-risk wildlife, fish, and plant species on National Forest System lands." The evidence is much stronger that wildlife viability is threatened by salvage logging rather than the absence of salvage logging. The Eastside Screens' intent statement for snags says "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 Report highlights the adverse effects of salvage logging on birds and the need for mitigation but provides no assurance that the mitigation will be implemented, saying "Post-fire timber harvest has been widely shown to have negative impacts on forest bird diversity (Puig-Girones et al. 2023), richness (Lindenmayer et al. 2018), abundance, and reproductive success (Basile et al. 2022). … Negative impacts of post-fire timber harvest to bird populations and communities may be mitigated by implementing timber harvest strategies that minimize the area treated, prioritize retention of snags and live trees, and avoid riparian areas (Fogg et al. 2022, Frank et al. 2025)." A site-specific NEPA analysis is needed to consider mitigation alternatives that properly limit the scope and intensity of salvage logging to ensure NFMA requirements are met.
- The Report alleges that salvage logging benefits certain disturbance-adapted wildlife, saying "Post-fire timber harvest, fuels management, and road or trail activities can create additional open areas and edge habitat within the already-open post-fire mosaic. Such changes may benefit disturbance-adapted wildlife species such as woodpeckers, flycatchers, and shrub-associated songbirds." However, the Report fails to acknowledge that those same benefits would accrue in unlogged stands as snags fall over time.
- The Report (p 65) admits some short-term effects on wildlife from salvage logging, then makes an unsupported conclusion that long-term effects on wildlife are "unlikely." This fails to recognize that salvage logging and replanting change the trajectory of forest development from a slow, complex, biodiverse, heterogeneous pathway into a rapid, simplified, even-aged conifer pathway. This has long-term implications for diverse wildlife that depend on diverse, complex early seral conditions. Salvage logging also exacerbates the "snag gap," leaving the affected area with deficit of snag habitat lasting 100 years or more until a new cohort of large green trees grow to replace the snags lost to salvage logging.

9 *LOWD v Connaughton*, (D. Or 2014) 2014 WL 6977611.

The Human Dimensions Impacts Analysis Report[10] for the Post-Fire Recovery Environmental Assessment has several problems. The Report focuses on economic values supported by timber extraction and recreation, while giving less attention to other important social and economic values associated with:

- avoiding or minimizing GHG emissions and avoiding the worst effects of global climate change and ocean acidification;
- economic stability of local communities. The timber industry notoriously booms and busts and tends to destabilize communities, and salvage logging manifests this effects on steroids because the agency tends to extract unsustainable timber value after fires then the landscape produces virtually nothing in terms of timber value for many decades. Rural community well-being would be enhanced by encouraging community economic diversification, rather than continued timber dependence;
- clean water for human use and to meet ecological goals;
- the economic value of soil productivity, slope stability, etc.
- quality of life that is much broader than recreation and scenic values;
- mitigating the adverse effects of hazardous fuels in a warming climate. Salvage logging and replanting conifers, and remove dead wood that serves as water reservoirs in a dry forest, will like make fire hazard worse, not better.

The National EA largely fails to fully understand the ability of burned forests to recover naturally and the numerous beneficial effects of natural recovery compered to salvage logging. The Forest Service recently commissioned a science synthesis on early seral forests, prepared under contract for USFS, Central Cascades Adaptive Management Partnership. Here are some relevant excerpts:

> "… disturbances create snags and down woody debris (Harmon et al. 1986), volatilize nutrients and biomass (Campbell et al. 2007), and open growing space for the establishment of new cohorts of shrubs, trees, and forbs (Oliver and Larson 1996)." (p 2)
>
> "Wind as a disturbance agent tends to superimpose a fine-scale mosaic pattern (Lertzman et al. 1996), frequently on a coarser mosaic created by large fire-created patches (Spies and Franklin 1989)." (p 2)
>
> "An important operation of most types of natural disturbance is that biological legacies are created or retained in the disturbance phase, and these enrich the developing stand (Franklin et al. 2000, Franklin et al. 2002)." (p 4)
>
> "The percentage of the regional landscapes of the Pacific Northwest in early succession was a highly variable parameter, …" (p 4)
>
> "Time to crown closure (and therefore the cessation of the early seral phase) is highly variable in Northwestern forests (Franklin et al. 2002). Assuming a very conservative low-end estimate of 30 years to crown closure (see Tappeiner 1997 and Poage et al. 2009 for context on this assumption), this would suggest that at any one point in recent history, 5-20% of a given landscape would have been in an early seral condition.: (p 4)
>
> "Even following clearcutting, burning, and planting with a commercial conifer tree species such as Douglas-fir, there may be a period of enhanced shrub and forb cover. On

10 USFS 2026. Human Dimensions Impacts Analysis Report for the Post-Fire Recovery Environmental Assessment. https://app.box.com/s/7sqtkwmabhz3z5n6uyrq87v25m5s8v58/file/2309445126594

clearcut sites in the western Oregon Cascades, Schoonmaker and McKee (1988) identified a peak in cover at stand age 10-20 of ecologically important shrubs…" (p 7)

"Many of these are important for nutrient fixation or cycling (e.g., nitrogen fixation by Ceanothus), forage (Ceanothus, Bromus, Salix, Rubus), and other values (e.g., nectar provision to pollinators by E. angustifolium). … Many of the shrubs and forbs, especially, are important fruit and forage producers. … Provision of food resources via fruit and seed production is a very important role of early seral forest ecosystems." (p 8).

"Biological legacies, living or dead residual structures from the pre-disturbance ecosystem (Franklin et al. 2000), are crucially important to early seral functionality." (p 8)

"Down woody debris and snags are key structural elements of highly functional early seral forest ecosystems (Swanson et al. 2011). The early seral phase following disturbance often represents a period of peak volumes for down wood and snags (Harmon et al. 1986); …" (p 8)

"Over longer time periods, spatially irregular development initiated early in succession, accompanied by a diversity of life-forms, may lead to structurally complex forests (Zenner 2005). Furthermore, the recently proposed 'precocity' pathway (Donato et al. 2011) states that diverse structure and spatial heterogeneity in early seral stands may actually accelerate the onset of structural and compositional attributes associated with late seral forests." (p 9)

"It is fitting to note that few species are absolutely obligate in early seral communities, but robust populations of many species are primarily found in early seral communities." (p 9)

"Many birds are characteristic of early seral habitats (Hagar et al. 1997). In the northern Rockies, Hutto (1995) found fifteen bird species occurring primarily in recently burned areas, with one species, the black-backed woodpecker (Picoides arcticus), relatively restricted to early seral post-fire environments. He also found that many species are relatively more abundant in post-fire environments, although they may not specifically select for them. Woodpeckers, especially, often have a limited period of high abundance during the first few years following severe wildfire (Covert-Bratland et al. 2006). Bosakowski (1996) examined breeding birds in relation to stand types and ages on an industrial forest landscape in southwest Washington. From a total of 78 species observed, he identified eight birds associated with early seral conditions that declined as harvested stands matured: white-crowned sparrow, song sparrow, rufus-sided towhee, willow flycatcher, black-headed grosbeak, orange-crowned warbler, yellow-rumped warbler, and American kestrel." (p 10)

"Insects contribute tremendously to species diversity in ecosystems worldwide (Wilson). In the Pacific Northwest, a number of insects are associated with early seral habitats." (p 12)

"The western bluebird (Guinan et al. 2008) and the black-backed woodpecker (Hutto 1995) are bird species almost emblematic of early seral habitat, and are on several state-level conservation lists. … A significant number of state-listed organisms associated with early seral habitats are lepidoptera (butterflies and moths), since their larval stages

depend on herbs, shrubs, or broadleaf trees that occur primarily in early seral habitats, and adults may require floral nectar as a food source." (p 12)

"Disturbances of greater spatial extent cover a wider range of edaphic and topographic conditions, engendering diverse recovery pathways in ways a smaller opening could not. Turner and Dale (1998) emphasize that large disturbances have persistent effects on ecosystems, present tremendous internal heterogeneity …" (p 14)

"Smaller disturbance patches tend to fill in more rapidly, since dispersing plant propagules (especially from trees) can access most or all of the disturbed area, decreasing time to recovery (Foster et al. 1998). Furthermore, small patches are generally still under the microclimatic control of the adjacent forest, and experience an array of biotic and abiotic edge effects. However, they may still generate substantial ecological benefits associated with early seral habitats. Hagar (2007) indicates the need to conserve non-conifer vegetation in forest understories, including in gaps across a broad range of sizes. Maintenance of areas of low tree density in young plantations may promote persistence of shrubs into later seral stages. … In general, thinning and gap creation are important for revitalizing or initiating understory development (Bailey and Tappeiner 1998, Chan et al. 2006) and creating certain types of wildlife habitat (Hayes et al. 1997), especially when accomplished in a spatially variable manner (Carey 2003). However, for many processes and organisms, these activities do not substitute for the physical and biological changes engendered by a large disturbance that creates a spatially heterogeneous template for ecosystem development. " (p 15)

"The early seral habitat produced by clearcutting is highly variable in its resemblance to naturally occurring early seral conditions. Woody debris and snags in clearcuts is frequently less abundant than in legacy-rich forest (Pedlar et al. 2002), with attendant consequences for wildlife. Clearcutting can recreate some of the natural processes associated with fire, but is not a functional substitute with regard to many ecosystem attributes (Means et al. 1996). … However, even retention approaches may not provide the functionality of naturally-created early seral habitats." (p 16)

"Salvage logging can result in reductions in available habitat structure, increased erosion, and other negative effects (Lindenmayer and Noss 2006, Lindenmayer et al. 2008). Salvage, especially when followed by dense replanting of conifers, can substantially curtail the early seral phase. … In a very substantial review, Russell et al. (2006) found that salvage logging tends to reduce snag longevity." (p 16)

"Compositional simplification of young stands via pre-commercial thinning and herbicide application can reduce or eliminate ecologically important processes." (p 16)

"Potential management responses may include:

· Deferring salvage and dense replanting across all or parts of major disturbed areas (Lindenmayer and Noss 2006, Lindemayer et al. 2008))

· When salvaging, practice variable retention to retain significant structural elements such as large-diameter live trees, snags, and down woody debris (Franklin et al. 1997, Eklund et al. 2009).

· Avoiding reseeding with exotic plant species such as perennial ryegrass (Lolium perenne) following fire or volcanic eruption (see Dale et al. 2005b).

・Attempt to incorporate elements of natural disturbance regimes into landscape-scale management (Lindenmayer and Franklin 2002)
・Deliberate creation of large, early seral areas via silviculture (Swanson 2010)." (p 17)

"It is hoped that the diversity and value of early seral conditions, from clearcuts to structurally and compositionally complex early seral habitat, will come to be recognized and widely incorporated into contemporary land management." (p 18)[11]

Conditions-based management lacks site-specificity

Neither the documentation for this Whitman Post-fire Recovery Project nor National Post-fire Recovery EA provide site-specific analysis of the effects of salvage logging, roads, site prep, and replanting. The National Post-fire Recovery EA says "When a site-specific project is proposed, mitigation measures will be reviewed." This punts the whole process of avoiding significance back to the local decision-maker. Every tree removed for timber, safety or fuels detracts from post-fire restoration goals. The FS cannot determine whether effects are significant without carefully weighing site-specific effects, competing interests, and considering alternatives to mitigate the adverse effects of tree removal and associated roads and other activities. This has not been done here.

The FS appears to be using *conditions-based management* which is not compatible with the requirements of NEPA. Project-level NEPA compliance is not fulfilled by programmatic NEPA analysis. Numerous core issues related to the environmental impacts and trade-offs caused by salvage logging and roads were not fully considered in the documentation for this proejct, such as impacts to soil, water, wildlife, carbon, fire hazard, etc. These issues were raised by the public but not addressed in the National Post-fire Recovery EA. Many details about the site-specific effects of salvage logging and roads were not address in the National Post-fire Recovery EA, such as soil types, current soil conditions based on past management, slope/aspect, special habitats, current vegetation conditions, a description of past vegetation management, existing road conditions, proximity to environmental features that require extra attention (streams, nearby homes, etc.), and an analysis of how logging and roads interact with these features. This national EA simply failed to enumerate many of these relevant facts and effects. The Supreme Court has ruled the Forest Service must provide the public with "notice and an opportunity to be heard" in the analysis of "specific areas in which logging will take place, and which logging methods will be used."[12] "NEPA requires that environmental analysis be specific enough to ensure informed decision-making and meaningful public participation. … The Forest Service's plan for condition-based analysis may very well streamline management … however, it does not comply with the procedural requirements of NEPA, which are binding on the agency. "NEPA favors 'coherent

11 Swanson, M.E., 2012. Early Seral Forest in the Pacific Northwest: A Literature Review and Synthesis of Current Science. http://ncfp.files.wordpress.com/2012/06/swanson_20120111.pdf.

12 *Ohio Forestry Ass'n v. Sierra Club*, 523 U.S. 726, 729–30 (1998).

and comprehensive up-front environmental analysis to ensure ... that the agency will not act on incomplete information, only to regret its decision after it is too late to correct."[13]

In order to comply with NEPA requirements and cover both the programmatic and site-specific impacts of restoration, the NEPA analysis must carefully document all the contingencies under which covered restoration actions might occur —

- all the different soil types and topographies;
- all the different plant communities; impacts to habitat for all the different special status species;
- proximity to special resources;
- possible conflicts with site-specific recreation uses;
- compliance with LRMP requirements for all the different land allocations;
- consideration of new information that may render the programmatic NEPA analysis obsolete;
- compatibility with the cumulative effects setting that exists in all the different watersheds, etc.

It's hard to imagine this being done well and thoroughly in a programmatic NEPA analysis.

EPA has commented critically of conditions-based NEPA analysis:

> *Site Specificity and Programmatic NEPA*
> Based upon available information, the Forest appears to be using a condition-based management approach for the Project. NEPA requires a "hard look" at potential environmental impacts of a proposed action and public disclosure of those impacts prior to implementation. The impacts associated with the Proposed Action will vary based on site-specific conditions including: vegetation community composition, soil-types, slopes, proximity to residences, proximity to aquatic resources, proximity to Class I airsheds, road construction needs, road maintenance status, volume and type of material burned, equipment used, volume of truck traffic, sensitive species habitat, etc., and those site-specific conditions are varied across the Hungry Creek landscape. Because conditions vary throughout the planning area, the impacts would be expected to vary as well. Individual treatment project design, impact assessment and determination of needed BMPs and mitigation will occur post-FONSI, years after the public comment period on this EA.1 This lack of site-specificity hampers informed decision-making as part of the NEPA process, and therefore meaningful public participation on the individual treatment projects, both important for understanding the potential for significant impacts and determining mechanisms for avoiding them.[14]

The documentation for this Whitman Post-fire Recovery Project is far from the required hard look at the site-specific effects of particular design criteria in particular places with particular environmental attributes.

---

13 *SE Alaska Conservation Council v. U.S. Forest Serv*. (D. Alaska 2020). Case No. 1:19-cv-00006-SLG. March 11, 2020.

14 McCoy, Melissa 2023. EPA Comments on the Dixie National Forest Hungry Creek EA. 8-28-2023 *citing* Edwards et al 2016. Effectiveness of Best Management Practices that Have Application to Forest Roads: A LITERATURE SYNTHESIS. General Technical Report NRS-163 October 2016. USDA Forest Service Northern Research Station. https://www.fs.usda.gov/nrs/pubs/gtr/gtr_nrs163.pdf.

Plan conformance is not properly documented

The IIJA specifies that any emergency action carried out under an ESD "shall be conducted consistent with the applicable land and resource management plan."[15] The Forest Service cannot use the emergency authority unless they clearly document compliance with the forest plan. This project will violate the LRMP as amended in several ways, including but not limited to:

- Salvage logging and roads will degrade riparian management objectives in violation of PACFISH/INFISH;
- Salvage logging "dying trees" up to 30" dbh will kill trees >21" dbh that are still alive in violation of the Eastside Screens;
- Salvage logging dead trees up to 30" dbh will cut and remove snags over 20" dbh in violation of the snag and green tree requirements of the 2021 Large Tree Amendment, and the project failed to conduct a science-based assessment of the ecological needs of snag-associated wildlife.
- Salvage logging and roads will likely violate LRMP standards & guidelines related to maintaining big game cover.

An important requirement of NEPA is to inform the public and the decision-maker about whether the proposed action meets legal requirements such as the LRMP standards & guidelines.[16] In fact, the National Post-fire EA says "consistency of the proposed site-specific activities with land management plan direction will be documented … " Unfortunately, from reading the documentation for this Whitman Post-fire Recovery Project, it is not clear whether this project will follow the requirements of the Wallowa-Whitman National Forest Land and Resources Management Plan. In fact, the documentation for this Whitman Post-fire Recovery Project does not appear to provide any map of affected land allocations or describe the relevant standards & guidelines.

The National Post-fire Recovery EA assumes "All activities should adhere to standards, guidelines, and requirements stated in the Forest Service Manual, the applicable land management plan, and all applicable State and Federal law." The FS needs to clearly document that this assumption is valid.

This project will likely degrade fish habitat in violation of PACFISH/INFISH (especially with respect to large wood and sediment).

Salvage logging has long-term impacts on snag abundance, implicating compliance with forest plan standards. The Whitman Post-fire Project Design Criteria call for retention of "all trees/snags >30" dbh and identified old trees/snag" which the agency appears to believe complies with current standards for snag management. This is problematic for at several reasons. The new snag and green tree standards in the 2021 Large Tree Amendment[17] are deeply

[15] 16 U.S.C. § 6592c(b)(3); see also 16 U.S.C. §1604(i) (requiring all projects to comply with applicable forest plan).

16 16 U.S.C. § 1604(i)

17 USDA FS 2021. Large Tree Amendment. https://usfs-public.app.box.com/v/PinyonPublic/folder/158226868935

flawed. This amendment adopted a new standardless approach to managing snags and green replacement trees calling for the provision of *some* snags to meet the needs of *some* species, but without any assurances that enough snags (and green trees) will be maintained and recruited over time to ensure population viability for the wide variety of species which are most sensitive to the absence of abundant snags found in natural forests. The 2021 Large Tree Amendment also calls for retention of all 21" snags OR conduct a science-based analysis of snag habitat, neither of which appears to be met here. The 2021 Amendment also has requirements to retain green trees for snag recruitment, but it fails to specify what happens when there are too few green trees to ensure adequate snag recruitment. Logically, this situation would be mitigated by further restrictions on snag removal, but the amendment is silent on this.

The documentation for this project fails to recognize that snags are ephemeral. Many of the retained snags will fall down within a decade, but there are too few green trees available from which to recruit replacement snags, leaving a significant "snag gap" while we wait for large trees to grow into suitable snag replacements.[18] Meeting management plan snag targets for a brief period after salvage logging is grossly inadequate. The LRMP requires meeting snag standards through time, not just at a point in time. The WW LRMP says green trees should be met to meet snag standards "at all times during a stands rotation."

In addition, though the documentation for this Whitman Post-fire Recovery Project is silent on the matter, we assume this project area includes Management Areas emphasizing big game habitat (which are important to the public and the Tribes) which would of course call for provision of both cover and forage for big game, but The project documentation fails to disclose any of this. Salvage logging and road and fuel work will undeniably remove cover and fragment cover patches and make it harder for wildlife to cross roads.

The FS says they intend to cut dead, dying, and damaged trees. The Eastside Screens call for retention of live trees >21" dbh, and the courts have made clear that dying trees are not dead so they are covered by this policy. Same is true to damaged trees is they are still alive. The 9th Circuit Court of Appeals which governs this region had occasion to consider the question of "what is a dead tree" in the School Fire Salvage case. The Forest Service later explained:

> The Appeals Court reasoned that in the absence of an adopted technical definition of "live trees," the common understanding of the word "live" from the Merriam Webster's Collegiate Dictionary (10th ed. 1993) meant "to be alive," which meant "not dead," and

18 The shortage of snags in the decades following stand replacing fire is acknowledged by the Forest Service. "In the event of a stand replacing wildfire, snags would be abundant for 0-30 years, followed by a century or more of low snag densities until burned areas regenerate." Wallowa-Whitman National Forest 2012. Trail Vegetation Management Project EA, page 136. https://www.fs.usda.gov/r06/wallowa-whitman/projects/34482; https://usfs-public.app.box.com/v/PinyonPublic/file/932429887055. See also, Congressional testimony in July 2004, Jerry Franklin "It is sometimes argued that following a stand-replacement fire in an old-growth forest that snags and logs are present in "excess" of the needs of the site, in terms of ecosystem recovery. In fact, the large pulse of dead wood created by the disturbance is the only significant input of woody debris that the site is going to get for the next 50 to 150 years—the ecosystem has to 'live' off of this woody debris until the forest matures to the point where it has again produced the large trees that can become the source for new snags and logs (Maser et al. 1988)." Dr. Jerry F. Franklin, Professor of Ecosystem Studies, College of Forest Resources, University of Washington. July 15, 2004. TESTIMONY FOR THE RECORD ON OVERSIGHT HEARING ON "RESTORING FORESTS AFTER CATASTROPHIC EVENTS" BY HOUSE COMMITTEE ON RESOURCES, SUBCOMMITTEE ON FOREST AND FOREST HEALTH. https://www.govinfo.gov/content/pkg/CHRG-108hhrg94996/html/CHRG-108hhrg94996.htm.

> concluded "the common meaning of the term 'all live trees' is all trees that have not yet died." Opinion at 12. Thus, according to the Appeals Court, dying trees designated for harvest were not yet dead, and remained "live" for the purposes of the Eastside Screens.
>
> The Appeals Court remanded the case to the District Court to issue an injunction consistent with its findings. The District Court issued an injunction on February 14, 2007, requiring that "The Forest Service shall not harvest from the three timber sales areas any "live tree" > 21 inches dbh." This includes any tree of requisite size with green needles or that is not yet dead." District Court Order at 2.[19]

Importantly, when attempting to predict the mortality of trees that are not yet dead, the Forest Service cannot predict with accuracy which trees will die and which trees will survive, so guessing will unavoidably cause the loss of live trees that would otherwise survive and jump-start to the recovery of the fire-affected forest.[20]

There are also many forest-wide standards & guidelines that the analysis fails to address. For example, the cumulative effects of salvage logging, danger tree removal, road work, site prep, fuel work, replanting, etc. will likely violate the forest plan limits on detrimental soil conditions.

As noted above, the Natural Resource Impacts Analysis Report for The National Post-fire Recovery EA highlights the adverse effects of salvage logging on birds and the need for mitigation but provides no assurance that the mitigation will be implemented, saying "Post-fire timber harvest has been widely shown to have negative impacts on forest bird diversity (Puig-Girones et al. 2023), richness (Lindenmayer et al. 2018), abundance, and reproductive success (Basile et al. 2022). … Negative impacts of post-fire timber harvest to bird populations and communities may be mitigated by implementing timber harvest strategies that minimize the area treated, prioritize retention of snags and live trees, and avoid riparian areas (Fogg et al. 2022, Frank et al. 2025)." A site-specific NEPA analysis is needed to consider mitigation alternatives that properly limit the scope and intensity of salvage logging to ensure NFMA requirements are met.

---

19 Record of Decision for the School Fire Salvage Project, Umatilla National Forest. 6-11-07. http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5211932.pdf.

20 Lisa M. Ganio, Robert A. Progar. 2017. Mortality predictions of fire-injured large Douglas-fir and ponderosa pine in Oregon and Washington, USA. Forest Ecology and Management. Volume 390, 15 April 2017, Pages 47-67. https://doi.org/10.1016/j.foreco.2017.01.008. ("We calculated the overall correct classification rate as the percent of correctly classified live and dead trees out of all classified trees and the overall error rate as the percent of incorrectly classified trees. We calculated sensitivity (percent of dead trees correctly predicted to be dead) and specificity (percent of live trees correctly predicted to be alive). We also calculated the correct mortality prediction rate as the percent of truly dead trees out of the total number of trees predicted to be dead and the incorrect live prediction rate as the percent of dead trees incorrectly predicted to be alive. The two types of misclassification errors, dead trees predicted as live (1-Sensitivity) or live trees predict as dead (1-Specificity), are inversely related. … *Ponderosa pine*. Direct application of previously published models to trees from wildfire or prescription fire resulted in a wide range of discriminatory ability for ponderosa pine, from 52% to 77%.").

The National Forest Management Act requires that all site-specific activities must comply with the governing forest plan,[21] and NEPA requires disclosure of information necessary to determine compliance with legal requirements such as the Endangered Species Act, Clean Water Act, National Forest Management Act, and applicable Forest Plan Standards & Guidelines.[22]

In *Klamath Siskiyou Wildlands Center v. Boody* Judge Hogan held "plaintiffs have raised a serious question as to whether BLM violated NEPA in failing to disclose sufficient information in the EA to confirm compliance with … the RMP."[23] Federal agencies routinely make conclusory claims that their actions conform to underlying substantive laws, rules, and policies and invoke an entitlement to deference to shield those actions from scrutiny. But as the Sixth Circuit has pointedly explained:

> An agency is not entitled to deference simply because it is an agency. It is true that agencies are more specialized than courts are. But for courts to defer to them, agencies must do more than announce the fact of their comparative advantage; they must actually use it. And that means, among many other things, that the agency must apply—rather than disregard—the relevant statutory and regulatory criteria.[24]

Significant effects require an EIS

Salvage logging, roads, log hauling, hazard tree logging, site-prep, and replanting will cause significant long-term impacts to soil, water, snag habitat, big game habitat, fish habitat, fire hazard, weeds, climate change, and the long-term trajectory of forest development, and therefore trigger the requirement to prepare an Environmental Impact Statement. NEPA significance is also indicated by cumulative impacts of wildfire, fire suppression, past logging and roads, global climate change, and by the uncertainty, complexity, and controversy of multi-objective land management generally, and salvage logging specifically.

The National Post-fire Recovery final EA exhibits unresolved conflicts between its stated purposes, including economic recovery of timber, hazard tree mitigation, fuel reduction, and forest restoration. Every large tree removed for economic recovery or fuel reduction or hazard mitigation is a detriment to the co-equal forest restoration goal. An EIS is needed to harmonize these goals at both the programmatic and site-specific level. The national EA does nothing to

---

21 16 U.S.C. § 1604(i).

22 *NW Indian Cemetery Protective Association v. Peterson*, 795 F2d 688 (9th Circ. 1986).

23 *Klamath Siskiyou Wildlands Center v. Boody* (D. Or. #03-3124-CO. May 18, 2004) https://casetext.com/case/klamath-siskiyou-wildlands-center-v-boody-2. See also, *ONRC Action v. U.S. Forest Service*, CV. 03-613-KI. http://web.archive.org/web/20041105214752/http://www.onrc.org/press/ONRCv.USFS.pdf; *Native Ecosystems Council v. USFS,* (9th Circuit, August 11, 2005) http://www.ntc.blm.gov/krc/uploads/194/2h%20-%20Native%20Ecosystems%20Council%20v%20US%20Forest%20Service%20--%20Jimtown.pdf; *Helena Hunter & Anglers V. Tom Tidwell.* Montana District Court. CV 08-162-M-DWM. July 29, 2009; *Native Ecosystems Council V. Tom Tidwell* (9th Circ. March 9, 2010) http://www.ca9.uscourts.gov/datastore/opinions/2010/03/09/06-35890.pdf;

24 *Meister v. U.S. Dept. of Agriculture*, 623 F.3d 363, 367 (6th Cir. 2010).

help a local decision-maker find balance between these competing objectives or to reduce the likelihood of significant effects.

"A threshold question in a NEPA case is whether a proposed project will 'significantly affect' the environment, thereby triggering the requirement for an EIS."[25] The 9th Circuit Court has established a "relatively low threshold for preparation of an EIS," and an EIS must be prepared if a plaintiff raises substantial questions about whether a project will have significant effects.[26]

If the agency decides not to prepare an EIS, the agency must supply a "convincing statement of reasons" to explain why the action will not have a significant impact on the environment. "The statement of reasons is crucial to determining whether the agency took a hard look at the potential environmental impact of a project."[27] The Court is to defer to the agency's decision not to prepare an EIS only when that decision is "fully informed and well considered."[28]

Northwest forest expert Jerry Franklin says the effects of salvage logging are both profound and long-term and that natural reforestation (not artificial replanting) will establish tree genotypes better adapted to local conditions:

> "Salvage: * WILL eliminate key structural legacies. … This is a LONG-TERM impact, since no new [coarse woody debris] for many decades. * WILL destroy/damage recovering vegetation * MAY cause damage to aquatic ecosystems and soils. Salvage logging never contributes directly to ecological recovery. Salvage logging is always a tax on ecological recovery; the tax may be large or small. … Reforestation will usually: * Reduce duration of ESFCs [early successional forest communities] * Reduce heterogeneity of the process by which closed forest canopy is re-established * Alter genotype of planted species (less selection by environment) * Homogenize composition of forest … Early SFCs need full compliment [sic] of biological legacies to fully function * Salvage will reduce functionality * Reforestation will truncate and modify ESFCs * Naturally regenerated ESFCs are more likely to be resilient to climate change (more diverse, good genotypes) … Removal of legacies is most profound long-term impact … Importance of Coarse Wood:
>
> - Habitat for species
> - Organic seedbeds (nurse logs)
> - Modification of microclimate
> - Protection of plants from ungulates
> - Sediment traps
> - Sources of energy & nutrients
> - Sites of N-fixation
> - Special source of soil organic matter
> - Structural elements of aquatic ecosystems"[29]

---

25 *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1212 (9th Cir. 1998), *citing* 42 U.S.C. § 4332(2)(C).

26 *NRDC v. Duvall*, 777 F. Supp. 1533, 1537 (E.D. Cal. 1991); *Blue Mountains*, 161 F.3d at 1212.

27 *Blue Mountains*, 161 F.3d at 1212 (internal quotations omitted).

28 *Jones v. Gordon*, 792 F.2d 821, 828 (9th Cir. 1986).

29 Jerry Franklin 2007. Early seral forest: a diminishing resource? What is a 'Good' Forest Opening? – https://www.slideshare.net/slideshow/jerry-franklin-early-seral-forest-a-diminishing-resource/5354265

An article from respected scientists in one of the world's leading science journals said:

> … [N]atural disturbances are key ecosystem processes rather than ecological disasters that require human repair. Recent ecological paradigms emphasize the dynamic, nonequilibrial nature of ecological systems in which disturbance is a normal feature and how natural disturbance regimes and the maintenance of biodiversity and productivity are interrelated … Salvage harvesting activities undermine many of the ecosystem benefits of major disturbances. … [R]emoval of large quantities of biological legacies can have negative impacts on many taxa. For example, salvage harvesting removes critical habitat for species, such as cavity-nesting mammals, [and] woodpeckers, … Large-scale salvage harvesting is often begun soon after a wildfire, when resource managers make decisions rapidly, with long-lasting ecological consequences….[30]

Salvage logging causes long-term adverse impacts, including:

- exacerbating the snag habitat deficit that can persist for decades or a century;
- altering the natural trajectory of forest development from biodiverse and structurally complex to simplified and structurally depauperate;
- Forgoing the opportunity to develop "precocious" old growth habitat, where the retained legacy structure combine with complex early seral vegetation to allow old growth species to hang on in disturbed landscapes;
- accelerated GHG emissions that remain in the atmosphere for decades to thousands of years;
- Creating dense young plantations that pose a fire hazard and risk creating a cycle of frequent high severity fire that may eventually shift the project area to shrubs and grasses;
- degraded soil conditions that can be long-lasting caused by roads, landings, yarding, heavy equipment, fuel treatments, site-prep, and loss of biomass needed to store water and replenish soil structure and nutrients;
- perpetuating the timber dependence of local communities and continuing the boom-bust tendencies of the timber industry, and its effects on cyclic unemployment and community instability;

The NEPA analysis fails to weigh the significance of these potential long-term impacts.

The FONSI for this project needs to take a hard look at the full suite of evidence indicating that salvage logging and replanting poses a relatively greater fire hazard, and natural recovery poses a relatively lower fire hazard, because:

- Young plantations represent dese resinous fuels close to the ground which pose a significant fire hazard for many decades,
- Salvage logging tends to move a log of find fuels form the canopy to the ground causing an increase in hazardous fuel conditions. The FS may say they intend to treat those fuels, but it takes time, and there is greater fire hazard during the lag time, and sometimes fuel treatments do not get done.

---

30 Lindenmayer, Franklin, Hunter, Noss, et al., 2005. ECOLOGY: Salvage Harvesting Policies After Natural Disturbance, Science 2004 303: 1303. http://www.eebweb.arizona.edu/courses/ecol406r_506r/lindenmayer&noss-2005-effectslogging4.pdf.

- Roads built for (and used by) salvage logging are a fire ignition risk. Natural recovery would likely naturally close some low use roads and reduce those risks.
- Small fuels were largely consumed by the fire, reducing fire hazard. The small fuels that remain are largely held high in the canopy and those fuels fall to the ground slowly over time, so they do not accumulate.
- The majority of fuels left behind by the fire are larger wood that holds moisture and poses a lower fire hazard.
- Natural fire recovery tends to encourage more heterogeneous vegetation and fuel conditions that are more resilient.

The FONSI for this project needs to recognize that:

- Natural post-fire recovery processes provide as good or better riparian shading via remaining green trees, snags, down wood, sprouting shrubs and other early seral vegetation, followed by conifer re-establishment over time. All of these will be adversely affected by salvage logging.
- There is no site-specific finding that hydrophobic soils are present.
- Hydrophobicity occurs in unburned soils as well as burned soils.
- Many of the treatment areas are relatively flat so soil movement is less of a concern.
- Hydrophobic soils are often vastly over-estimated. In reality, hydrophobic soils occur in small patches and effects are short-lived as the soils are affected by weather, animals, and woody material falling to the ground. Minshall (2003) said:

  > Salvage harvest yields responses (e.g., ground disturbance, woody debris removal, interruption of normal infiltration pathways, and acceleration of surface flows) that interact with the direct and indirect effects of fire to make these actions so potentially damaging. In addition, the negative effects extend many years beyond the actual time of salvage activities because the harvest of snags that normally fall and become incorporated into stream channels and forest floors over several decades or more (Lyon 1984). These wood inputs are important to create habitat, increase nutrients, and retard runoff and channel alteration during what is normally the most critical stage of stream and riparian recovery.[31]

- Salvage causes adverse effects on soils and erosion far worse than natural forest recovery via roads, landings, site prep, yarding, pile burning, and heavy equipment, that collectively cause significant soil displacement, compaction, loss of woody structure that normally captures sediment as it moves downslope, provides nutrients, structure, and water holding capacity.

Likely violations of the LRMP also indicate NEPA significance. In this case, the Forest Service is:

- not managing toward LOS as required by the Eastside Screens,
- not retaining large live and dying trees over 21" dbh, as required by the Eastside Screens,

31 Minshall, G.W. 2003. Responses of stream benthic macroinvertebrates to fire. Forest Ecology and Management. 178: 155-161. http://www.famu.org/mayfly/pubs/pub_m/pubminshallg2003p155.pdf.

- not protecting large snags as required by the 2021 Large Tree Amendment[32] (and failed to conduct a science based analysis),
- not managing these burned forests consistent with big game requirements of the LRMP,
- failed to maintain connectivity between LOS patches as required by the Eastside Screens,

The FONSI for this project needs to consider that in September 2015, over 260 scientists sent a joint letter to Congress and the President highlighting the ecological value of post-fire landscapes, the significant adverse effects of salvage logging, and opposing bills that would encourage post-fire logging.

> … numerous scientific studies tell us that even in the patches where forest fires burn most intensely, the resulting wildlife habitats are among the most ecologically diverse on western forestlands and are essential to support the full richness of forest biodiversity. Post-fire conditions also serve as a refuge for rare and imperiled wildlife species that depend upon the unique habitat features created by intense fire. These include an abundance of standing dead trees, or "snags," which provide nesting and foraging habitat for woodpeckers and many other plant and wildlife species responsible for the rejuvenation of a forest after fire.
>
> The post-fire environment is rich in patches of native flowering shrubs that replenish soil nitrogen and attract a diverse bounty of beneficial insects that aid in pollination after fire.
>
> …
>
> This post-fire renewal, known as "complex early seral forest," or "snag forest," is quite simply some of the best wildlife habitat in forests, and is an essential stage of natural processes that eventually become old-growth forests over time. This unique habitat is not mimicked by clearcutting, as the legislation incorrectly suggests. Moreover, it is the least protected of all forest habitat types, and is often as rare, or rarer, than old-growth forest,
>
> …
>
> After a fire, the new forest is particularly vulnerable to logging disturbances that can set back the forest renewal process for decades. Post-fire logging has been shown to eliminate habitat for many bird species that depend on snags, compact soils, remove biological legacies (snags and downed logs) that are essential in supporting new forest growth, and spread invasive species that outcompete native vegetation and, in some cases, increase the flammability of the new forest.
>
> While it is often claimed that such logging is needed to restore conifer growth and lower fuel hazards after a fire, many studies have shown that logging tractors often kill most conifer seedlings and other important re-establishing vegetation and actually increases flammable logging slash left on site. Increased chronic sedimentation to streams due to the extensive road network and runoff from logging on steep slopes degrades aquatic organisms and water quality.

32 https://www.fs.usda.gov/sites/nfs/files/r06/malheur/publication/Forest%20Managment%20Direction%20Large%20Diameter%20Trees%20Decision%20Notice%202021.pdf

> We urge you to consider what the science is telling us: that post-fire habitats created by fire, including patches of severe fire, are ecological treasures rather than ecological catastrophes, and that post-fire logging does far more harm than good to public forests.[33]

The FONSI for this project needs to consider a review of 116 research articles, dating from 1960 to 2002, which examined bird-forestry relationships in managed forests across North America found that —

> … The response of birds to forestry practices has been mixed and highly species-specific, but in general, net change in community richness following timber harvest was negligible. Among silvicultural practices, uneven-aged management (e.g., selection harvest) appears to be the most favorable for birds. In contrast, snag removal was highly deleterious, with >80 percent of studies reporting net species loss; net gain was never reported.…
> … What seems to be particularly detrimental to forest avifauna is removal of snags. When prescriptions involved manipulation of snag densities, either by removing (Kilgore 1971, Scott 1979, Dingledine and Haufler 1983, Scott and Oldemeyer 1983, Schreiber and deCalesta 1992), retaining (Dickson et al. 1983, Zarnowitz and Manuwal 1985, Stribling et al. 1990, Schreiber and deCalesta 1992, Welsh et al. 1992), or creating (McPeek et al. 1987) snags, bird numbers were typically found to be positively correlated with snag density. Unlike even-aged and unevenaged management practices, removal of snags never resulted in more species increasing in abundance than decreasing. The importance of snags to birds is well known (Davis et al. 1983 and references therein, Bull et al. 1997, references above), not only to cavity nesters, but also songbirds (Sallabanks et al. 2002) that may use snags for nesting, perching, foraging, singing, and scanning for predators.
> … Since large remnant snags and "defective" residual green trees provide much of the snag habitat for cavity-nesters in early- to mid-successional stands, particularly on private lands (Ohmann et al. 1994), retention of these structures will be important for maintaining populations of cavity- and snag-using avian species in managed forests. Snag retention and/or creation were the most commonly listed management recommendations from studies included in our review. We concur that leaving snags wherever possible is another important way that foresters can improve or maintain avian habitat quality within managed forest landscapes.[34]

This project proposes a wide variety of actions that can have both positive and negative effects over a variety of temporal and geographic scales. The NEPA document does not adequately consider these significant complexities and an EIS is needed to properly consider, analyze, and disclose these complex issues.

The leaders of the U.S. Forest Service, the U.S. Geological Survey and the National Oceanic and Atmospheric Administration, appeared at the annual meeting of the 8,000-member Ecological

---

33 DellaSala, Hanson et al (2015) Open Letter to U.S. Senators and President Obama from Scientists Concerned about Post-fire Logging and Clearcutting on National Forests. http://www.geosinstitute.org/images/stories/pdfs/Publications/Fire/SciLetterOpposingPostfireLoggingBillsSept2015.pdf; https://web.archive.org/web/20151015005302/http://www.geosinstitute.org/press-room-sp/press-releases/1228-260-scientists-oppose-post-fire-logging-bills.html.

34 Rex Sallabanks and Edward B. Arnett. Accommodating Birds in Managed Forests of North America: A Review of Bird-Forestry Relationships. PSW-GTR-191. https://www.fs.usda.gov/psw/publications/documents/psw_gtr191/psw_gtr191_0345-0372_sallabanks.pdf.

Society of America and admitted to the complexity of land management and the uncertainty of outcomes. These are indicators of NEPA significance:

> Forest Service Chief Dale Bosworth said his agency no longer focuses on a particular tree or animal species as it did 40 years ago, but now takes a more complicated landscape-wide approach to managing federal forests.
>
> "That ecological complexity has humbled us as land managers," he said. "It means that we're not going to be 100 percent sure about management prescriptions, and we're not going to be 100 percent sure about the outcomes of what we do on the land."
>
> Bosworth, who was appointed the agency's chief in 2001, said mistakes will be made in managing forests. "But through science maybe we can do a much better job of learning through those mistakes and help us improve our future management."

The agencies have previously recognized the complexities and uncertainties of forest management:

> The management of large forest landscapes is a complex and developing discipline. There is less than complete information about many of the relationships and conditions of fire ecology, wildlife and plant species, forest habitats, the economy, and conditions in rural communities."[35]

Similar complexities have been recognized in the peer-reviewed literature:

> Climate change, fire policy, and fuel-treatment strategies are complex biosocial issues, and integrating them with wildlife conservation objectives is challenging. Conservation of taxa that live in late-seral forest and riparian habitat has been a dominant management paradigm for the past two decades, but this emphasis is often incompatible with increased use of fire and mechanical thinning for ecosystem restoration (Cissel et al. 1999). For example, fuel treatments and natural fires that remove a portion of the overstory, understory, and surface fuels reduce the risk of subsequent crown fire but also preclude habitats required for some plant and animal species.[36]

The complexity and uncertainty of modern forest management, especially multiple-objective projects like this, require careful consideration in an EIS.

Johnson & Franklin (2009) said "Treatment of areas following occurrence of major disturbances is a complex and controversial topic. Complexities include the trade-offs among various resource management goals, such as between management of fuels and provision of wildlife habitat in the case of wildfires. Conflicts often exist between economic and ecological objectives as timber salvage is generally about recovering economic values rather than enhancing ecological recovery. A further complication is that science of post-disturbance management activities has only recently begun to receive serious attention."[37]

---

35 Medford BLM, South Deer Landscape Management Project EA, July 2005.

36 Donald Mckenzie, Ze'ev Gedalof, David L. Peterson, and Philip Mote. Climatic Change, Wildfire, and Conservation. Conservation Biology 18(4), Aug 2004. http://www.uoguelph.ca/cedar/Pubs/McKenzie_et_al_ConsBio.pdf.

37 Johnson & Franklin 2009. Report: Restoration of Federal Forests in the Pacific Northwest http://www.forestry.oregonstate.edu/cof/fs/PDFs/RestorationOfFederalForestsInThePacificNorthwest.pdf.

The interagency Interior Columbia Basin Ecosystem Management Project found "The costs and benefits of activities such as salvage logging and its appropriate role have emerged as national issues."[38]

"Treatment of areas following occurrence of major fires is a complex and controversial topic. Complexities include the trade-offs among various resource management objectives, such as fire fuel management objectives and provision of wildlife habitat. Conflicts often exist between economic and ecological objectives … "[39]

Franklin and Agee (2003) said "What are appropriate restoration treatment policies after a fire? The topic is contentious …"[40]

USFWS (2008) said "There is widespread debate over the merits of salvage logging, and salvage is controversial in the technical literature. … [T]here is considerable controversy over post-fire logging (such as salvage logging) and its role in ecosystem recovery."[41]

The 2013 Science Synthesis prepared by the PSW Research Station states:

> ***Post-Fire Salvage Logging***
> One of the more controversial activities in the post-fire environment is salvage logging of fire-killed trees. …
> ***Ecological Considerations***
> Salvage logging is controversial because few short-term positive ecological effects and many potential negative effects have been associated with post-fire logging (Peterson et al. 2009). Knowledge of the ecological effects of post-fire logging, most of which is short-term, has been summarized by McIver and Starr (2000), Lindenmayer et al. (2004), Lindenmayer and Noss (2006), Peterson et al. (2009), and Lindenmayer et al. (2011). These reviews note that general ecological concerns associated with salvage logging include impacts to soils; impacts to understory vegetation and recruitment; potential increases in surface fuel loads; reductions in such as snags and burned logs and their associated habitat values; and other influences on forest development. Impacts to tree recruitment have been observed when salvage logging has been delayed until after seedlings have become established (Donato et al. 2006, Newton et al. 2006). Salvage logging by helicopter is likely to avoid more of the ground disturbance. However, the economic feasibility of salvage logging in general, and especially more costly methods such as helicopter logging, may depend on removing larger, more merchantable dead trees. Such larger trees are likely to be disproportionately valuable for post-fire dependent wildlife (Hutto 2006); …

---

38 U.S. Department of Agriculture, Forest Service. 1996. Status of the interior Columbia basin: summary of scientific findings. Gen. Tech. Rep. PNW-GTR-385. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; U.S. Department of the Interior, Bureau of Land Management. 144 p. p 22.

39 K. Norm Johnson, Jerry Franklin, Debora Johnson. The Klamath Tribes' Forest Management Plan. Dec 2003. http://web.archive.org/web/20090122131645/http://www.klamathtribes.org/forestplan.htm.

40 Franklin and Agee. 2003 "Forging a Science-Based National Forest Fire Policy," Issues in Science and Technology *Online*. Fall 2003. http://web.archive.org/web/20071215154828/http://www.issues.org/issues/20.1/franklin.html

41 USFWS 2008. Final Recovery Plan for the Spotted Owl. APPENDIX E: FIRE AND SPOTTED OWL HABITAT. Pp 119-120. https://web.archive.org/web/20090110092629/http://www.fws.gov/pacific/ecoservices/endangered/recovery/pdf/NSO%20Final%20Rec%20Plan%20051408.pdf.

...

Re-burns

The long-term ecological effects of re-burns, including potential ecological benefits of post-fire salvage of dead trees, are an important gap in our knowledge of post-fire management ...

Social Considerations

Despite controversy over the ecological effects of salvage logging, several studies have found a high level of public support for salvage logging in communities that have experienced a nearby wildfire, or are located in an area where the risk of wildfire is high. ... However, their support was contingent on salvage logging being environmentally benign.[42]

Salvage logging and replanting may have significant effects and require an EIS, including but not limited to:

- Salvage logging will exacerbate the shortage of snags and dead wood across the landscape. Snags and dead wood provide important ecosystem services and vital habitat for wildlife and fish, including endangered species. Snags are virtually absent on vast areas of private land, and are in short supply on large areas of public land that are managed for timber, fuel reduction, roads, and safety. There is an inverse relationship between snag abundance and proximity to past timber harvest and roads.[43] The only place that snags are expected to be recruited at natural levels is inside wilderness and unmanaged roadless areas,[44] which represent a small fraction of the landscape.
- After a wildfire occurs, forest managers have a very important choice to make, a choice that has a strong connection to NEPA significance: "What trajectory will we put this burned forest on? Will we put it on a trajectory that helps address the shortage of artificially rare habitat types, or a trajectory that increases habitat types that are already artificially abundant?" Salvage logging and replanting will push the landscape further from the natural range of variability by reducing areas of abundant snags and dead wood and degrading complex early seral habitat that is vastly under-represented compared to

---

42 Long, Jonathan; Skinner, Carl; North, Malcolm; et al 2013. Science synthesis to promote resilience of social-ecological systems in the Sierra Nevada and southern Cascades. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 504 p. http://www.fs.usda.gov/psw/publications/reports/psw_sciencesynthesis2013/index.shtml; http://www.fs.usda.gov/psw/publications/reports/psw_sciencesynthesis2013/psw_sciencesynthesis2013_4_3.pdf, published as General Technical Report, PSW-GTR-247. See also Jonathan R. Thompson, Thomas A. Spies, and Lisa M. Ganio. 2007. Reburn severity in managed and unmanaged vegetation in a large wildfire. Proceedings of the National Academy of Sciences. *PNAS* published online Jun 11, 2007. http://www.fs.usda.gov/pnw/pubs/journals/pnw_2007_thompson001.pdf. "The study also illustrates that we really don't fully understand the how fire hazard varies with time and place following fire and management and that we have a way to go before we can provide managers with decision support tools to help them evaluate multiple resource tradeoffs related to post-fire management." Clarification of Key Findings and Implications: https://web.archive.org/web/20090514083136/http://www.fs.fed.us/pnw/research/PNAS_Biscuit_Author_Comments_PNW.doc. https://www.fs.usda.gov/psw/publications/documents/psw_gtr247/psw_gtr247.pdf.

43 Wisdom, M.J., and Bate, L.J. 2008. Snag density varies with intensity of timber harvest and human access. For. Ecol. Manage. 255: 2085–2093. doi:10.1016/j.foreco.2007.12.027. https://web.archive.org/web/20111024015158/http://www.fs.fed.us/pnw/pubs/journals/pnw_2008_wisdom001.pdf.

44 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.usda.gov/psw/publications/documents/gtr-181/049_Korol.pdf.

the natural range of variability. Salvage logging and replanting will create more dense young conifer plantations which are a vastly over-represented habitat type compared to the natural range of variability. These dense young forests are also a significant fire hazard, and will deplete summer stream flows for decades.

- Salvage logging exacerbates the biodiversity crisis which is caused by the loss of habitat and human interference in natural ecological processes that wildlife evolved with, including wildfire, dead wood accumulation, and natural recovery of diverse vegetation after fire. Before widespread logging, every tree that grew in the forest died in the forest and generally remained in the forest until it was removed by decay or fire. Wildlife (and fish) evolved in a landscape with much more abundant snags and dead wood, and they evolved to use dead wood for a wide variety of life functions – feeding, shelter, communication, travel, etc. The landscape now provides very few areas with the dead wood abundance they are used to. Numerous wildlife and fish species associated with abundant wood are in decline, including: goshawk, woodpeckers, owls, amphibians, marten, Pacific fisher, salmonids, bats, etc. Salvage logging will make that worse.
- Salvage logging typically removes "dying trees" and there will be numerous instances of false positives, i.e., the agency will kill trees that would otherwise survive the fire, which will make a bad situation worse for soil recovery and exacerbate the future "snag gap." Live trees share food with a complex below-ground ecosystem. After fire, there is a severe shortage of food, so surviving trees help jump-start soil recovery, and any cutting of green trees will make this worse. Surviving trees also help provide future snag habitat when it is needed most. The apparent abundance of snags after fire is temporary and hides a significant "snag gap" in the decades after most of the snags have fallen and before the stand can grows and can start recruiting large snags again. Salvage logging will thus deepen and widen the "snag gap."
- Salvage logging tends to target areas with large snags, which removes some of the best snag habitat, and the remove the largest snags that are used by the greatest number of species and most likely to remain standing longest and help mitigate the snag gap.
- Salvage logging has significant adverse effects on soil, water quality, streamflows, and weeds from heavy equipment, roads, landings, logging and yarding, slash burning, and loss of woody biomass.
- Salvage logging and replanting have significant adverse hydrologic effects including artificial peak and low stream flows caused by accelerated run-off, and establishment of artificially dense tree plantations with a high rate of evapotranspiration at the watershed scale.
- Salvage logging has significant effects on terrestrial and aquatic habitat from exacerbating the existing shortage of snag and dead wood on the landscape, and within riparian and stream ecosystems.
- Salvage logging will deprive at-risk late-successional wildlife, such as spotted owls, marten, fisher, woodpeckers, salmonids, etc., from persisting in post-fire landscapes, and delaying development of preferred complex, wood-rich habitat for late successional wildlife. Many ESA-listed species, including spotted owls and salmon, and their prey, rely on abundant dead wood which will be depleted long-term by salvage logging.
- Salvage logging will deprive riparian and aquatic fish and wildlife of abundant snags and dead wood that enrich their habitat by creating pools, dissipating energy, capturing and storing sediment and spawning gravel, partitioning space, thermal buffering, trophic substrate, etc.
- The effects of salvage logging on soil, water quality, hydrology, fish & wildlife habitat, weeds, climate change, fire hazard, slope stability, etc. are similar to, or worse than, the significant effects of clearcutting. They can be worse because there may not be any green trees to retain as mitigation, soil is already very sensitive due to wildfire effects, the

salvage harvest units are often not bordered by green stands that can serve as mitigation, seed sources, wildlife refugia, etc.

- Salvage logging will significantly increase emissions of greenhouse gases that will amplify and accelerate global climate change and ocean acidification.
- Salvage logging and replanting will interfere with climate change adaptation by imposing plant communities that are ill-adapted to the future climate, and inhibiting the natural processes of plant communities shifting to different plant communities that are better adapted to the future climate. Salvage logging also makes it harder to wildlife to survive in the changing climate by removing canopy and dead wood that offers shelter from climate extremes.
- Salvage logging and its effects are controversial in the scientific literature.[45]
- There are unresolved conflicts among alternative uses of natural resources after fire, e.g., wood products vs. habitat, recovery of under-represented conditions vs. over-represented conditions, putting workers in harm's way, or not, etc. These trade-offs need to be analyzed in an EIS that considers multiple alternatives that resolve trade-offs in different ways.
- LRMP standards & guidelines related to post-fire recovery and late successional are outdated and lack scientific credibility. Current LRMP standards & guidelines fail to adequately conserve soil, water, snags, dead wood, diverse early seral ecosystems, and fire resilient diverse early seral plant communities. The NEPA supporting the old LRMPs is also outdated and scientifically discredited because it fails to consider significant new information about the adverse effects of salvage logging and replanting that has come to light since the LRMPs were adopted.
- Salvage logging as currently practiced likely violates existing LRMP standards & guidelines. Conformance with the LRMPs and other policies is not a good indicator of insignificance, because the LRMPs are outdated, and the current administration is actively trying to dismantle the conservation policies that would otherwise mitigate the effects of salvage logging, e.g., roadless rule, roads policy, Northwest Forest Plan amendment, Eastside Screens, ESA harm rule, Migratory Bird Treaty Act re-interpretation, etc.
- Salvage logging will cause a significant loss of diverse ecosystem services provide by abundant dead wood. Some of the important ecosystem services provided by dead trees and down wood, and degraded by salvage logging, includes:
    - All the benefits to fish and wildlife describe above,
    - Carbon storage that mitigates global climate change and ocean acidification,
    - Providing favorable sites for regeneration and growth of trees and other native vegetation after fire,
    - Soil building,
    - Nutrient storage and cycling,
    - Capturing sediment and keeping it out of streams,
    - Supporting snow loads and moderating peak delivery of water to streams;

---

45 Long, Jonathan; Skinner, Carl; North, Malcolm; et al 2013. Science synthesis to promote resilience of social-ecological systems in the Sierra Nevada and southern Cascades. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 504 p., published as General Technical Report, PSW-GTR-247 https://www.fs.usda.gov/psw/publications/documents/psw_gtr247/psw_gtr247.pdf; FWS 2008. Final Recovery Plan for the Spotted Owl. APPENDIX E: FIRE AND SPOTTED OWL HABITAT. Pp 119-120. https://web.archive.org/web/20090110092629/http://www.fws.gov/pacific/ecoservices/endangered/recovery/pdf/NSO%20Final%20Rec%20Plan%20051408.pdf.

- Water storage that helps maintain soil moisture that helps amphibians and plants survive in late summer, and maintain fuel moisture that reduces fire hazard,

For greater detail, refer to Rose et al. (2001).[46]

Salvage will retard attainment of RMOs in violation of PACFISH/INFISH.

The Wallowa-Whitman National Forest is home to numerous sensitive fish species, including some listed under the Endangered Species Act. Salvage will retard achievement of riparian management objectives in violation of TM-1 of PACFISH/INFISH. Attainment of riparian objectives is best achieved through natural vegetation recovery and development pathways and natural sediment regimes, both of which will be adversely affected by the proposed salvage.

The PDCs clearly contemplate logging across streams which is likely to disturb soil and vegetation that is critical to maintaining watershed integrity especially after fire.

Retaining abundant wood across the watershed will help capture, store, and release sediment, water, and nutrients, while salvage logging, roads, site prep, and fuel reduction will deplete large wood and interfere with these processes. Removing wood through salvage logging will degrade all those mitigations and benefits provided by retaining wood after wildfire.

Lewis et al. (2017):

> The data reveal strong associations of turbidity with the proportion of area harvested in watersheds draining to the measurement sites. Turbidity increased significantly over the measurement period in 10 watersheds and decreased at one. Some of these increases may be due to the influence of wildfire, logging roads and haul roads. However, turbidity continued trending upwards in six burned watersheds that were logged after the fire, while decreasing or remaining the same in two that escaped the fire and post-fire logging.[47]

Conserve Unroaded Areas

Large intact expanses of unfragmented habitat are ecologically important and were once quite common but are now rare. Salvage logging and road building and tree planting will adversely affect the significant ecological values associated with unroaded areas under the primary influence of natural processes. This is another indicator of NEPA significance and requires analysis in the Environmental Impact Statement.

The 9th Circuit Court of Appeals says "It is well established in this [9th] Circuit that logging in an unroaded area is an 'irreversible and irretrievable' commitment of resources and 'could have

46 Rose, C.L., et al. 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.

47 Jack Lewis, Jonathan J. Rhodes, Curtis Bradley 2017. Turbidity Responses from Timber Harvesting, Wildfire, and Post-Fire Logging in the Battle Creek Watershed, Northern California. Environmental Management https://doi.org/10.1007/s00267-018-1036-3.

serious environmental consequences.'" and therefore requires an EIS.[48] This project involves activities in such unroaded areas. The NEPA analysis for this project does not adequately discuss the impacts of proposed activities on all the many significant values of roadless/unroaded areas.

The 9th Circuit has held that the agencies have a NEPA obligation to consider the potential for future wilderness designation before conducting management activities in areas that may be eligible for wilderness, even if they are not inventoried roadless areas.[49] The court enjoined salvage logging that would have affected uninventoried roadless areas less than 5,000 acres in size that were located adjacent and contiguous with an inventoried roadless area.

The Northwest Forest Plan Late-Successional Old Growth Effectiveness Monitoring Plan says that "perhaps 80 percent or more [of the historic late-successional old-growth forest] would probably have occurred as relatively large (greater than 1,000 acres) areas of connected forest."[50] Currently, these 1,000 acre and larger patches are rare on the landscape, so most of the existing mature and old-growth forest is located in more fragmented landscapes that are less able to meet the needs of wildlife that evolved in larger habitat patches.

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. This goal is just as important as goals related to tree density or species composition that the agency too often relies on to justify logging and road building.

Large blocks of unroaded landscape under the primary influence of natural processes are an important part of the evolutionary system under which wildlife evolved. Those natural processes include the interplay of photosynthesis, succession, and various natural disturbance processes, like fire, wind, insects, etc. Decades of logging and roads, grazing and fire suppression have left the landscape highly modified and diminished the role of natural processes. Maintaining viable populations likely requires restoring the natural range of variability for large unmanaged habitat blocks. This project moves things in the wrong direction, representing a potentially significant effect. The NEPA analysis for this project needs to address this important issue.

The NEPA analysis should discuss whether the project will push the landscape toward or away from the natural range of variability for large-scale habitat patches. Landscape analysis based on historic disturbance patterns suggests that historically the majority of old forest occurred in

---

48 *Sierra Club v. Austin* No 03-35419; DC No. CV-03- 00022 DWM (9th Circ. 2003), *citing Smith v. Forest Service* 33 F.3d 1072, 1078 (9th Circ. 1994).

49 *The Lands Council v. Martin*, (9th Circ, June 25, 2008). http://www.ca9.uscourts.gov/datastore/opinions/2008/06/24/0735804.pdf

50 Miles Hemstrom, Thomas Spies, Craig Palmer, Ross Kiester, John Teply, Phil McDonald, and Ralph Warbington; Late-Successional and Old-Growth Forest Effectiveness Monitoring Plan for the Northwest Forest Plan, USFS General Technical Report PNW-GTR-438; December 1998; https://www.fs.usda.gov/pnw/pubs/gtr_438.pdf.

large patches.[51] These large patches of older forests that native fish and wildlife species evolved with are now severely underrepresented on the forest landscape and must be protected and restored.

The agency can develop a preliminary map of roadless/unroaded areas >1,000 acres by simply querying your GIS database for polygons between roads that are >1,000 acres. This preliminary map can be made more accurate by subtracting regen harvest units younger than 50 years. Oregon Wild has already done this[52] and we found that the project area includes several unroaded areas that are shaded in purple in the map below.

/ / /

/ / /

/ / /

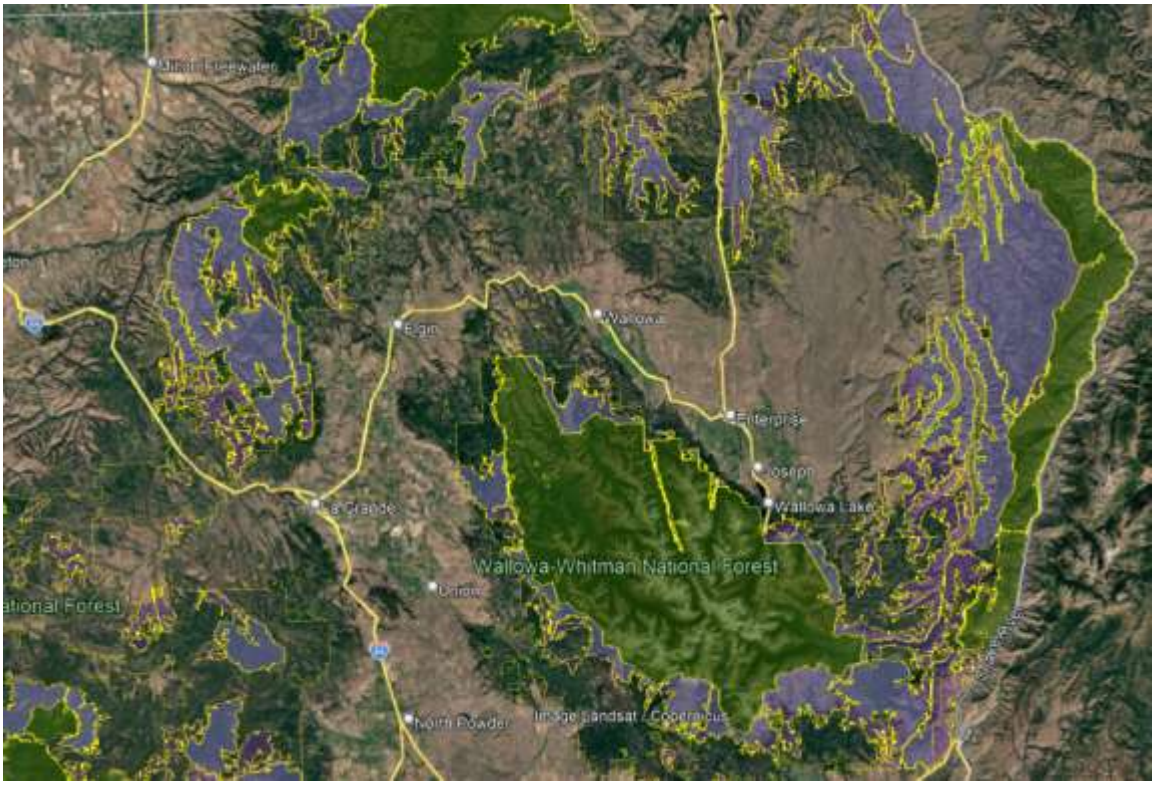
51 Wimberly, M. 2002. Spatial simulation of historical landscape patterns in coastal forests of the Pacific Northwest. Can. J. For. Res. 32:13-16-1328 (2002) pdf.

52 Oregon Wild's Citizen Roadless Inventory is shown on interactive statewide map available at http://www.oregonwild.org/explore-oregon/oregon-wild-map-gallery by following the link for "All Potential Forest Wilderness." We generally define these areas as those that meet the criteria for inventoried roadless areas set forth by the USFS but based on new science showing the significant ecological values of unroaded areas >1,000 acres, we applied the criteria to federal land areas over 1,000 acres. They are generally in fairly good shape with no substantial/obvious logging, development, or roads.

While these areas have wilderness qualities and may qualify for Wilderness protection, there are many other significant values that make these areas worthy of special attention including (but not limited to) their value as places where natural processes can do the ecological work and as a control to experiments (intentional and otherwise) being done across a landscape dominated by human activities including commercial logging, mining, grazing, road building, and other development.

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. While we refer to Forest Service guidelines in identifying these areas, FS inventories such as RARE II are not the final word. In addition to errors made during the inventory, there are a number of exclusionary biases in defining potential wilderness area's and the roadless inventory. Furthermore, science has evolved since that time to recognize significant ecological value in areas than 5,000 acres.

To identify these areas, Oregon Wild started with a GIS query. Using the most current data layers available for existing roads, we identified all polygons >1,000 acres bounded by those roads. Using GIS layers, we excluded non-federal lands, clearcuts, and heavy thins. We then used aerial images to further refine boundaries based on obvious developments, roads, quarries, and other logging areas not previously identified. We then recruited volunteers to "adopt" candidate unroaded areas and ground-truth them to the extent possible by adding and subtracting areas based on ground reconnaissance. While not every area has been ground-truthed, we update the inventory as we receive information from individuals and agencies during project planning and at other times. Our inventory of unroaded areas is a work-in-progress with a fairly high level of accuracy.



Ibisch et al (2016) explained the global significance of the cumulative loss of wild unroaded landscapes.

> The planet's remaining large and ecologically important tracts of roadless areas sustain key refugia for biodiversity and provide globally relevant ecosystem services. … Global protection of ecologically valuable roadless areas is inadequate. International recognition and protection of roadless areas is urgently needed to halt their continued loss.
>
> …
>
> 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.
>
> …
>
> 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).
> ...
> 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.
> ...
> 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).
> ...
> 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. ... 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.[53]

Mildrexler et al. (2026) highlight the benefits of large and small roadless areas and the perils of more roads and logging.

> A century of intensive logging resulted in over 386,000 miles of roads built on US national forests, enough to circle the globe about 15 times, with an estimated additional 60,000 miles of illegal unauthorized roads (USDA, 2001). This massive road system contributes to reductions in the quality and quantity of water, habitat fragmentation, spread of invasive plants, increased wildfire risk, and other problems that undermine ecological integrity (Aplet et al., 2026; Healey, 2020; Gucinski et al., 2001; Lindenmayer et al., 2025; Wisdom et al., 2018). In this context, remaining roadless areas have enormous ecological value, including roadless areas that are larger than 1000 acres but less than the 5000-acre minimum criteria for IRA designation (DellaSala et al., 2011; Henjum et al., 1994; Rhodes et al., 1994).
> ...
> The high forest integrity scores for IRAs are underpinned by healthy ecosystem functions and the many valuable well-documented ecosystem services that IRAs provide (DellaSala et al., 2011; Dietz et al., 2021; Talty et al., 2020). If protected, IRAs can make important contributions toward achieving climate and biodiversity targets and safeguarding critical water resources (Crist et al., 2005; DellaSala et al., 2011; Law et al., 2021; Loucks et al., 2003).
> ...
> *Exceptional water values*
> IRAs are profoundly important for their role in preserving the natural hydrology of forest ecosystems, a quality that is now rare in temperate forests due to the long and intense history of resource extraction (Haddad et al., 2015; Usher, 1987; Wilcove et al., 1986). This includes above and belowground water movement and flow patterns which are

53 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.

highly vulnerable to human impacts such as road building and logging (Kastridis, 2020). Forests and water are an integrated system, and native forests and soils are particularly important for water flows and supplies (Creed et al., 2019). Because IRAs are predominantly located in mountainous terrain, they protect topographically complex headwater stream systems that feed into larger rivers (Fig. 2). These areas provide numerous valuable ecosystem services such as cold water refugia for fish like bull trout and salmon, habitat for sensitive plant species, resilience to climate change, and drinking water supplies to millions of Americans (DellaSala et al., 2011; Isaak and Luce, 2023; Liu et al., 2022). In the Western US, about 90% of people are served by public drinking water systems derived from NFS lands that include 71% of all IRAs in the nation (Liu et al., 2022).

...

Intact headwater streams that IRAs protect are superior at retaining, filtering, and slowly releasing water throughout the year (DellaSala et al., 2011; Furniss et al., 1991). This regulation of water quantity and quality is vital for supporting late-summer stream flows important to fisheries, cultural values, and recreational opportunities (Colvin et al., 2019). IRAs also contribute water supplies to downstream agricultural use. Through regulation of water flow, roadless areas help buffer species and services important to economies from climate impacts.

...

Strongholds for wildlife and wildlands

IRAs are among the most wild, undeveloped lands both in the nation and within their respective states (Talty et al., 2020). They provide habitat for hundreds of vulnerable wildlife species (Dietz et al., 2021), and they are key to the conservation of threatened, endangered, or imperiled species (Loucks et al., 2003). Large roadless areas serve as source populations for many species including wide-ranging carnivores like grizzly bear (Ursus arctos), wolverine (Gulo gulo), Canada lynx (Lynx canadensis) and fisher (Martes pennanti) (Carroll et al., 2001; Noss and Cooperrider, 1994; Sanderson et al., 2002). IRAs are strongholds for fish, including threatened salmonids and bull trout (Gucinski et al., 2001; Rhodes et al., 1994). They provide a safe haven for old and ancient trees that contribute unique evolutionary diversity having survived long cycles of environmental change (Cannon et al., 2022). Old-growth forests are a key component of IRAs and provide unique habitats for threatened species, and buffer sensitive species from warming (Betts et al., 2018; Piovesan et al., 2022).

IRAs are often located near existing reserves, thereby enhancing landscape connectivity of the larger reserve system. This proximity serves to increase the size of large intact habitats and reduce distance between core areas. Additionally, existing reserves tend to be at higher elevations than nearby IRAs that extend into adjacent lower elevation areas with unique wildlife habitats and ecosystem types (Aycrigg et al., 2016; Crist et al., 2005; Talty et al., 2020). Roadless areas that physically link existing reserves together safeguard system functionality that is of existential importance to wide-ranging species and critical to climate adaptation. IRAs expand ecoregional and elevational representation of the reserve system and increase the number of areas large enough to provide refugia for species needing large tracts of land relatively undisturbed by people (Develice and Martin, 2001). ... Present and future ecological integrity of existing reserves is ultimately intertwined with and bolstered by the roadless lands near to them.

...

Forest carbon and climate mitigation values

Because IRAs have been protected from road building, they contain a significant amount of mature and old-growth forests that were often targeted for logging in roaded areas of

national forests. Mature and old-growth forests with large trees play an outsized role in storing and accumulating carbon from the atmosphere, making them essential for climate change mitigation (Moomaw et al., 2019; Mildrexler et al., 2020; Law et al., 2022; Birdsey et al., 2025). A study of US forest carbon stocks found that IRAs hold 22% of the total mature forest carbon stock and 27% of the total old-growth carbon stock on national forest lands (Birdsey et al., 2025). In addition to their large, accumulated carbon stocks, mature and old forests provide co-benefits to biodiversity, water availability, and buffering climatic extremes linked to their ecological integrity and ecosystem functions (Frey et al., 2016; Perry and Jones, 2016; Moomaw et al., 2019; Mildrexler et al., 2023; DellaSala et al., 2025). IRAs are thus high-priority areas that could be strategically protected (GAP 1 or 2) to meet climate preservation targets of 30% protection by 2030, and 50% by 2050 (Law et al., 2021).

Medicine, food, and culture
Roadless areas play an important role in provisioning foods and medicines that support the nutritional, economic and cultural well-being of a large percentage of US citizens, especially among rural and Indigenous communities (Chamberlain et al., 2025).
...
Many IRAs are on the ancestral homelands of Tribes and hold spiritual, cultural, and ecological significance to Indigenous cultures (Vest, 1988).
...
Risks of rescinding the roadless rule
National forest roads - unmanageable and underfunded
With over 386,000 miles of roads on national forest lands, the USFS struggles to maintain a fraction of the existing road system. Deteriorating roads and road densities that exceed management standards degrade valuable ecosystem services, such as water quality and habitat security for wildlife (USDA, 2002; Wisdom et al., 2018).
...
Opening roadless areas to road building jeopardizes aquatic values
The exceptional aquatic values of IRAs are seriously threatened by road building. Negative consequences of roads include increased risk of sedimentation and debris slides, stream flow alterations, habitat fragmentation, invasion by exotic species, dispersal of pathogens, impacts on water quality such as chemical contamination, degradation of aquatic habitat, and other human actions (for example, trash dumping, illegal hunting, fires) (Gucinski et al., 2001; Wemple et al., 2018). Roads significantly elevate erosion and sediment delivery to streams (Gucinski et al., 2001; Kastridis, 2020). They disrupt subsurface flows essential to the maintenance of baseflows, and channel water into ditches and culverts, causing multiple negative impacts on water quality and hydrology of watersheds (Wemple and Jones, 2003; Wemple et al., 2018). Altogether, roads are one of the greatest sources of aquatic degradation for fish and other species (Rhodes et al., 1994). Water quality impaired by road systems and forest cover loss may require expensive restoration or water treatment systems to accomplish what intact watersheds do free of cost (DellaSala et al., 2011; Gucinski et al., 2001; Warziniack et al., 2017).
...
More roads lead to more wildfires
Although the rationale for rescinding the Roadless Rule to permit road building in IRAs is given as reducing wildfire risk, in fact, a wide body of research shows that the opposite is true (Aplet et al., 2026; Balch et al., 2017; DellaSala and Frost, 2001; Yang et al., 2006). Human-started wildfires are an increasingly costly and dominant driver of fire regimes in the US, with human-related ignitions concentrated near forest roads (Calef et

al., 2008; Faivre et al., 2014; Higuera et al., 2023; Narayanaraj and Wimberly, 2012; Syphard et al., 2025). A recent assessment of the impacts of roads on wildfire ignition density found that from 1992 to 2024, in all 8 contiguous-US Forest Service regions combined, the highest wildfire-ignition density was in lands within 50 m of roads (Aplet et al., 2026). The lowest wildfire ignitions were in designated Wilderness and IRAs (Aplet et al., 2026). Another study analyzed over 1.5 million fires across the US from 1992 to 2012 and found a significant increase in the frequency of human-caused wildfire ignitions, which accounted for 84% of all wildfires and 44% of total area burned (Balch et al., 2017). Human activities associated with roads alter fire regimes in three primary ways (Bowman et al., 2011). 1) Humans change the distribution and density of ignitions, with roads being a primary location where increased ignitions occur. 2) Humans shift the seasonality of burning by introducing ignitions into landscapes at times when natural starts from lightning are rare, but fuels are sufficiently dry enough to ignite and carry fire (Balch et al., 2017; Higuera et al., 2023). … 3) Humans alter available fuels especially along roadsides. Roads are strongly associated with the spread of invasive plant species in national forests (Healey, 2020), and invasive plants provide highly flammable vegetation to dry roadsides, where human-ignitions most frequently occur. …

…

Wilderness areas and IRAs are critical intact landscapes where natural fire regimes can function, which helps reduce fuel build-up, modulate future wildfire activity, and confer landscape resilience to climate change (Koch, 1935; Bradley et al., 2016; Johnston et al., 2021). Qualities that make these areas relatively good places to manage natural fire for resource benefit at relatively low risk, such as topographic complexity, and remote backcountry settings, also make them costly, difficult, and hazardous places for on-the-ground fire suppression activities (Dunn et al., 2020). Keeping IRAs intact and free from roads and emphasizing natural processes in these areas is an efficient, cost-effective, risk-reduction management strategy, particularly for an agency that is currently looking to reduce costs associated with land management and adapt ecosystems to a changing climate.

…

Logging in IRAs is damaging and uneconomic

Logging within IRAs runs counter to the urgent need to prevent forest degradation of intact forest ecosystems (Moomaw et al., 2019; Pan et al., 2024; Watson et al., 2016). The protection of Earth's remaining intact forests, including IRAs, is necessary to help humanity adapt to some of its greatest challenges – water security, climate change, and biodiversity loss. Moreover, directing limited agency resources toward costly and ecologically damaging backcountry logging takes resources away from areas where restoration is a higher priority, putting communities and ecosystems at greater risk. Logging activities in IRAs are far more costly to plan and implement compared with roaded areas (DeVelice and Martin, 2001; Hjerpe et al., 2017). For operators, the high cost of transport from relatively remote locations contributes to tight economic margins which spur more aggressive logging to offset costs, such as logging large-diameter trees. Logging large trees rapidly releases decades to centuries of accumulated carbon to the atmosphere worsening climate change and degrading forests (Law et al., 2021; Mildrexler et al., 2020, Mildrexler et al., 2023). Timber harvest in IRAs is misguided economic policy because it degrades roadless areas and the valuable ecosystem services they provide, exacerbates climate change, and redirects resources away from protecting communities.[54]

54 Mildrexler et al 2026. Roadless rule rescission threatens highest integrity forest ecosystems in the United States. Biological Conservation. Volume 321, September 2026, 111950. https://doi.org/10.1016/j.biocon.2026.111950.

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), as explained by The Wilderness Society --

> **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.[55]

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.[56] 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.[57]

The PNW Regional office issued a directive relative to uninventoried roadless areas, aka "undeveloped areas". This 11-24-04 memo from Lisa Freedman wisely instructs the Forest Service to give consideration to "special" features of undeveloped areas regardless of size. However, this memo also has some troubling instructions that deserve mention. First, the memo instructs Forests not to "establish a permanent identity or inventory for these areas" which not only interferes with efficient management of information and natural resources but also violates the NFMA mandate to maintain an accurate and up-to-date inventory of the renewable resources of the National Forests. The National Forest Management Act requires "the Secretary of Agriculture shall develop and maintain on a continuing basis a comprehensive and appropriately detailed inventory of all National Forest System lands and renewable resources. This inventory shall be kept current so as to reflect changes in conditions and identify new and emerging resources and values."[58] Second, Forests are instructed to focus their analysis on the "effects of the proposed activity where the effects occur rather than on identification or inventory of the undeveloped area." How can the effects of management be adequately disclosed

55 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.

56 http://web.archive.org/web/20010729111100/http://roadless.fs.fed.us/documents/feis/glossary.shtml.

57 USDA Forest Service 2000. National Forest Roadless Area Conservation FEIS.

58 16 U.S.C. 1603.

"where they occur" or anywhere else for that matter, UNLESS the qualities of the area are fully understood through identification and inventory. This memo essentially instructs the Forest Service to (i) routinely destroy factual information about resources under its management, and (ii) provide uninformed disclosure of the effects of proposed management action without collecting and considering contextual information about roadless/undeveloped areas that could be affected. If the Forest Service follows these instructions they will be violating NEPA, so don't do it.

The agency cannot limit its analysis of roadless areas to inventoried areas >5,000 acres, because smaller roadless areas that were not inventoried are ecologically relevant and potentially significant. The NEPA analysis must reflect the growing scientific evidence (cited below) indicating the significant value of roadless areas smaller than 5,000 acres and larger than 1,000 acres. Recent scientific literature emphasizes the importance of unroaded areas greater than 1,000 acres as strongholds for the production of fish and other aquatic and terrestrial species, as well as sources of high quality water. Commercial logging and/or road building within large unroaded areas threatens these significant ecological values.

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.... 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.... 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.[59]

Law et al (2022) make a strong case that conservation of intact forests advances the twin goals of protecting the climate and biodiversity, and that broad-scale thinning to reduce fire severity conflicts with climate and biodiversity goals.

> "While primary forests of all extents have conservation value, areas of greater extent warrant particular attention where they persist, as they support more biodiversity, contain larger carbon stocks, provide more ecosystem services, encompass larger-scaled natural processes, and are more resilient to external stresses. The significance of large areas of primary forests has been highlighted by the global mapping of Intact Forest Landscapes (IFL) greater than 500 km2 in extent. While suitable for many purposes, other thresholds may be more suitable at regional and national levels that reflect local ecological factors." (IUCN Policy Statement on Primary Forests, https://www.iucn.org/sites/dev/files/content/documents/iucn_pf-ifl_policy_2020_approved_version.pdf, accessed on 22 April 2020).

59 Letter to President Clinton from 136 scientists (Dec. 10, 1997). https://drive.google.com/file/d/0B4L_-RD-MJwrRzhFcm5QcFRoMHM/view?usp=sharing&resourcekey=0-2-sbGMN3bOUBQGGMDBQM1Q.

> ...
> Instead of regularly harvesting on all of the 70% of U.S. forest land designated as "timberlands" by the U.S. Forest Service, setting aside sufficient areas as Strategic Reserves would significantly increase the amount of carbon accumulated between now, 2050 and 2100, and reestablish greater ecosystem integrity, helping to slow climate change and restore biodiversity. The 2022 IPCC AR6 report stated that "Recent analyses, drawing on a range of lines of evidence, suggest that maintaining the resilience of biodiversity and ecosystem services at a global scale depends on effective and equitable conservation of approximately 30% to 50% of Earth's land, freshwater and ocean areas, including currently near-natural ecosystems (high confidence)." Continuing commercial timber harvest on a portion of the remaining public lands and tens of millions of hectares of private lands would continue to adequately supply a sustainable forestry sector. Preserving and protecting mature and old forests would not only increase carbon stocks and growing carbon accumulation, they would slow and potentially reverse accelerating species loss and ecosystem deterioration, and provide greater resilience to increasingly severe weather events such as intense precipitation and flooding.
> ...
> Many of the existing forest management practices allegedly protect forests and homes from wildfire and are having severe adverse effects on forest ecosystem integrity and resilience, and are worsening climate change and diminishing biodiversity.
> ...
> To summarize, harvest-related emissions from thinning are much higher than potential reduction in fire emissions. In west coast states, overall harvest-related emissions were about 5 times fire emissions ...[60]

Law et al (2022) describe a strategic reserve approach to protect water, biodiversity, and carbon in Oregon's forests. Existing unroaded areas could make a significant contribution to such an approach.

> Our study demonstrated that Oregon has high carbon density forests that also have high biodiversity and connectivity for species movement. When these characteristics were prioritized within each ecoregion, it identified sufficient forestland to meet both the 30% protection by 2030 and 50% by 2050 targets that are important nationally and internationally. ... the climate resilience rank highlights large areas within the ecoregions with larger landscape features that are important for resilience (Figure 2D), such as the topography of mountain ranges in southwest Oregon, the Coast Range, Cascades, and Blue Mountains in the northeast. ... Meeting the forest preservation targets would substantially increase protection of tree carbon stocks, animal and tree species' habitat, and surface drinking water source areas. ... Meeting these forest preservation targets would substantially increase forest habitat protection for threatened and endangered (T&E) species and other species of interest ... Mitigation strategies need to explicitly protect existing oldgrowth forests, and allow mature secondary forests to regrow to their carbon capacity. For climate mitigation using natural climate solutions, effectiveness is based on the time that a unit of biomass carbon is resident in a forest ecosystem stock and thus kept out of the atmosphere (Körner, 2017; Mackey et al., 2020). ... We also found that limiting harvest to half of current levels on public lands and doubling harvest cycles to 80 years on private lands was three times more effective as a land use strategy

[60] Law, Beverly E., William R. Moomaw, Tara W. Hudiburg, William H. Schlesinger, John D. Sterman, and George M. Woodwell. 2022. Creating Strategic Reserves to Protect Forest Carbon and Reduce Biodiversity Losses in the United States. Land Vol. 11, no. 5: 721. https://doi.org/10.3390/land11050721, https://www.mdpi.com/2073-445X/11/5/721/htm.

> than replanting and reforestation after cutting within current forest boundaries in Oregon (Law et al., 2018). … There is concern that protecting areas that are vulnerable to increased drought and fire will be ineffective, however, species diversity, and threatened and endangered species still need habitat, refugia and connectivity with other protected areas. Wildfires tend to be patchy, and a majority of trees survive low to mixed-severity fires (Halofsky et al., 2011) that can be critical habitat, and burned forests still retain the vast majority of their carbon (Hudiburg et al., 2009; Law et al., 2018). … Older forests in Oregon's watersheds exhibit greater water retention and improved late summer stream flows compared to managed plantations (Segura et al., 2020). Intact forests also tend to harbor more large and old trees, bolstering carbon stores and biodiversity services that large trees provide (Lutz et al., 2018; Plumtre et al., 2021). … The most important action Oregon can take to mitigate climate change, reduce biodiversity losses, and protect watersheds for drinking water is to set aside existing forests.[61]

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 described 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. … 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]
>
> …
>
> **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]
>
> …
>
> 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.
>
> …
>
> 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 … [p 110]
>
> … 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

[61] Law BE, Berner LT, Mildrexler DJ, Bloemers RO and Ripple WJ (2022) Strategic reserves in Oregon's forests for biodiversity, water, and carbon to mitigate and adapt to climate change. Front. For. Glob. Change 5:1028401. doi: 10.3389/ffgc.2022.1028401. https://www.frontiersin.org/articles/10.3389/ffgc.2022.1028401/pdf.

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]

...

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]

...

Because the distribution of many native fishes in Oregon's national forests has receded into steep headwater areas, USFS 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]

...

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/mi^2. 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.

Cumulative impacts are significant

The FS needs to prepare an EIS to consider the significant cumulative effects of all the recent wildfires, plus all the recent and proposed logging and roads in and near the planning area. There are also unaddressed cumulative effects from all the salvage logging and roads that has been and will be authorized under the National Post-fire Recovery EA.

Appendix C[62] of the Wildlife BE purports to describe cumulative impacts, but it addresses the whole forest, not this project area and the stands impacted by the fire, past logging, global climate change, etc.

The Forest Service must consider the additive effects of salvage logging, road construction, log hauling, activity fuel treatment (broadcast burning, pile burning, and mechanical fuel

62 https://app.box.com/s/obktqwcjoeiiowirmn44r369qrrmlisb/file/2482487668469

reduction), site preparation, tree planting, OHVs, as well as the cumulative effects of past logging, roads, wildfire effects, fight fighting, etc.

The agency cannot look at each category of environmental effect in isolation. Many effects interact resulting in compound risks that are greater than the sum of each effect viewed individually. Disclosure of cumulative impacts should include a description of the compounding effects of multiple factors that influence environmental values.

The analysis does not address the cumulative impacts of logging danger trees in areas with relatively high density of roads and private land boundaries.

New info on post-fire forest development and salvage trade-offs

New information shows significant adverse trade-offs caused by salvage logging related to soil, water, weeds, carbon/climate, fish, wildlife, recreation, scenic values, etc. The Wallowa-Whitman National Forest LRMP is outdated. Since the LRMP was adopted significant new scientific information has come to light indicating that forests are fire dependent, and that post-fire salvage logging, plus road building and conifer replanting, significantly interferes with development of complex forest conditions necessary to maintain viable populations of native wildlife that evolved in fire-affected forests with abundant dead wood. To minimize and mitigate the adverse effects on sensitive wildlife from altered fire regimes, Lindenmayer et al. (2025) recommend "minimizing the stressors that can co-occur with (and interact negatively with) altered fire regimes" such as post-fire salvage logging.[63]

Snag habitat needs better conservation

Snag and dead wood habitat in central Oregon is in short supply and will likely get worse as the snags from recent fires decay. Salvage logging will make a bad situation worse in terms of the "snag gap" that naturally occurs as a result of wildfire, regen logging, and other stand replacing disturbances. Wildlife evolved in a world with abundant snags and dead wood because the natural range of variability is based on virtually 100% of the trees that grow in the forest die in the forest and stay in the forest until they with burn or decay.

Large snags are severely under-represented in our forests and logging will capture, reduce and delay recruitment of future large snags. Korol et al (2002) estimated that even if we 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.[64] Wisdom et al (2008) found that

63 Lindenmayer, D., Zylstra, P., DellaSala, D. A., Taylor, C., & Legge, S. (2025). The response and management of species sensitive to altered fire regimes. *Nature Reviews Biodiversity*, 1-12. https://doi.org/10.1038/s44358-025-00086-1.

64 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.usda.gov/psw/publications/documents/gtr-181/049_Korol.pdf.

snag abundance in the Pacific northwest forests is inversely related to past harvest and proximity to roads. "Our highest snag density … occurred in unharvested stands that had no adjacent roads. … Stands with no history of timber harvest had 3 times the density of snags as stands selectively harvested, and 19 times the density as stands having undergone complete harvest. Stands not adjacent to roads had almost 3 times the density of snags as stands adjacent to roads."[65]

Current plan direction for protecting and providing snags and down wood is outdated and tends to be focused on a small subset of the full spectrum of values provided by dead wood and does not ensure the continued operation of these ecosystem functions or meet the complete lifecycle needs of the many species associated with this unique and valuable habitat component. The NEPA analysis needs to consider all the many values of snags and down wood presented in Rose et al. (2001).[66]

Dead trees have high ecological value and are in short supply. Counterintuitively, that dead tree shortage is made worse by the fire because large number of trees have died, and while dead trees may seem abundant now, those dead trees fall and decay, and they will not be replaced for 100 years, because there will not be a new cohort of large green trees to replace these dead trees until the trees that germinate after the fire grow large. Some of the dead trees removed by this project would persist and help fill the "snag gap" in future decades. The same large trees that the FS wants to remove because they have economic value are the trees most likely to persist. That means every large tree removed today may exacerbate the snag gap. The agency should strive to mitigate this adverse effect by balancing safety and ecological goals.

Bell et al (2021) confirm the long-term deficit of snag habitat, the critical role of federal lands in providing snag habitat, and note that federal management goals often conflict with efforts to reduce the snag deficit.

> Since the mid-20th century, anthropogenic stressors, such as timber harvesting, land conversion, and wildfire, have greatly reduced the extent of old-growth forests in Oregon and Washington (Bolsinger and Waddell 1993). Many wildlife species in this region rely entirely or in part on the availability of large live and dead trees …
> … Other management goals can conflict with the aim to increase snag densities, such as thinning to accelerate old forest conditions in moister forests (northwestern OR, western WA), and fuel reduction treatments in drier forests (southwestern OR, eastern OR and WA).
> …
> While we observed increases in areas supporting large live trees and snags during recent decades (Fig. 6), these changes in area were relatively small (Fig. 5) and are therefore unlikely to offset past losses for the region as a whole. We observed increases in area with large live trees and snags on federal lands, but not on nonfederal lands, indicating that those federal lands drive most of the regional changes. The reduction of forest area

65 Wisdom, M.J., and Bate, L.J. 2008. Snag density varies with intensity of timber harvest and human access. For. Ecol. Manage. 255: 2085–2093. doi:10.1016/j.foreco.2007.12.027. https://web.archive.org/web/20111024015158/http://www.fs.fed.us/pnw/pubs/journals/pnw_2008_wisdom001.pdf.

66 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.

supporting high densities of large live trees and snags since historical times and the lack of substantial increases during recent decades on all lands highlights major challenges to maintaining quality habitat for some wildlife species.

...

Conclusions

In part, the maintenance of forest biodiversity depends on the retention of existing and restoration of late-successional and older forest habitat for wildlife species to within natural or desired ranges. Our results indicate that the forests of Oregon and Washington have lost a substantial proportion of forests supporting large live trees and snags compared to reference conditions and that recruitment of these structural elements of wildlife habitat at regional scales is a slow process. ... Large quantities and diversities of dead wood structures are needed to maintain biodiversity in forest ecosystems (Sandström et al. 2019). Given that most forests supporting large live trees and snags are federally managed, these federal lands will be central to the conservation and management of large live trees and snags in the Pacific Northwest.[67]

Dead wood serves important watershed functions, such as building healthy soil, capturing/storing/releasing energy, water, and sediment. Dead wood is also a limiting factor for many wildlife species.[68] Removal of trees and fuels has adverse effects on future wood recruitment and will compromise watershed functions and wildlife habitat provided by dead wood in all its forms. The NEPA analysis needs to disclose this and consider mitigating alternatives.

The moisture-holding properties of dead wood are increasingly important in a warming climate. The South Cascades LSR Assessment (p 89) highlights --

> "the importance of down wood as water storage reservoirs. Decaying logs are sponge-like, and in the dry season hold almost twice as much water per unit volume as mineral soil (Perry 1991). Water is important to biological activity because it buffers temperature extremes. Moist logs are key habitat for many forest organisms. Late successional amphibians are associated with moist logs due to their susceptibility to desiccation and the abundance of prey - these logs are islands of invertebrate productivity."

Snags are not just nice to have, they are an essential feature of old forests. A stand of big trees without snags is not a healthy forest. The ICBEMP Scientific Analysis Group (SAG) review of selected terrestrial vertebrate populations used “large snag density as a proxy for the structural quality of old-forest habitats.” and the SAG found that

> Key model factors contributing most strongly to low environmental index values and low population outcomes—
>
> *Families 1 and 2 (Old-forest families)—*
>
> • Low recruitment of large snags composed of shade-intolerant tree species, such as ponderosa pine, western larch, and western white pine, as indexed by moderate and high HRV (Lewis’ woodpecker (migrant), pygmy nuthatch, flammulated owl), are the key factors contributing to low environmental index and low population outcomes.

---

67 David M. Bell et al 2021. Quantifying regional trends in large live tree and snag availability in support of forest management. Forest Ecology and Management 479 (2021). https://pdf.sciencedirectassets.com/271259/1-s2.0-S0378112720X0020X/1-s2.0-S0378112720313232/am.pdf.

68 Thomas, Jack Ward [Technical Editor] 1979. Wildlife Habitats in Managed Forests the Blue Mountains of Oregon and Washington. Agriculture Handbook No. 553. U.S. Department of Agriculture, Forest Service. 512 p. https://www.srs.fs.usda.gov/pubs/misc/agh553.pdf.

> • Low quality of old-forest structural conditions (lack of diversity of size and decadence of large trees, large snags, and large logs), as indexed by declining large snag and/or large log trends (northern goshawk [summer], American marten, hoary bat), are the key factors. …
>
> *Long-eared myotis (Family 7)—*
>
> • … decreasing snag trends (indexing low availability of roost sites) contribute to low environmental index and low population outcomes. …
>
> *Western bluebird (Family 8)—*
>
> • High HRV departure and declining large snag density (indexing a lack of shade-intolerant tree species recruited as snags) contribute to the low environmental index and low population outcomes.[69]

Wagenaar et al. (2025) found a positive relationship between dead wood and biodiversity --

> The most reported forest structure connected to biodiversity was deadwood volume. … The clear positive relationship between deadwood volume and biodiversity that was found by the reviews (Table 1) could be explained by deadwood creating many habitats and serving as a food substrate for many saproxylic species such as fungi, insects, and lichens … In addition, reviews found that vascular plants and bryophytes can use deadwood as a substrate to grow on … We also found a positive relationship between deadwood volume and the species richness and diversity of birds and bats (Table 1). These organisms can use deadwood as a feeding and nesting/roosting substrate and, additionally, forage on insects that live in the deadwood … Furthermore, some mammals and (litter-dwelling) invertebrates had a positive relationship with deadwood because they can use it as a shelter and can benefit from the moist environment that it creates … Many of the reviews reported that deadwood with a larger diameter can host more (red-listed) fungi, lichen, bryophyte, insect, bird, bat, mammal, amphibian, and vascular plant species because it contains more microhabitats, resources, moisture, and a stable microclimate with a slow decay … The latter results in habitat continuity which is especially important for immobile organisms that face more difficulties when colonizing a substrate (but see Komonen and Müller, 2018). However, Bouget et al. (2012) and Berger et al. (2013) found that there are also species that specialize on fine woody debris (FWD) which shows that not all species prefer deadwood with large diameters.[70]

Federal forest management also needs to mitigate for conditions on non-federal lands where dead wood is highly under-represented. The PNW Research Station reported that "Large snags and logs decreased on forest industry lands as legacy dead wood derived from historical natural disturbance events was not replaced through management. Conservation oriented policies designed to maintain or increase dead wood may have strong positive influence on large dead

---

69 Martin G. Raphael, Richard S. Holthausen, Bruce G. Marcot, Terrell D. Rich, Mary M. Rowland, Barbara C. Wales, Michael J. Wisdom, 2000. DRAFT Effects of SDEIS Alternatives on Selected Terrestrial Vertebrates of Conservation Concern within the Interior Columbia River Basin Ecosystem Management Project, March 2000, revised June 23 , 2000 and November 14, 2000.

70 Wagenaar, L. F., Olsson, O., Stjernman, M., & Smith, H. G. (2025). A systematic meta-review: The relationship between forest structures and biodiversity in deciduous forests. *Forest Ecology and Management*, *596*, 123072. https://doi.org/10.1016/j.foreco.2025.123072 pdf. [internal citations omitted].

wood abundance and related biodiversity in parts of a region also under intensive management."[71]

Almost all of the agencies' focal species use dead wood for important aspects of their life cycle. Pileated woodpeckers and cavity excavators use dead wood for nesting, foraging, and possibly communication. Goshawks, owls, and other raptors use dead wood for nesting, roosting, and to support a healthy prey base. Pacific fisher and American marten for denning, travel, cover, foraging, and prey base. Deer and elk use dead wood for cover and protection of bedding and fawning areas. Salmon, trout, and other aquatic species use dead wood for shade and stream cooling, hiding cover, spatial partitioning of habitat, energy dissipation, capture-storage-release of sediment and nutrients, and substrate and energy input for the food web that provides their food.

Experts recognizes at least 27 birds that nest in tree cavities in the Pacific Northwest.[72] Secondary cavity nesters include numerous species of conservation concern including the Pacific fisher, American marten, bufflehead, flammulated owl, western bluebird, Vaux's swift, northern flying squirrel, and several bat species, plus bears, amphibians, invertebrates, and many others. Approximately 31% of the total bird fauna of this region use snags for nesting and denning, foraging, roosting, communicating, and as hunting and resting perches. (Raphael and White 1984), so the importance of dead wood as a habitat element cannot be over-stated. Snags and down wood also serve several crucial ecosystem functions related to site productivity, nutrient storage & cycling, hydrology, geomorphology, disturbance, and habitat (terrestrial, riparian and aquatic).

In a dynamic ecosystem life may be fleeting but the snags and logs that survive disturbance provide very critical temporal links from one stand to the next. Under natural conditions, a forest hands down a large legacy of living and dead material from one stand to another even after an intense disturbance. Even non-stand-replacing disturbance creates pulses of dead material that are critical for forest ecosystems. See

1. Franklin, J.F., Lindenmayer, D., MacMahon, J.A., McKee, A., Magnuson, J., Perry, D.A., Waide, R., and Foster, D. 2000. Threads of Continuity. Conservation Biology in Practice. [Malden, MA] Blackwell Science, Inc. 1(1) pp9-16. https://andrewsforest.oregonstate.edu/sites/default/files/lter/pubs/pdf/pub2815.pdf;
2. William F. Laudenslayer, Jr., Patrick J. Shea, Bradley E. Valentine, C. Phillip Weatherspoon, and Thomas E. Lisle *Technical Coordinators*. Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests. PSW-GTR-181. https://www.fs.usda.gov/psw/publications/documents/psw_gtr181/psw_gtr181.pdf.
3. Lofroth, Eric. 1998. The dead wood cycle. In: Conservation biology principles for forested landscapes. Edited by J. Voller and S. Harrison. UBC Press, Vancouver, B.C. pp. 185-214. 243 p. http://www.for.gov.bc.ca/hre/deadwood/DTrol.htm.

---

71 Kennedy, R. 2010. Large dead wood in coastal forests projected to increase on federal land, decrease on private. *In* Mazza, Rhonda 2010. 2010 Science Accomplishments Report of the Pacific Northwest Research Station. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 88 p. http://www.treesearch.fs.usda.gov/pubs/37383.

72 Fran Cafferata Coe 2014. Cavity-Nesting Birds and Small Woodlands. Woodland Fish & Wildlife Project of the Western Forestry and Conservation Association. https://woodlandfishandwildlife.com/wp-content/uploads/2019/12/Cavity-Nesting-Birds-and-Small-Woodlands_reduced.pdf.

4. Rose, C.L., et al. 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) https://apps.fs.usda.gov/r6_decaid/legacy/decaid/pages/documents/Rose-et-al-2001.pdf.
5. Stevens, Victoria. 1997. The ecological role of coarse woody debris: an overview of the ecological importance of CWD in B.C. forests. Res. Br., B.C. Min. For., Victoria, B.C. Work. Pap. 30/1997. http://www.for.gov.bc.ca/hfd/pubs/docs/Wp/Wp30.pdf.
6. Hagar, Joan, 2007, Assessment and management of dead-wood habitat: USGS Administrative Report 20071054, pp. 1-32. http://pubs.usgs.gov/of/2007/1054/pdf/ofr20071054.pdf
7. Bruce G. Marcot; 2002. An Ecological Functional Basis for Managing Wood Decay Elements for Wildlife; USDA Forest Service Gen. Tech. Rep. PSW-GTR-181. https://web.archive.org/web/20121024180652/http://www.fs.fed.us/psw/publications/documents/gtr-181/068_Marcot.pdf.
8. Bruce G. Marcot 2017. Ecosystem Processes Related to Wood Decay. PNW Research Note 576. https://web.archive.org/web/20190701221558/https://www.fs.fed.us/pnw/pubs/pnw_rn576.pdf;
9. Jennie Sandström et al. 2019. Impacts of dead wood manipulation on the biodiversity of temperate and boreal forests. A systematic review, Journal of Applied Ecology (2019). DOI: 10.1111/1365-2664.13395. https://besjournals.onlinelibrary.wiley.com/doi/pdf/10.1111/1365-2664.13395.
10. Blue Mountain Native Forest Alliance. 199x. Problems Related to the Loss of Dead Wood. http://www.subtleenergies.com/ormus/bmnfa/DEADWOOD.HTM.

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 recently amended Eastside Screens changed the requirements for snag habitat in a way that offers no assurances of population viability. The 2021 Amendment to the Screens adopted a standardless approach to managing snags and green replacement trees, calling for the provision of *some* snags to meet the needs of *some* species, but without any assurances that enough snags (and green trees) will be maintained and recruited over time to ensure population viability for the wide variety of species which are most sensitive to the absence of abundant snags found in natural forests.

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.

"More recent empirical studies indicate that snag numbers and sizes selected by some wildlife species are far higher than those calculated using the maximum potential population method (Bull et al. 1997, Rose et al. 2001)."[73]

73 Deschutes NF 2025. Managed Stands Eastside Environmental Assessment. https://usfs-public.app.box.com/v/PinyonPublic/file/1925647535091

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.[74]

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),

74 Region 6 - USDA Forest Service. A Guide to the Interpretation and Use of the DecAID Advisor. June, 2006. https://web.archive.org/web/20161212221748/http://www.fs.fed.us/r6/nr/wildlife/decaid-guide/

American marten (*Martes americana*) (Bull et al. 2005), and fisher (*Martes pennanti*) (Zielinski et al. 2004).[75]

The agencies need to prepare a EIS to consider a replacement methodology for maintaining species and other values associated with dead wood. This is especially critical because adequate dead wood is recognized as an essential feature of healthy forests and the Forest Service has identified lots of "management indicator species" associated with dead wood habitat.

Back in the early 1990s the Forest Service recognized their forest plans were not adequate to maintain populations of spotted owls and they tried to develop plans to conserve spotted owl without following NEPA and NFMA procedures. The courts said they had to stop cutting owl habitat until they had complied with environmental laws. This is the same situation we find ourselves in today with dead-wood associated species. The agencies should stop harming dead wood habitat until they have a legal plan to conserve associated species over the long-term.[76]

Hazardous fuels are made worse by salvage logging and replanting

Post-fire landscapes are not a significant fire hazard and should not be a priority for large-scale fuel reduction. Modeling done by the University of Washington scientists shows that post-fire landscapes are by far the least hazardous fuel profiles not just in the short-term but for several decades after wildfire. If the agency is following the National Fore Plan they will prioritize fuel reduction in areas that are suffering from fire suppression, not areas that have just burned.[77]

In addition, salvage logging is likely to make fuel hazard worse, not better. Salvage logging, removing hazard trees, and replanting conifers will create hazardous fuel conditions in the form of homogeneous dense young conifer stands mixed with flammable brush. These risks are amplified by the well-documented elevated fire ignition risk near roads that will have hazardous fuels conditions due to logging and replanting. Rapid establishment of conifers is of particular concern. That is not how natural forests develop after fire. Natural fire recovery is slower and more diverse and is more likely to create heterogeneous forest and fuel conditions that are less prone to subsequent extreme fire.

There is little empirical support for the idea that salvage logging reduces the intensity or severity of subsequent fire. Recent data show an actual increase in fire severity where post-fire logging had occurred.[78]

---

75 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.usda.gov/pnw/pubs/journals/pnw_2010_marcot002.pdf.

76 *Seattle Audubon Society v. Epsy*, 998 F.2d 699, 704 (9th Cir. 1998) (an agency must re-examine its decision when the EIS "rests on stale scientific evidence and false assumptions").

77 C. Larry Mason, Kevin Ceder, Heather Rogers, Thomas Bloxton, Jeffrey Comnick, Bruce Lippke, James McCarter, Kevin Zobrist, Investigation of Alternative Strategies for Design, Layout and Administration of Fuel Removal Projects; Rural Technology Initiative; July 2003; http://www.ruraltech.org/pubs/reports/fuel_removal/. See especially Appendix B, pages 13 and 14.

78 McIver, James D.; Starr, Lynn; [Technical Editors] 2000. Environmental effects of postfire logging: literature review and annotated bibliography Gen. Tech. Rep. PNW-GTR-486. Portland, OR: U.S. Department of Agriculture,

A scientific study of post-fire logging by McIver and Ottmar (2007) showed that salvage logging causes a four-fold increase in fine fuels and that increase can last for 15 years. Fine fuels tend to cause wildfires to rapidly spread which is more likely to kill young trees and set back forest recovery. Unlogged fire areas (the controls) had lower levels of fine fuels but had higher levels of large fuels. Large fuels do not tend to exacerbate the spread of fire but they can heat the soil. However, soil heating is a patchy phenomenon that forests have evolved with and can tolerate. Retaining the large wood is also important for wildlife habitat and soil conservation. The scientific consensus in the fuel management literature is that it is more important to control small fuels.[79]

Recognizing that small fuels are the most hazardous and large fuels are the least hazardous, the best way to summarize the effects of salvage logging is to say that it increase fuel loads and fire hazard for several years, followed by a 40 year shortage of large woody habitat. Peterson et al. (2015) found:

> Our study examined fuel succession patterns by surveying downed woody fuels across a chronosequence of dry coniferous forest stands that burned with high fire severity (95–100% overstory tree mortality) within mixed- and high-severity wildfires in eastern Washington and Oregon, USA, between 1970 and 2007. We sampled forests in which ponderosa pine (*Pinus ponderosa*) and Douglas-fir. (*Pseudotsuga menziesii*) are the dominant early-seral tree species … Relative to unlogged stands, post-fire logging initially increased surface woody fuel loads, increasing small diameter fuel loads by up to 2.1 Mg/ha during the first 5 years after fire and increasing medium diameter fuel loads by up to 5.8 Mg/ha during the first 7 years after fire. Logging subsequently reduced surface woody fuel loads, reducing large diameter fuel loads by up to 53 Mg/ha between 6 and 39 years after wildfire … The initial pulse of elevated surface fuels in logged stands was expected under our first hypothesis. Post-fire logging transfers woody debris in tree branches and tops from the canopies of fire-killed trees to the forest floor, producing well-documented conditions of higher surface woody fuels in logged stands than in unlogged stands in the first 1–4 years following logging (Donato et al., 2006, 2013; McIver and Ottmar, 2007; Monsanto and Agee, 2008; Keyser et al., 2009). Higher amounts of surface woody fuels – especially small and medium diameter woody fuels – can increase short-term fire hazards in logged stands by increasing potential rate of spread and fire-line intensity … Post-fire logging was most effective for reducing large diameter surface fuels, consistent with our second hypothesis. By removing tree boles, post-fire logging reduced maximum large diameter fuel loadings and produced a long

---

Forest Service, Pacific Northwest Research Station. 72 p. http://www.fs.usda.gov/pnw/pubs/gtr486.pdf; Harma K., and P. Morrison. 2002. Analysis of Vegetation Mortality and Prior Landscape Condition, 2002 Biscuit Fire Complex. Pacific Biodiversity Institute. http://web.archive.org/web/20060518211529/http://www.siskiyou.org/issues/pbivegetative.pdf; Dennis C. Odion, Evan J. Frost, James R. Strittholt, Hong Jiang, Dominick A. Dellasala§, And Max A. Moritz. 2004. Patterns of Fire Severity and Forest Conditions in the Western Klamath Mountains, California. Conservation Biology. Volume 18 Issue 4 Page 927 - August 2004. http://www.blackwell-synergy.com/links/doi/10.1111/j.1523-1739.2004.00493.x.

79 J.D. McIver, and R. Ottmar. 2007. Fuel mass and stand structure after post-fire logging of a severely burned ponderosa pine forest in northeastern Oregon. Forest Ecology and Management. Volume 238, Issues 1-3 , 30 January 2007, Pages 268-279. http://www.sierraforestlegacy.org/Resources/Conservation/FireForestEcology/SalvageLoggingScience/Salvage-McIver07.pdf.

> period of reduced large diameter fuels, including both sound and rotten fuels. Although large diameter fuels may contribute little to fire spread rates (Hyde et al., 2011) and are typically disregarded in fire behavior modeling ….[80]

This study showed that salvage logging is most effective at reducing large fuels, which contribute least to fire hazard, but the study strangely failed to consider the effect on habitat. Reducing large wood for 40 years or more will have a significant adverse effect on wildlife habitat. It is also notable that this study focuses on fuels, but failed to note whether any of the numerous fire areas they looked at across Oregon and Washington had actually reburned. Studies that have looked at this issue, show that the risk of reburn (with or without salvage logging) is small, while the risk to wildlife from salvage logging is great.

Similar results were found in a "NecroDynamics" model that looked at 7 fires in the eastern slopes of the Oregon Cascades, the same landscape as this project.

> Salvage logging immediately increased surface fine woody fuel loadings by 160–237% above maximum loadings observed in unmanipulated stands, and were higher during the initial 18–22 years post-fire … [O]ur modeling results suggest salvage logging has mixed effects on reducing hazardous fuel conditions since it increases fine woody fuel loadings and decreases coarse woody fuel loadings. … [P]rescriptions can be altered. For example, [to] retain a higher abundance of snags which would reduce the magnitude of difference in fine woody fuels between salvaged and unmanipulated stands during early in post-fire succession …. Although salvage logging reduces coarse woody fuel loadings, alone it does not mitigate re-burn hazard because it increases fine woody fuel loadings …. Additionally, intensive reforestation typically substitutes conifer biomass for shrub biomass, limiting hazardous fuels reduction unless additional efforts are employed … Understory woody vegetation reestablishes rapidly in these dry-mixed conifer forests (Dunn and Bailey, in press) and can be a highly-flammable fuel layer (Weatherspoon and Skinner, 1995), as well as a source of post-fire fine woody fuels when shrub crowns die (Table 4). This suggests salvage logging alone will not mitigate contributions to re-burn hazard from dead biological legacies when the temporal dynamics of multiple fuelbeds (e.g. fine woody fuels, coarse woody fuels, and regenerating vegetation) are evaluated. R … Salvage logging to enhance ecosystem resilience may not be appropriate if multiple ecosystem functions and resources are considered, including; coarse wood use by wildlife (Cahall and Hayes, 2009; Hutto, 1995; Fontaine et al., 2009; Saab et al., 2005), functional attributes of early seral vegetation (Swanson et al., 2010), compounding effects on soil and nutrient pools (Brais et al., 2000; Triska and Cromack, 1980) and reduced water and carbon storage (Harmon et al., 1986).[81]

Notably, the authors suggested modifying salvage logging prescriptions to retain more snags, which would help retain fine fuels in the canopy longer and reduce the amount of fine fuels that are moved from the canopy to the ground.

---

80 Peterson, David W.; Dodson, Erich K.; Harrod, Richy J. 2015. Post-fire logging reduces surface woody fuels up to four decades following wildfire. Forest Ecology and Management. 338: 84-91. http://www.treesearch.fs.usda.gov/pubs/48822

81 Christopher J. Dunn, John D. Bailey 2015. Modeling the direct effects of salvage logging on long-term temporal fuel dynamics in dry-mixed conifer forests. Forest Ecology and Management 341 (2015) 93–109. http://www.sierraforestlegacy.org/Resources/Conservation/FireForestEcology/SalvageLoggingScience/Dunn&Bailey2015.pdf.

A large study of instances where reburn did occur found that past fire helps moderate future fire for up to 20 years, though there are a lot of complex variables. Tortorelli, et al. (2024) said:

> In forests that historically experienced frequent-fire regimes, high-severity fire exacerbates the severity of subsequent fires by increasing prevalence of shrubs and/or by creating drier understory conditions. Low- to moderate-severity fire, in contrast, can moderate future fire behavior by reducing fuel loads. … Previous fire moderated reburn severity in all ecoregions with the strongest effects occurring in the California Coast and Western Mountains and the average duration of moderating effects ranging from 13 years in the Western Mountains to >36 years in the California Coast. The strength and duration of moderating effects depended on climate and initial fire severity in some regions, reflecting differences in post-fire fuel accumulation. … Moderating effects were largely robust to fire weather, suggesting that previous fire can mediate future fire severity even under extreme conditions.[82]

The FS needs to take a hard look and disclose that NOT salvage logging (e.g., natural recovery) may have some countervailing benefits in terms of fire risk and reburn potential, including: (a) large logs store water, (b) standing snags provide some shade, (c) regrowth tends to be more patchy and less dense and continuous, (d) fuels in the form of branches and dead trees fall to the ground slowly over time and have a chance to decay as they added, (e) falling snags over time ten to break up the continuity of fuels in the form of brush and reprod.[83]

Conserve large trees to meet legal requirements

Large snags provide disproportionate ecosystem services and should be retained unless they pose an imminent public safety risk with 100 feet of roads. The LRMP as amended by the 2021 Large Tree Amendment requires retaining trees >20" dbh or conduct a science based analysis of species ecological requirements,[84] but this project fulfills neither requirement in clear violation of the LRMP and NFMA.

---

82 Tortorelli, C. M., Latimer, A. M., & N. Young, D. J. 2024. Moderating effects of past wildfire on reburn severity depend on climate and initial severity in Western US forests. *Ecological Applications*, e3023. https://doi.org/10.1002/eap.3023, https://esajournals.onlinelibrary.wiley.com/doi/epdf/10.1002/eap.3023.

83 Salvage typically removes the largest logs that act as water "reservoirs" and are least prone to drying. *See* Amaranthus, M.P.; Parrish, D.S.; and D.A. Perry. 1989. Decaying Logs as Moisture Reservoirs After Drought and Wildfire. In: Alexander, E.B. (ed.) Proceedings of Watershed '89: Conference on the Stewardship of Soil, Air, and Water Resources. USDA-FS Alaska Region. RIO-MB-77. p. 191-194. Pdf. This study found that large down logs in a post-fire landscape contain 25 times more moisture than the surrounding soil. While the authors recommended preventing large accumulations of "woody residue" (which the author described as very small diameter material--branches, twigs, etc.), they also recommended leaving down logs after fires to PREVENT future fire severity. They concluded that, "When forest managers are analyzing for fire risk, they should take into account the high water content of fallen logs during the period in which wildfire potential is greatest… Fallen trees, in a range of decay classes, therefore provide a long-term reservoir of moisture. A continuous supply of woody material left on the forest floor, not only protects the productive potential of the forest soil, but also provides a sanctuary for ectomycorrhizae and a significant source of moisture in the event of prolonged drought or wildfire." The study was conducted in the Klamath region in an area with roughly 40 inches of annual rainfall. It was published in 1989 in Proceedings of Watershed '89: a conference on the stewardship of soil, air and water resources. USDA Forest Service, Alaska Region: pp. 191-194 (1989).

84 https://usfs-public.app.box.com/v/PinyonPublic/file/935342313298 ("Maintain all snags > 20 inches (or whatever is the representative DBH of the overstory layer if it is less than 20 inches) OR complete a snag analysis using the best available science on species ecological requirements as applied through current snag tools, models, or other

Because large snags last much longer than small snags, large snags are disproportionately valuable as wildlife habitat, nutrient and water reservoirs, soil stabilizers, etc. If the agency chooses to conduct a salvage operation in this fire area, they must use a diameter cap and protect these scarce and valuable forest structures. Bull (1994) said:

> … if the objective were to salvage stands, yet retain as much wildlife value as possible for each watershed. Given this objective in a salvage operation, leaving live trees that provide forage for many birds and mammals, nest sites for raptors, replacements for snags, and cover and shelter for most forest birds is critical. Large-diameter snags (> 20 inches d.b.h.) should be left because these trees are in short supply, are least likely to be replaced, and are preferred for woodpecker nest sites. At least 40 logs per acre should be left, preferably > 15 inches d.b.h. These logs provide foraging habitat for woodpeckers, cover for mammals, and nest sites for ants. Hollow, standing cull trees should be left because species like the Vaux's swift, bats, woodpeckers, and mammals depend on them. Their value can be demonstrated by the fact that a pair of Vaux's swifts every day feed their nestlings 4000 to 7000 insects, including western spruce budworm (Bull and Beckwith, in press). These recommendations suggest that salvage operations should concentrate on removing the smaller dead trees, smaller logs, and fine fuels other than those on the forest floor. The remaining live trees and large snags and logs will pose much less fire hazard than if the reverse is done.[85]

In Congressional testimony, Jerry Franklin highlighted the value of large snags and down wood created by natural disturbance events -

> The larger and the most decay resistant snags and logs are the most important ecologically. Larger snags and logs will serve a large array of organisms and functions than smaller snags and logs as well as persist longer. For example, large snags are necessary for large cavity excavators, such as the Pileated Woodpecker and large logs are critical elements in creating stable aquatic habitat. *Large snags and logs of decay-resistant species--such as cedars and Douglas-fir—can also persist and fulfill habitat and other ecological functions for several centuries in terrestrial environments or even millennia, in the case of stream and river ecosystems.*[86]

Since large snags last longest, if large trees are retained, maybe the temporal gap in snag habitat will be partially mitigated.[87] "Parrish et al. (2010) reported that while small diameter Douglas-fir (<4" dbh) snags fall somewhat quickly in coastal British Columbia, those 20" and larger had a

---

documented procedures to maintain or increase diverse snag composition, size, structure, and distribution (i.e. groups or clusters) for a diverse composition of wildlife species and ecological site conditions.").

85 Evelyn L. Bull 1994. CONSERVING WILDLIFE HABITAT, *in* Eastside Forest Ecosystem Health Assessment; Volume IV. Everett, Richard L., comp. 1994. Restoration of Stressed Sites, and Processes. Gen. Tech. Rep. PNW-GTR-330. Portland, OR: USDA, Forest Service, Pacific Northwest Research Station. https://web.archive.org/web/20081008193259/https://www.fs.fed.us/pnw/pubs/pnw_gtr330.pdf.

86 Dr. Jerry F. Franklin, Professor of Ecosystem Studies, College of Forest Resources, University of Washington. July 15, 2004. TESTIMONY FOR THE RECORD ON OVERSIGHT HEARING ON "RESTORING FORESTS AFTER CATASTROPHIC EVENTS" BY HOUSE COMMITTEE ON RESOURCES, SUBCOMMITTEE ON FOREST AND FOREST HEALTH. https://www.govinfo.gov/content/pkg/CHRG-108hhrg94996/html/CHRG-108hhrg94996.htm.

87 Everett, Richard et al. 1999. Snag Dynamics in a Chronosequence of 26 Wildfires on the East Slope of the Cascade Range Washington State, USA. International Journal of Wildland Fire. 9(4) 223-234 (1999). http://web.archive.org/web/20041101184206/http://www.fs.fed.us/pnw/pubs/journals/snag.pdf

very high probability (>0.9) of standing for at least 50 years."[88] A study conducted in the Black Hills National Forest found that 1) Wildlife disproportionately forage on large diameter snags; 2) Cavity nesters disproportionately utilized large diameter snags for nesting; 3) Cavity nesters were less abundant (usually absent in this case) in managed forest because of the scarcity of large diameter snags; and 4) Logging and thinning has led to serious shortages of large diameter snags.[89]

Historically, a mosaic of recent and not-so-recent fires, left lots of "snag patches" and patchy accumulations of down wood of various sizes and decay-stages. These snag patches provided tremendous habitat value for a whole host of wildlife species, include birds, mammals, amphibians, insects. 96 species are known to be associated with snags and 86 species are associated with down wood. Most of these species depend upon or prefer large snags and wood. With aggressive salvage policies that continue to this day, these snag patches are an under-represented feature on the landscape.

The agency's outdated snag retention guidelines are based on the needs of a few life needs of a few wildlife species, but fail to consider or analyze the need to retain large snags and large down logs to meet other life needs or to provide ecological functions such as shade, water storage, disturbance (via falling and sliding), nutrient storage, channel forming, sediment trapping, soil conservation, underground processes, etc.

The Eastside Screens prohibit removal of large trees that are dying. The 9th Circuit Court of Appeals which governs this region had occasion to consider the question of " what is a dead tree" in the School Fire Salvage case.

> The Appeals Court reasoned that in the absence of an adopted technical definition of "live trees," the common understanding of the word "live" from the Merriam Webster's Collegiate Dictionary (10th ed. 1993) meant "to be alive," which meant "not dead," and concluded "the common meaning of the term 'all live trees' is all trees that have not yet died." Opinion at 12. Thus, according to the Appeals Court, dying trees designated for harvest were not yet dead, and remained "live" for the purposes of the Eastside Screens. The Appeals Court remanded the case to the District Court to issue an injunction consistent with its findings. The District Court issued an injunction on February 14, 2007, requiring that "The Forest Service shall not harvest from the three timber sales areas any "live tree" > 21 inches dbh." This includes any tree of requisite size with green needles or that is not yet dead." District Court Order at 2.

Record of Decision for the School Fire Salvage Project, Umatilla National Forest. 6-11-07. http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5211932.pdf.

When attempting to predict the mortality of trees that are not yet dead, the Forest Service cannot predict with accuracy which trees will die and which trees will survive, so guessing will unavoidably cause the loss of live trees that would otherwise survive and jump-start to the

88 USFS 2021. Vegetation Specialist Report for the Adapting the Wildlife Standard of the Eastside Screens Final EA. P 40. https://www.fs.usda.gov/project/?project=58050.

89 D.J. Spiering, R.L. Knight. 2005. Snag density and use by cavity-nesting birds in managed stands of the Black Hills National Forest. Forest Ecology and Management 214 (2005) 40–52. http://www.sciencebuff.org/content/files/science-staff/spiering_knight_2005.pdf (Note: "large" snags in this study were >48 cm, or 19" dbh). The agency should consider the significant implications of this study. Large snags are critically important for species viability, yet further loss of large snags (such as that caused by this project) will make a bad situation worse.

recovery of the fire-affected forest.

ABSTRACT: Wild and prescribed fire-induced injury to forest trees can produce immediate or delayed tree mortality but fire-injured trees can also survive. ... We used data from 4024 ponderosa pine (Pinus ponderosa Dougl. ex Laws.) and 3804 Douglas-fir (Pseudotsuga menziesii (Mirb.) Franco) trees from 23 fires across Oregon and Washington to assess the discriminatory ability of 21 existing logistic regression models and a polychotomous key (Scott guidelines). We used insights from the validation exercise to build new models for each tree species and to identify fire-injury variables which consistently produce accurate mortality predictions. Only 8% of Ponderosa pine and 14% of Douglas-fir died within 3 years after fire. The amount of crown volume consumed, the number of bole quadrants with dead cambium and the presence of beetles were variables that classified most accurately, but surviving trees in our sample displayed a wide range of fire injury making the accurate classification of dead trees difficult. For ponderosa pine, our new model correctly classified 99% of live trees and 12% of dead trees while the Malheur model (Thies et al., 2006) correctly classified 95% of live trees and 24% of dead trees. The Scott guidelines accurately predicted at least 98% of live ponderosa pine trees but less than 2% of dead ponderosa pine. For Douglas-fir the Scott guidelines accurately predicted at least 80% of live trees and generally less than 10% of dead trees.

...

We calculated the overall correct classification rate as the percent of correctly classified live and dead trees out of all classified trees and the overall error rate as the percent of incorrectly classified trees. We calculated sensitivity (percent of dead trees correctly predicted to be dead) and specificity (percent of live trees correctly predicted to be alive). We also calculated the correct mortality prediction rate as the percent of truly dead trees out of the total number of trees predicted to be dead and the incorrect live prediction rate as the percent of dead trees incorrectly predicted to be alive. The two types of misclassification errors, dead trees predicted as live (1-Sensitivity) or live trees predict as dead (1-Specificity), are inversely related.

...

Ponderosa pine. Direct application of previously published models to trees from wildfire or prescription fire resulted in a wide range of discriminatory ability for ponderosa pine, from 52% to 77%.

...

Douglas fir. ... Over all models, there was a wide range of average discriminatory ability (AUC), from slightly above 50% (Ryan and Amman, 1994) to over 80% (Hood et al., 2008). For some models (e.g., Kobziar et al., 2006; Ryan and Amman, 1994) the lower confidence limit indicates that the average discriminatory ability can be only slightly better than a coin toss.

...

Error rates. The error rates for the Scott guidelines and our logistic regression models were similar. In general, a large proportion of our live trees demonstrated a wide range of fire injury and live trees had significant amounts of fire injury. This resulted in low error rates when classifying live trees but high error rates (>80%) when classifying dead trees.

... [I]n salvage operations, managers must assess the relative cost of predicting a dead tree as live (resulting in a loss of revenue) versus predicting a live tree as dead (resulting in salvage logging of live trees).

... [T]he range of fire injury for trees which survive for 3 years is surprisingly wide.

... The two types of errors that can occur (i.e., falsely predicting a dead tree will live and

falsely predicting a live tree will die) come with different costs to land managers … Lisa M. Ganio, Robert A. Progar. 2017. Mortality predictions of fire-injured large Douglas-fir and ponderosa pine in Oregon and Washington, USA. Forest Ecology and Management. Volume 390, 15 April 2017, Pages 47-67. https://doi.org/10.1016/j.foreco.2017.01.008. Basically, these models are good for predicting which trees are going to live, but bad at predicting trees are going to die.

This information needs to inform the effects analysis and reasonable alternatives that retain more and larger snags.

Modify site prep and replanting to meet multiple objectives

The Forest Service proposes extensive replanting of conifers which typically requires extensive site preparation. Site preparation can involve significant soil disturbance and loss of valuable woody structure. All of these activities cause significant trade-offs including:

- soil disturbance that causes erosion and stimulates weeds,
- loss of water holding capacity in both soil and wood,
- carbon emissions (from fragmenting and burning wood and from forgoing natural forest recovery with more diverse vegetation and more stable carbon),
- control of competing vegetation that includes natives species valuable for forage, cover, pollination, nesting, nuts/seeds/berries, etc., and
- establishment of dense young conifer stands that pose a significant fuel hazard.
-

We urge the agency to carefully consider how replanting can be adjusted to minimize and mitigate adverse effects on complex early seral habitat, for instance:

- consider relying on natural regeneration;
- replant only where natural seed sources are far away;
- leave unplanted "skips" within planting areas;
- plant in a highly variable, clumpy, gappy pattern;
- plant at low density, so that future thinning entries are not needed;
- plant diverse species and diverse genetic stock (especially important considering climate change);
- minimize soil disturbance and avoid weeds;
- retaining complex dead wood structure (retain all snags, leave dead/down wood in patches, leave some fuel piles unburned, etc.).

Science shows that natural regeneration is adequate to restock conifers even in large high severity burn patches. Hanson et al (2021): "In our analysis the percentage of plots lacking conifer regeneration decreased significantly with larger plot sizes, a finding contrary to previous studies which assumed vast "deforested" areas in wildland fires, a bias created by small plot size. We found higher conifer regeneration closer to live-tree edges, but we consistently found natural post-fire conifer regeneration at all distances into interior spaces of large high-severity fire patches, including >300 m from the nearest live trees. Distance from live-tree edges did not affect pine dominance in post-fire regeneration."[90]

90 Hanson CT and Chi TY (2021) Impacts of Postfire Management Are Unjustified in Spotted Owl Habitat. Front. Ecol. Evol. 9:596282. doi: 10.3389/fevo.2021.596282. https://www.frontiersin.org/journals/ecology-and-evolution/articles/10.3389/fevo.2021.596282/pdf.

New science shows that automatic tree planting after fire can be counter-productive. Allen (2022):

> … the results of this study suggest that some earlier replanting efforts may not have been needed, such as a 2010 replanting at the site of the 2008 Gnarl Ridge Fire on Mt. Hood. "That was probably unnecessary," says Busby. "What we saw in the field and modeling work that we did suggest that the natural regeneration in that area was sufficient, and it's possible the replant has compounded tree density in a negative manner for forest resistance to fire, drought, insects and pathogens."
>
> Results and techniques from this study can now be used by forest managers as a new tool to pinpoint where natural tree regeneration is likely or unlikely to occur after fires. This will prevent overplanting, which can be needlessly expensive and actually place forests at increased risk of future fires.[91]

This project should be adjusted to reflect the growing recognition of the ecological and social value of complex early seral habitats which are promoted by delayed re-establishment and dominance of conifers after disturbance.

Complex early seral habitat, with diverse vegetation, as well as retaining some structure remaining after previous entries, often provides important ecological value to a wide variety of wildlife including big game, birds, insects, small animals, plants and wildflowers, butterflies, etc.

Complex early seral habitats are now relatively uncommon as a result of many decades of timber dominant forestry, with regeneration harvest, fire suppression, salvage logging, and conifer replanting.

This project could be made more beneficial to the creation of complex early seral habitat by dropping areas from planting entirely when they have a nice existing complement of diverse vegetation. Please minimize efforts to control competing native vegetation.

Another option is to replant at very low densities or in a very clumpy-patchy-gappy pattern to allow existing non-conifer vegetation more time in the sun. Try to avoid homogenizing tree densities.

The agency should be willing to accept delayed conifer re-establishment. Slow progress toward conifer dominance is not a failure of forestry, but a boon to biodiversity.

The diversity and complexity of naturally established early seral forests are both resilient to climate change and help store a lot of carbon. Bormann et al. (2015): "Fifteen years of growth of shrubs and hardwood trees in the Early-seral plantation was remarkable, resulting in total aboveground biomass increment (18 Mg/ha/yr) double that of the Douglas-fir plantations."[92]

---

91 Summer Allen June 9, 2022. PORTLAND STATE STUDY SHOWS HOW 'GREEN ISLANDS' HELP FORESTS REGENERATE AFTER FIRE. https://www.pdx.edu/news/portland-state-study-shows-how-green-islands-help-forests-regenerate-after-fire.

92 Bernard T. Bormann, Robyn L. Darbyshire, Peter S. Homann, Brett A. Morrissette, Susan N. Little. 2015. Managing early succession for biodiversity and long-term productivity of conifer forests in southwestern Oregon. Forest Ecology and Management 340 (2015) 114–125

Danger tree removal and fuel removal are excessive

The FS intends to remove fuels and danger trees along roads, within harvest areas, and maybe within replanting areas that may pose a hazard to the public and workers. Some hazard tree removal of needed, but the FS should consider several adjustments to reduce the adverse trade-offs and better balance ecological values and safety concerns. Roads that receive little use from the public, such as ML1 roads, do not need to be treated. The FS should scale back the roadside logging to focus on high use roads let nature take its course on ML1 roads and close them. Trees more than 100 feet from roads are statistically unlikely to fall and hit the road, so the roadside treatments can be narrowed.

The Forest Service's one-size-fits- all approach to danger trees is not supported by the evidence. Eliminating every hazard is not necessary or desired. The agency and the public willingly accepts some level of hazard, especially when they visit wild lands.

- The objective of public safety is laudable, but there are gradations of risk based on characteristics of the site and the tree and the type and amount of public exposure, so felling of hazard trees must be balanced against other important objectives such as wildlife habitat, carbon storage, water quality/stream shade, etc.
- Clearing large areas along an extensive road system can have significant negative cumulative impacts such as: soil degradation from heavy equipment operating off roads and biomass removal, water quality degradation from heavy equipment affecting ditches that convey water to streams; cumulative loss of habitat associated with snags, down wood, and diverse early seral vegetation; accelerated carbon emissions; increased fire hazard associated with fire ignition risks, and plantation fuel structure; habitat fragmentation and loss of habitat connectivity caused by increasing the width of non-habitat associated with roads; etc.
- The agency should be more risk tolerant and retain more trees in sensitive areas, such as unroaded areas, riparian areas, and mature and old-growth stands and conservation areas.
- The agency can also be more risk tolerant because some agents of tree decay such as heart rot can coexist in living trees for hundreds of years.[93]
- To protect soil and water quality and vegetation diversity, heavy equipment should not be allowed off of roads.
- USFS Roads Policy requires the agency to use an open, public roads analysis process to balance competing interests involved in roads management including public safety and environmental values, and the policy urges the agency to focus maintenance work on the roads that get the most use, and emphasizes decommissioning of roads where environmental conservation should take priority, and "If necessary for environmental protection and due to lack of funding, travel on classified roads may need to be restricted or closed."[94] The careful weighing of interests required to perform careful roads analysis means that it is not appropriate to categorically exclude danger tree removal projects from NEPA.
- The agency should consider alternative means of managing hazards from falling trees:

---

https://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/55627/MorrissetteBrettForestryManagingEarlySuccession.pdf.

93 Katherine Latham 2021. The Lost Generation of Ancient Trees. 8th September 2021. https://www.bbc.com/future/article/20210908-the-lost-generation-of-ancient-trees.

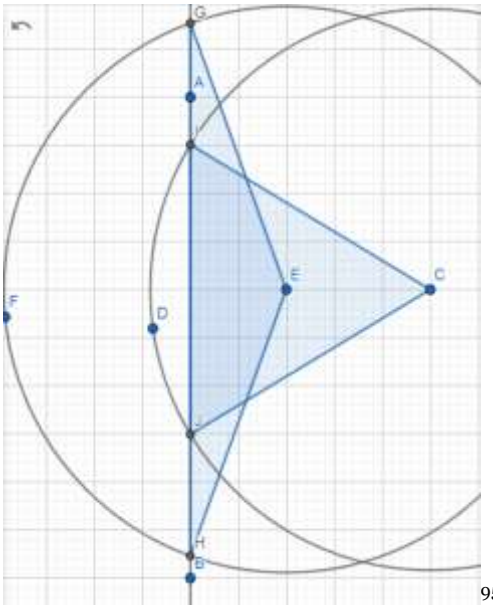
94 USFS Road Management Policy. https://www.fs.usda.gov/nfs/11558/www/nepa/115185_FSPLT3_5597368.pdf.

    - Minimize human activities near hazard trees (e.g., closing roads). This may not work where a hazard trees is adjacent to a high traffic road, but some little used roads can be closed. Analyze whether spurs or overgrown roads truly receive public use that justifies hazard tree removal;
    - Temporarily limit the use of roads that cannot be permanently closed until the risk of falling trees is naturally reduced;
    - Top trees, rather than kill them, if shortening them would reduce the chance they would reach the road if they fell;
    - Place signage warning people of post-fire hazards, particularly on roads that are infrequently used. This way people can evaluate the risks for themselves;
    - Often the hazard is not from the tree falling directly on people, but from cars colliding with trees that have previously fallen. This hazard can be mitigated with signage and speed limits, while allowing valuable wildlife trees to persist;
    - Prohibit cutting live, green trees, since all surviving trees are helping to rebuild the below-ground ecosystem, stabilize soils, and serve a valuable role as legacy structure and a recruitment pool for future large trees and snags;
    - Focus tree removal on imminent danger or hazard trees located within striking distance of high use areas, such as developed sites, parking lots, and paved roads. Wherever possible, use hazard trees for restoration of streams and placement in nearby stands that lack large wood;
    - Where they do not pose an immediate threat to safety, all trees presumed to be dying should be treated as live until they are dead, so as to not lose the ecological benefits of those trees that may survive;
    - Take measures to stabilize impacted slopes in areas where roadside logging is unavoidable; and
    - Analyze the cumulative impacts of all post-fire sales and roadside logging projects across agency jurisdictions.
- The agency should only fall trees that pose an imminent hazard to the public. There is little need to fell trees that lean away from the road. Even if a tree is directly on the edge of the road, a tree falling in a random direction has only a 50% chance of hitting the road, and the likelihood diminishes as the distance from the road increases. Trees more than 100 feet from the road have a low probability of falling on the road, even if they are taller than 100 feet. This is because of all the directions these trees could fall, only a small subset would reach the road. For instance, in the figure below, if a tree located at point (E) is close to a road (represented by line G-H) there is a much higher risk of it hitting the road compared to a tree at the location of point (C). The sum of the angles from the tree to the road (in the blue shaded areas) represent either broad or narrow risk of a tree falling and hitting the road depending on its distance from the road.

/ / /

/ / /

/ / /

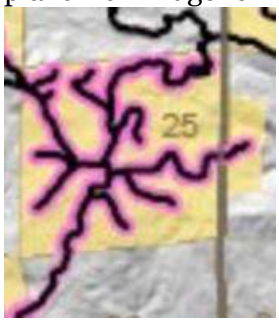


95

- There are several reasons that danger tree felling should be limited to 100 feet from roads. The chance of trees more than 100 feet from roads impacting the road are not very high because the tree would have to fall in precisely the right direction toward the road. And there is a much higher chance it will fall in numerous directions that do not threaten the road. In addition, many dead tree tops break off and fall close to the base of the tree, leaving a shorter snag with a more limited zone of hazard. Felling trees more than 100 feet from roads is unnecessarily risk averse, and unjustifiably sacrifices environmental values (such as snag habitat, dead wood habitat, and soil health).
- Removing trees more than 1 tree length is removing trees that have a zero percent chance of hitting the road. Those are not hazard trees. Removing hazards within 100 feet of the roads is usually sufficient. Trees farther than 100 feet from the road have a very low risk of hitting the road unless they are leaning toward the road. Going out 1 ½ tree lengths is unnecessarily risk averse. Removing trees more than 100 feet from roads is more about extracting timber volume and less about safety. Removing trees more than 100 feet from roads is inconsistent with authorities intended for hazard removal or emergency stabilization, and fails to provide a reasonable balance between safety and conservation. Removing large trees more than 100 feet from roads sacrifices relatively high ecosystem services (habitat, carbon storage, scenic values) for very small increases in safety.
- The agency should focus on roads that are heavily used by the public and workers. There is a trade-off between safety and habitat, and the agency should conserve defective trees and snag habitat in areas that receive little public use.
- The agency should fell trees as absolutely necessary, but wherever possible leave the trees on-site to provide down wood habitat. When tree removal is necessary use the wood to restore stream habitat or to add down wood to previously clearcut plantations where down wood habitat is severely lacking.
- We object to commercial sale of hazard trees, because there are economic conflicts of interest that could lead to ecologically important large trees being removed for the wrong reasons. And the need for large trees for restoration purposes far outstrips the supply.
- The cumulative impact of hazard tree removal needs to be carefully considered. There is a dense road network across the federal/non-federal landscape and if all the hazard trees are

95 https://www.geogebra.org/geometry?lang=en

removed a certain distance from all those roads, then the area of the forest that can support large snags become greatly diminished. See, for instance, these roadside danger tree removal plans from Eugene BLM's McKenzie watershed:





96

In their danger tree CX BLM said "Effects to potential spotted owl foraging in moderately and severely burned areas would not be significant because hazard tree removal would affect a linear corridor rather than entire forest stands" But they did not appear to account for these situations where is a dense road network and the linear corridors affect a large fraction of the stand. The cumulative effects analysis must also account for the lost potential for high quality large snag habitat caused by past regeneration harvest and salvage logging. The NEPA analysis should disclose how the forest can meet DecAID 50-80% tolerance objectives given the cumulative loss of large snag habitat.

The risk of a dead trees actually falling and hitting someone is extremely remote and must be put in perspective. For instance, the agency allows the public to use thousands of miles of roads where the risk of death or injury from collisions or other accidents is far far higher than the risk of being hit by a falling tree. The agency also allows boating and swimming in dangerous waterbodies, winter camping, mountain climbing, off-road vehicle use, and hunting with dangerous weapons. The agency also *promotes* dangerous occupations such as logging and firefighting, and piloting aircraft used for a variety of forest management activities. Furthermore, public use of public lands is skewed toward the summer months, while the extreme weather that tends to cause trees to fall is skewed toward the winter months. If the purpose of this project is to increase public safety please consider all the alternative ways that safety might be enhanced.

The hazards from trees falling is also mitigated by time. These are not high use roads. The chance that an employee or member of the public will be there when the tree falls is very low. To put things in perspective, there are almost 16 million seconds in a year. How many seconds are there vehicles on the road under these trees during the course of a year, and what fraction 16 million is that?

There are multiple options for managing safety, (a) manage the physical feature presenting the hazard, or (b) mange public use so that the public is less likely to be subject to the physical hazard. We strongly support retention of large snags while educating the public and managing public use to keep the public out of harm's way as much as possible. Truly hazardous trees (i.e., imminent risk of falling in very high use areas) may need to be felled (often leaving a high stump for wildlife) but the boles of such trees should generally be left to provide for wildlife and soil needs.

Here are some examples of signage that may improve safety awareness in burned landscapes:

96 https://eplanning.blm.gov/eplanning-ui/project/2009923/570.



Willamette NF 2025, Clark Butte Trail.



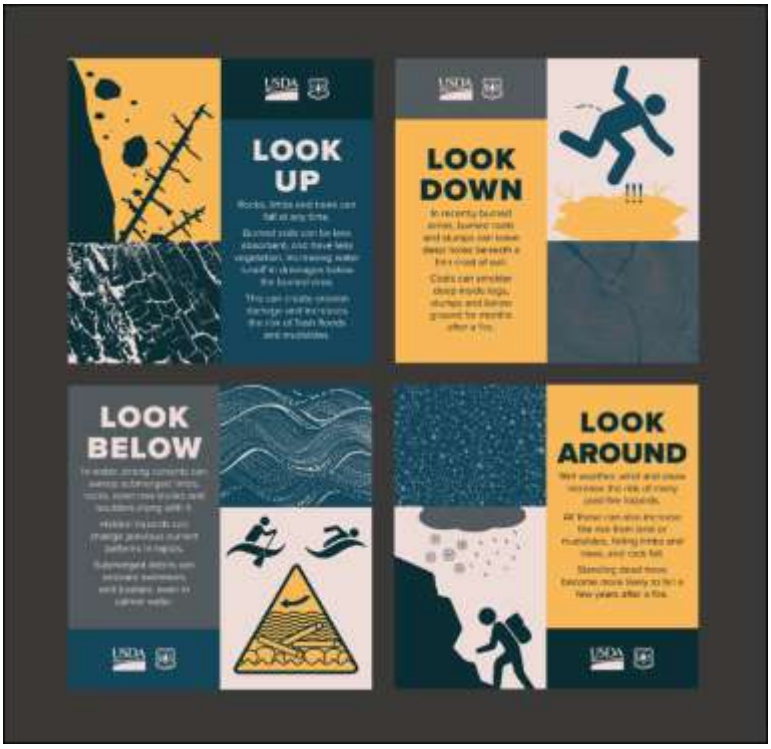
Pilot Creek OHV Trail System, Six Rivers National Forest.

If the Forest Service is willing to tolerate risk to people hiking on National Forest lands, why not tolerate a bit more risk for people driving on National Forest lands?

/ / /

/ / /

/ / /



Situational awareness is critically important for staying safe in burned areas. Practice the Four Steps for Safety to improve your awareness of natural hazards:
LOOK UP for upland burned areas, snags, and exposed rocks that may fall.
LOOK DOWN for debris from falling rocks, erosion – especially at road and trail edges, and ash pits (which may form from root pockets or stumps of burned trees),
LOOK AROUND Be situationally aware. Check the weather before you travel, including at higher elevations. Wind, rain, ice and snow can increase the risk of tree fall, rock fall, slides and other hazards. Flash floods and landslide risks are elevated below severely burned areas.
LOOK BELOW the surface of standing water and moving water for floating logs, submerged trees and other debris, which can strike or entangle swimmers and boaters and damage other infrastructure.[97]

Under-represented snag habitat should be retained on along low standard roads because the PNW Region of the Forest Service already distributes an educational brochure titled "Getting Around on National Forest Roads" which says of low standard roads "If you choose to drive these roads, plan to encounter rocks and boulders, road washouts, downed trees and brush encroaching on the roadway. For safety, … carry extra equipment such as axe, shovel, gloves …"[98] The public already expects some inconvenience when driving remote forest roads and would willingly trade some risk of inconvenience and small chance of encountering safety hazards for viable populations of native wildlife.

The agencies' field guide for danger tree identification indicates that little-used logging roads are

97 Willamette National Forest 2022. 2020 Fire Affected Road System Risk Reduction Project Storymap. https://storymaps.arcgis.com/stories/841b9854be5346638c3c34291913fe31

98 See "Getting Around on National Forest Roads" R6-ENG-RG-01-01. https://babel.hathitrust.org/cgi/pt?id=umn.31951002920989g&view=1up&seq=2.

a low priority for danger tree removal because of intermittent and infrequent hazard exposure.

> There are many miles of roads that may have danger trees adjacent to them. It is not possible to correct the danger tree problem immediately, so it is necessary to prioritize the danger tree treatment workload. The treatment priority should be highest where people are most likely to be impacted by danger trees. Consideration of exposure level and traffic frequency provides a way to prioritize the workload.
>
> ...
>
> Another aspect of exposure along roads is traffic frequency. Roads that have a higher traffic frequency expose more people to a danger tree than roads with a lower traffic frequency.
>
> The longer people are exposed to a tree, the more opportunity there is for the failed tree to impact them. If exposure duration and traffic frequency are reduced, the opportunity for the tree to impact people is also reduced. The qualified person should consider traffic frequency and exposure duration when determining whether a tree poses a danger to people.[99]

Sometimes the motivation for eliminating hazards is based on a misunderstanding of legal liabilities. The NEPA analysis needs to acknowledge that the public assumes certain risk when recreating on public lands, so not every hazardous tree on every dead end spur road needs to be felled and removed.[100]

ORS 105.682(1) provides:

> Except as provided by subsection (2) of this section [pertaining to intentional injuries], and subject to the provisions of ORS 105.688 [limiting immunity to those who do not charge for use of the land or who charge no more than $20 per cord for woodcutting on the land], an owner of land is not liable in contract or tort for any personal injury, death or property damage that arises out of the use of the land for recreational purposes, woodcutting or the harvest of special forest products when the owner of land either directly or indirectly permits any person to use the land for recreational purposes, woodcutting or the harvest of special forest products. The limitation on liability provided by this section applies if the principal purpose for entry upon the land is for recreational purposes, woodcutting or the harvest of special forest products, and is not affected if the injury, death or damage occurs while the person entering land is engaging in activities other than the use of the land for recreational purposes, woodcutting or the harvest of special forest products.

ORS 105.676 provides:

> The Legislative Assembly hereby declares it is the public policy of the State of Oregon to encourage owners of land to make their land available to the public for recreational purposes, for woodcutting and for the harvest of special forest products by limiting their liability toward persons entering thereon for such purposes...

"Land" is defined by ORS 105.672(3) as including "all real property, whether publicly or privately owned." "Owner" is defined by ORS 105.672(4) as "the possessor of any interest in any

---

99 Toupin, Filip, Erkert & Barger. 2008. Field Guide for Danger Tree Identification and Response. USDA FS, USDI BLM, Oregon OSHA. http://www.blm.gov/or/districts/medford/plans/files/fieldguidedangertree.pdf.

100 See ORS §§ 105.672(3), 105.682(1) and Brewer v. ODFW, 2 P.3d 418, 167 Or.App. 173. http://www.publications.ojd.state.or.us/A103245.htm.

land, including but not limited to possession of a fee title. 'Owner' includes a tenant, lessee, occupant or other person in possession of the land."

The Oregon Court of Appeals in *Brewer* said,

> The trade-off represented by this policy is manifest. The owner of land opened for recreational use in accordance with the Act gives up exclusive enjoyment of the land and, in return, is insulated from certain types of liability for injuries that may occur there. The users of recreational lands opened in accordance with the Act give up their rights to sue land owners for certain types of injuries but gain the benefit of using land for recreation that otherwise would not be available to them."[101]

Also, the Federal Tort Liability Act provides the government some degree of immunity in exercising their discretionary functions like hazard tree management. For instance, the National Park Service was found not liable for failing to remove a tree weakened by root rot that fell and killed a recreational motorist at Great Smokey Mountains National Park, even when the road involved was a high use paved road near a visitor center, and when the tree species at issue (Black Locust) was known by the Park Service to be prone to fall down.[102] The appeal court overturned the district court and held that the agency's balancing of public safety and preserving natural areas prevented judicial second guessing and gave them immunity from liability for the death of the motorist.

Avoid road construction, and minimize road impacts

Road construction, maintenance, and reconstruction will cause significant effects on soil, wildlife movement, weeds, and fire ignition risk. The Forest Service should focus on areas accessible from existing roads, allow the agency to scale back the damaging effects of roads. NEPA analysis is needed to consider alternatives that better balance competing values.

Problems with roads/culverts include:

- Soil disturbance, erosion, compaction, loss of forest productivity
- Pollution: sedimentation, thermal loading
- Hydrologic modification: flow interception, accelerated run-off, peak flows
- Impaired floodplain function
- Barrier to movement of wood and spawning gravel
- Habitat removal
- Reduced recruitment of snags and down wood habitat
- Fragmentation: wildlife dispersal barrier
- Human disturbance, weed vector, hunting pressure, loss of snags, litter, marbled murrelet nest predation, human fire ignition, etc.
- Reduced carbon storage in the road prism and in adjacent and nearby forests
-

The agency should focus on treating areas that are accessible from existing roads, in order to avoid all the many adverse effects of roads. As part of this project, the agency should also close

---

101 *Brewer v. ODFW*, 2 P.3d 418, 167 Or.App. 173. http://www.publications.ojd.state.or.us/A103245.htm

102 AUTERY v. UNITED STATES 992 F.2d 1523 (11th Cir. 1993). https://web.archive.org/web/20051203012108/http://classweb.gmu.edu/erodger1/prls560/content/autery.htm.

roads (especially those with the greatest adverse impacts on watershed conditions and habitat quality) to bring the project area into compliance with plan standards for road density.

The science is very clear, fire danger is higher in areas with existing roads and it increases dramatically with construction of new roads. Downing et al. (2022): "We observed a strong positive association between private ignitions and road density, and a weak positive association with average temperature. For the USFS ignitions model, road density was the most important variable and demonstrated a strong positive association with ignitions."[103]

WildEarth Guardians created a fact sheet summarizing the influence of roads on fire hazard.

Forest Roads Increase Wildfires

- A review of 1.5 million fire records over 20 years found human-caused fires were responsible for 84% of wildfires and 44% of the total area burned.
- Road density has been linked with increases in human-caused wildfires, as the density of roads increases so does the number of fire ignitions.
- Roads change microclimates far into the forest which increases wildfire risks by making areas drier, hotter and windier.
- An increase in lightning-caused fires in roaded areas may be due to roadside edge effects.
- Roaded areas create a distinct fire fuels profile which may influence ignition risk and burn severity

Ecological Impacts

- Forest roads can change where and when fires burn, which harms ecological communities.
- After a wildfire, roads are susceptible to erosion and catastrophic culvert failures, which delivers sediment to streams and reduces the quality of aquatic habitat.
- Post-burn roads are prone to noxious weed invasions.
- After a wildfire, roads that were previously well vegetated often burn or are bladed for fire suppression access or firebreaks, which reduces wildlife habitat security for at-risk and big game species.
- Heavily roaded watersheds typically have received intensive management in the past leaving forests in a condition of high fire vulnerability.[104]

Conserve big game

There is an important Mule deer travel corridor going from SW to NE directly through this project area.[105] Big game use dead trees and down wood for cover, especially when the live trees

103 Downing, W.M., Dunn, C.J., Thompson, M.P. et al. Human ignitions on private lands drive USFS cross-boundary wildfire transmission and community impacts in the western US. Sci Rep 12, 2624 (2022). https://doi.org/10.1038/s41598-022-06002-3, https://www.nature.com/articles/s41598-022-06002-3.pdf.

104 WEG 2020. Factsheet: Wildfire and Forest Roads. http://pdf.wildearthguardians.org/site/DocServer/Roads-and-Wildfire-Fact-Sheet-Sept-2020.pdf *citing* https://guardiansaction.org/roads-lit-review.

105 https://apps.usgs.gov/western-migrations/, https://experience.arcgis.com/experience/6979b6598f904951bd0af1821e1595f1/

have all burned up. Salvage logging, danger tree removal, and road work will significantly impact big game cover and migration. Clearing fuels and danger trees along 13 miles of roads will create a significant impediment to big game movement.

Fire kills vegetation and dramatically changes forage and cover quality for big game. Big game have also lived with fire for millennia. Deer are known to use areas affected by fire. The fire-created mosaic of forage and residual cover may be beneficial for big game. Forage will almost certainly improve following fire, but in order for the big game populations to take advantage of this new flush of forage, the agency must maintain an adequate amount of cover.

The agency must address the adverse effects of salvage logging, hazard tree removal, and road construction on big game habitat, especially in areas allocated for big game management in the LRMP for the Wallowa-Whitman National Forest.

According to the Forest Service's own Fire Effects Information System (FEIS), dead and dying trees do provide cover value for big game. See USFS FEIS Elk narrative:

> Site preference studies show that elk usually prefer to graze on burned as opposed to unburned sites. … Fire in a Southwestern ponderosa pine forest increased forbs, grasses, and shrubs, created edge, and provided snags for cover. Elk increased in the burn, reaching a peak 7 years after fire when grasses were most abundant. … In Glacier National Park fires increased carrying capacity on winter range by creating a mosaic of thermal and hiding comver [sic] and forage areas. … Standing dead trees may provide adequate cover within burns.[106]

And the FEIS narrative on Mule deer says:

> Deer seem to prefer foraging in burned compared to unburned areas … Small burns are more beneficial than large burns to mule deer because they tend to use burned areas close to cover.[107]

Generally speaking, wildfires provide two benefits for big game: improved forage and that forage is in proximity to adequate hiding cover in the form of surviving trees and dead trees. Salvage logging will remove what little cover they have. Montana Fish & Game staff have observed big game using fire killed trees as security cover:

> The upside of fires is that they remove some of the blocking overstory and rejuvenate forage in the understory, Kolbe said. When a burn takes place it can improve forage for as long as 25 or 30 years.
> "In most cases burns are, in the long term, really beneficial," he said.
> It depends on the scope and intensity of the fire to estimate when a herd may return. In some instances, especially if the area is more wet than average, elk are back as early as the year following a burn if green grass is growing abundantly in the rich soil. In other cases it can take several years for the soil to recover and plants to start growing again.

---

106 FIRE EFFECTS AND USE WILDLIFE SPECIES: Cervis elaphus | Elk. http://reference.allrefer.com/wildlife-plants-animals/animals/mammal/ceel/fire-effects-use.html.

107 FIRE EFFECTS AND USE WILDLIFE SPECIES: Odocoileus hemionus | Mule Deer. http://web.archive.org/web/20060524192803/http://www.fs.fed.us/database/feis/wildlife/mammal/odhe/fire_effects_and_use.html, http://reference.allrefer.com/wildlife-plants-animals/animals/mammal/odhe/fire-effects-use.html.

Kolbe said he's witnessed an interesting trend in tight patches of lodgepole that are burned. A few years following those torchings, the lodgepoles start to fall over and create a thick patchwork covering the ground. That's difficult for people to walk through, but doesn't seem to affect elk travel.
Kolbe said he's seen some bulls seek out those areas and hide among the thick downed trees where there's plenty of grass and less potential danger.
"The elk are going to go where the forage and habitat security is," he said.[108]





A deer finds cover in a burned forest. Salvage logging will eliminate cover, thus reducing the utility of newly created forage.

Although fire may have impacted big game habitat, salvage logging will make a bad situation worse by reducing cover and delaying recovery of vegetation species that are favorable for foraging and hiding cover. Even dead trees can provide hiding or thermal cover for a period of time. The NEPA analysis must assess the lost cover associated with salvage logging of dead trees, either those killed by the fire or that will die in the near term from fire-related damage.[109]

---

108 ALEXANDER DEEDY 2015. Elk numbers at or above target in north-central Montana. Helena Independent Record. September 17, 2015. http://helenair.com/lifestyles/outdoors/elk-numbers-at-or-above-target-in-north-central-montana/article_941cf307-8cc1-5370-876b-01aa2f921039.html

109 Grifantini (1990 and 1991) *cited in* McIver, James D.; Starr, Lynn, tech. eds. 2000. Environmental effects of postfire logging: literature review and annotated bibliography. Gen. Tech. Rep. PNW-GTR-486. Portland, OR: U.S.

Following two wildfires in northern California that occurred 10 years apart, Grifantini et al. (1992) compared vegetation response of areas that were unsalvaged and unplanted vs. areas that were clearcut salvaged, burned, and planted. They found that:

1. Unsalvaged sites had much more deerbrush cover, than did salvaged sites (measured 12 years after wildfire);
2. Unsalvaged sites had greater forb cover than did salvaged sites (measured 2 years after wildfire);
3. Unsalvaged sites supported more vascular plant diversity;
4. Unsalvaged sites had greater mean hiding cover values that salvages sites (measured both 2 and12 years after wildfire) "suggesting that salvage logging and reforestation resulted in less screening cover than if the stands would have been left unsalvaged." (p 166)
5. "Apparently postfire management influenced early seral stand development and the quantity and diversity of deer forage" (p 166)
6. "[W]e hypothesize that lack of cover may limit deer use. Maintaining a mosaic of unsalvaged stands, located adjacent to water sources, meadows, traditional migration corridors and staging areas (locations having potential for heavy deer use) would likely be an important post-fire mitigation." (p 167)
7. They recommend maintaining all available screening cover near potentially high deer-use areas, keeping patch size to a fraction of deer's average home range size, using a variety of post-fire management options, and dispersing different management schemes across the landscape.[110]
8.

Salvage logging is adverse to big game for two reasons – it removes hiding cover, and it increases adverse impacts related to construction and use of roads.[111]

Reduce carbon emissions and address climate change

Salvage logging will fragment large wood and expose it to microbial decomposition and fuel burning which will accelerate the transfer of carbon from the forest to the atmosphere. This will add to the cumulative excess of long-residence greenhouse gas in the atmosphere and exacerbate global climate change. Setting up high risk fuel conditions in the form of dense plantations will likely prevent the landscape from developing more fire resilient heterogeneous vegetation that is more likely to accumulate and store carbon in the future.

All forms of logging will accelerate the transfer of carbon from the forest to the atmosphere and exacerbate global climate change and ocean acidification. One might think that salvage logging

---

Department of Agriculture, Forest Service, Pacific Northwest Research Station. 72 p. https://web.archive.org/web/20170504124830/http://www.fs.fed.us/pnw/pubs/gtr486.pdf.

110 Grifantini, M.C., Stuart J.D., and L. Fox III, 1992. "Deer Habitat Changes Following Wildfire, Salvage, Logging and Reforestation, Klamath Mountains, California," Proceedings of the Symposium on Biodiversity of Northwestern California, Oct 28-30, 1991, Santa Rosa, CA. UC Wildland Resource Center Report 29. December 1992. https://catalog.hathitrust.org/Record/010833504

111 M. Hebblewhite, R.H. Munro, E.H. Merrill. 2009. Trophic consequences of postfire logging in a wolf–ungulate system. Forest Ecology and Management 257 (2009) 1053–1062. https://web.archive.org/web/20120630203349/http://www.cfc.umt.edu/heblab/PDFS/FORECO11394.pdf.

is an exception but it is not. Wood products decompose at about the same rate as large wood in the forest, but the carbon effects of salvage logging go beyond wood products, it also involves rapid transfer of the carbon in small wood (as well as some soil carbon) to the atmosphere.

Campbell et al (2016) looked at carbon losses after the Biscuit fire and found –

> Decomposition was highest for fire-killed leaves and fine roots and lowest for large diameter wood. Decomposition rates varied somewhat among tree species and was only 35% lower for trees still standing than for trees fallen at the time of the fire. We estimate a total of 4.7 Tg C was killed but not combusted in the Biscuit Fire, 85% of which remains 10 years after.[112]

Dunn et al. (2015):

> Salvage logging to enhance ecosystem resilience may not be appropriate if multiple ecosystem functions and resources are considered, including; coarse wood use by wildlife (Cahall and Hayes, 2009; Hutto, 1995; Fontaine et al., 2009; Saab et al., 2005), functional attributes of early seral vegetation (Swanson et al., 2010), compounding effects on soil and nutrient pools (Brais et al., 2000; Triska and Cromack, 1980) and reduced water and carbon storage (Harmon et al., 1986).[113]

The authors suggested modifying salvage logging prescriptions to retain more snags, which would help retain fine fuels in the canopy longer and reduce the amount of fine fuels that are moved from the canopy to the ground.

Replanting can also adversely affect the climate. A 2020 study found that natural regeneration can capture more carbon more quickly and more securely than plantations, because natural regen is both more resilient and better able to absorb carbon.[114]

Climate change is expected to increase the magnitude and intensity of rain events which can cause significant erosion, especially after disturbances such as fire and logging. It would be wise to retain extra woody material on site after fire in order to intercept and absorb the energy of rain drops, absorb and store water, stabilize soil, capture and store mobile sediment, etc.[115] The agency needs to ensure that the hydrology and erosion models used in the NEPA analysis accurately account for the expected increase in storm impacts due to climate change.

New evidence reveals a counterintuitive finding that beetles inoculate dead trees with diverse fungi that actually *reduce* the rate of decay and reduce the carbon emissions from dead wood.

---

112 Campbell, J. L., J. B. Fontaine, and D. C. Donato (2016), Carbon emissions from decomposition of fire-killed trees following a large wildfire in Oregon, United States. J. Geophys. Res. Biogeosci., 120, doi: 10.1002/2015JG003165. http://onlinelibrary.wiley.com/doi/10.1002/2015JG003165/full

113 Christopher J. Dunn, John D. Bailey 2015. Modeling the direct effects of salvage logging on long-term temporal fuel dynamics in dry-mixed conifer forests. Forest Ecology and Management 341 (2015) 93–109. http://www.sierraforestlegacy.org/Resources/Conservation/FireForestEcology/SalvageLoggingScience/Dunn&Bailey2015.pdf.

114 Cook-Patton, S.C., Leavitt, S.M., Gibbs, D. et al. Mapping carbon accumulation potential from global natural forest regrowth. Nature 585, 545–550 (2020). https://doi.org/10.1038/s41586-020-2686-x. See also, FRED PEARCE 2020. Natural Debate: Do Forests Grow Better With Our Help or Without? Yale Environment 360. SEPTEMBER 24, 2020 https://e360.yale.edu/features/natural-debate-do-forests-grow-better-with-our-help-or-without

115 Garbrecht, J. D., J. L. Steiner, and C. A. Cox (2007), Climate change impacts on soil and water conservation, Eos Trans. AGU, 88(11), 136. http://www.agu.org/eos_elec/2007/11-136_climate.html.

the kicker – the more species of fungi that were brought in by beetles or introduced in the lab, the lower the rate of decay.

This outcome was not completely surprising to Skelton. "The majority of the fungi the beetles carry do not decay wood." But it wasn't just that. The diversity of fungi was key to lowering the rate of decay, irrespective of whether individual species could decay wood or not. This effect had been found in other studies in wood without beetles where researchers found that that as the number of fungal species increased, CO2 release declined. And again, it wasn't so much who was there but how many.

Early models of CO2 release from beetle-killed forests were mostly tales of gloom and doom predicting a rapid mass release of carbon into the atmosphere. However, field-based studies have since helped define crucial factors affecting carbon release that were missing in the early models.[116]

Magnússon et al (2016) found that increased retention of dead wood may help increase the magnitude and stability of carbon storage in forests.

> Worldwide, forests have absorbed around 30% of global anthropogenic emissions of carbon dioxide (CO2) annually, thereby acting as important carbon (C) sinks. It is proposed that **leaving large fragments of dead wood, coarse woody debris (CWD), in forest ecosystems may contribute to the forest C sink strength**. CWD may take years to centuries to degrade completely, and non-respired C from CWD may enter the forest soil directly or in the form of dissolved organic C. Although aboveground decomposition of CWD has been studied frequently, little is known about the relative size, composition and fate of different C fluxes from CWD to soils under various substrate-specific and environmental conditions. Thus, the exact contribution of C from CWD to C sequestration within forest soils is poorly understood and quantified, although understanding CWD degradation and stabilization processes is essential for effective forest C sink management. This review aims at providing insight into these processes on the interface of forest ecology and soil science, and identifies knowledge gaps that are critical to our understanding of the effects of CWD on the forest soil C sink. It may be seen as a "call-to-action" crossing disciplinary boundaries, which proposes the use of compound-specific analytical studies and manipulation studies to elucidate C fluxes from CWD. Carbon fluxes from decaying CWD can vary considerably due to interspecific and intraspecific differences in composition and different environmental conditions. These variations in C fluxes need to be studied in detail and related to recent advances in soil C sequestration research. Outcomes of this review show that the presence of CWD may enhance the abundance and diversity of the microbial community and constitute additional fluxes of C into the mineral soil by augmented leaching of dissolved organic carbon (DOC). Leached DOC and residues from organic matter (OM) from later decay stages have been shown to be relatively enriched in complex and microbial-derived compounds, which may also be true for CWD-derived OM. Emerging knowledge on soil C stabilization indicates that such complex compounds may be sorbed preferentially to the mineral soil. Moreover, **increased abundance and diversity of decomposer**

116 Six, D. 2020. How tiny fungi may be slowing carbon release from bark beetle-killed trees. Blog post. https://web.archive.org/web/20210114234939/https://eddycovarianceblog.wpcomstaging.com/2020/06/11/how-tiny-fungi-may-be-slowing-carbon-release-from-bark-beetle-killed-trees/.

organisms may increase the amount of substrate C being diverted into microbial biomass, which may contribute to stable C pools in the forest soil.[117]

Salvage logging also interferes with climate change adaptation. "… [B]y disrupting existing disturbance regimes, … interventions run the risk of reducing diversity and structural heterogeneity and thus may undermine functional redundancy core to [climate change] resilience."[118]

Whitebark pine

We are concerned about significant incidental take of Threatened whitebark pine which is likely growing at low density in a significant portion of this project area due to the proximity of seed sources and the dispersal distances facilitated by birds that cache whitebark pine seeds.[119] Adoption of the PDCs identified in the Pacific Northwest Region Whitebark Pine Programmatic BiOp does not ensure take avoidance, does not constitute a NEPA hard look, nor does it ensure lack of significant effects.

Large areas of reforestation likely includes clearing trees that could include live whitebark pine.

The fire may have created a significant opportunity for whitebark pine seeding and reproduction. Planting large areas with competing conifers will adversely affect Whitebark pine conservation and recovery.

Avoid and minimize weeds

The combination of salvage logging, road work, site prep and replanting will expose mineral soil and stimulate the proliferation of weeds that pose a long-term problem for native vegetation, wildlife habitat, fire hazard, and meeting other land management goals.

The Nature Conservancy finds that non-native plant species occur on high-use, low-use, and abandoned forest roads, with the greatest frequency on roads with the highest level of

---

117 Rúna Í. Magnússon, Albert Tietema, Johannes H.C. Cornelissen, Mariet M. Hefting, Karsten Kalbitz 2016. Tamm Review: Sequestration of carbon from coarse woody debris in forest soils. Forest Ecology and Management Volume 377, 1 October 2016, Pages 1-15. http://www.sciencedirect.com/science/article/pii/S0378112716303309.

118 Ingalls, M.; Dwyer, M. B. 2016. Missing the forest for the trees?: Navigating the trade-offs between mitigation and adaptation under REDD. Climatic Change 136(2): 353-366. DOI: 10.1007/s10584-016-1612-6. https://boris-portal.unibe.ch/server/api/core/bitstreams/0634d533-a2d4-48b6-b356-b51fd93738a4/content

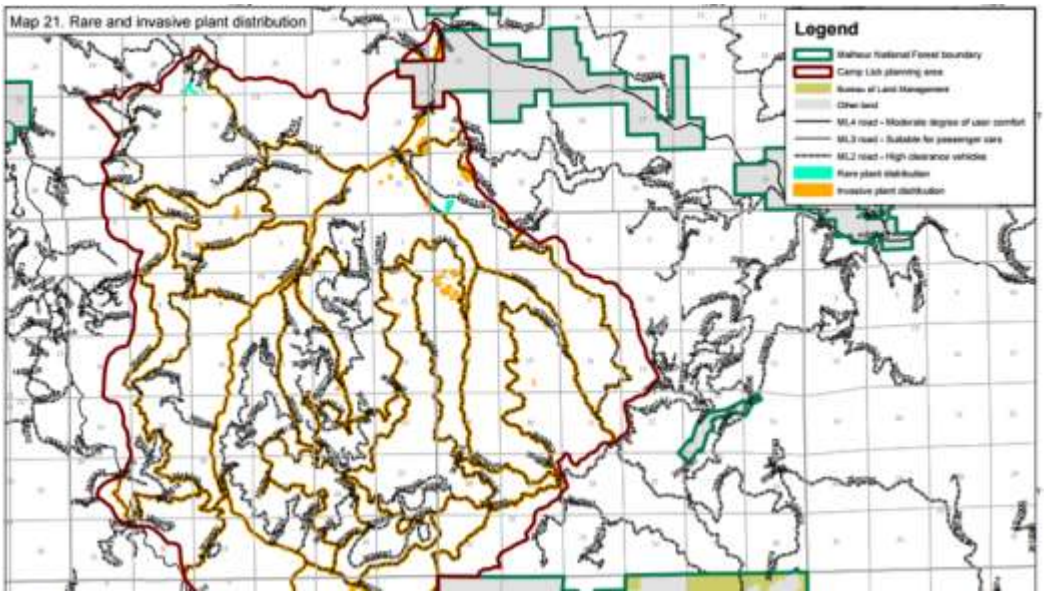
119 Diana F. Tomback 2012. Whitebark pine: Ecology, Threats, and Why We Care. Whitebark Pine Ecosystem Foundation, Science and Management Workshop 14 September 2012, Kimberley, B.C. https://whitebarkfound.org/wp-content/uploads/2013/09/Diana-Tomback-Ecology-Threats-Why-We-Care.pdf; Keane, R. E., D. F. Tomback, C. A. Aubry, A. D. Bower, E. M. Campbell, C. L. Cripps, M. B. Jenkins, M. F. Mahalovich, M. Manning, S. T. McKinney, M. P. Murray, D. L. Perkins, D. P. Reinhart, C. Ryan, A. W. Schoettle, and C. M. Smith. 2012. A range-wide restoration strategy for whitebark pine forests. General Techical Report RMRS-GTR-279, USDA Forest Service Rocky Mountain Research Station, Fort Collins, Colorado. https://www.fs.usda.gov/rmrs/publications/range-wide-restoration-strategy-whitebark-pine-pinus-albicaulis.

disturbance and lowest percentage of canopy cover.[120] Exotic weeds spread outward from roadsides in lowland forest and rangeland in Montana, invading relatively undisturbed areas.[121]

Gray (2005) found --

> "... This analysis of recent forest inventory data in western Oregon indicates that nonnative species have become an important part of the flora in these forests, having been detected on 40 percent of the plots on non-Federal forest lands.... Abundance of most nonnatives was greater on lands that had been recently clearcut or thinned and was more closely related to stand density than climate.... "[122]

This map of invasive weeds in the Malheur NF's Camp Lick Project area shows the close relationship between roads and weeds.



[123]

120 Parendes, L. A. and J. A. Jones. 2001. Role of Light Availability and Dispersal in Exotic Plant Invasion along Roads and Streams in the H. J. Andrews Experimental Forest, Oregon. Conservation Biology. Vol. 14, No. 1 (Feb., 2000), pp. 64-75. https://doi.org/10.1046/j.1523-1739.2000.99089.x.

121 Forcella, F. and S. J. Harvey. 1983. Eurasian weed infestation in western Montana in relation to vegetation and disturbance. Madroño 30: 102-109.

122 Gray, Andrew N. 2005 Nonnative Plants in the Inventory of Western Oregon Forests. In: McRoberts, Ronald E.; Reams, Gregory A.; Van Deusen, Paul C.; McWilliams, William H.; Cieszewski, Chris J., eds. Proceedings of the fourth annual forest inventory and analysis symposium; Gen. Tech. Rep. NC-252. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 11-16. http://ncrs.fs.usda.gov/pubs/gtr/gtr_nc252/gtr_nc252_011.pdf.

123 http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/100820_FSPLT3_3963178.pdf

Reducing forest canopy can also exacerbate invasive grasses that can adversely alter fire regimes. Kerns et al. (2020): "In combination with climate change, wildfire, and overstory management, invasive grasses could create a "perfect storm" that threatens forest resilience."[124]

A March 2005 "Science Update" from the Forest Service summarized the findings of the Forest Inventory and Analysis results including the fact that "nonnative species were significantly more abundant in stands with the smallest and youngest trees, and in stands with fewer overstory trees, such as stands recently thinned. This trend held true for different forest types."[125] This confirms that opening up the canopy and disturbing the soil through road building and logging could spread non-native weeds far and wide. The invasive weed sites in the analysis area and along all log and gravel haul routes should be fully inventoried and documented as part of the NEPA process for this project. In the absence of valid and complete weed survey information, harvest and road and fuel treatment activities planned as part of this project might exacerbate the problem instead of contain it.

Consult with tribes

The Forest Service needs to meaningfully consult with the Umatilla Tribes, Nez Perce Tribe (and other affected interests) regarding the effects of this significant logging project.

It is important to redo cultural resources surveys after fire, because the fire may have exposed lithic scatters and other artifacts that were obscured by forest duff and understory plants before the fire.

==

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, including mitigation alternatives, that balance tradeoffs in different ways, (iii) carefully analyzed and documented as part of the effects analysis, and (iv) used to inform the finding of significance.

Please post to the project website, links to all relevant ESA and EFH consultation documents, RMPs, watershed analyses, and other supporting documents relied on in the NEPA analysis.

The NEPA analysis should clearly document how proposed activities will comply with substantive requirements including applicable laws and the LRMP as amended.

Please post to the project website before the public comment period, georeferenced maps of the proposed activity units that can be used to navigate in the field using apps such as Avenza.

---

124 Becky K. Kerns, Claire Tortorelli, Michelle A. Day, Ty Nietupski, Ana M.G. Barros, John B. Kim, Meg A. Krawchuk. 2020. Invasive grasses: A new perfect storm for forested ecosystems? Forest Ecology and Management. Volume 463, 1 May 2020, 117985. https://doi.org/10.1016/j.foreco.2020.117985.

125 Rapp, V. 2005. Invasive Plants in 21st Century Landscapes. Science Update: Issue 9, March 2005. https://www.fs.usda.gov/pnw/pubs/science-update-9.pdf.

Please provide Oregon Wild with timely notice of any forthcoming comment opportunities, and any draft and final decisions on this project. If the agency discovers new information or changed circumstance or modifies the project or the analysis after the decision, Oregon Wild requests to be notified and provided an opportunity to comment.

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

Sincerely,



Doug Heiken (he/him)
dh@oregonwild.org