From:	Katie Bilodeau
To:	FS-appeals-northern-regional-office
Cc:	Gary Macfarlane; jeff@friendsoftheclearwater.org; Mike Garrity
Subject:	[External Email]Emerald Project objection
Date:	Thursday, March 4, 2021 1:08:41 PM
Attachments:	00_FOC_AWR_Objection_FINAL_3-4-21.pdf

Dear Sir or Madam,

Attached please find the objection to the Emerald Project filed for Friends of the Clearwater and Alliance for the Wild Rockies.

I have mailed a CD that contains another copy of the attached above and the supporting documents cited in our objection.

Thank you,

--
Katie Bilodeau (she/her)
Staff Attorney
Friends of the Clearwater
P.O. Box 9241
Moscow, ID 83843
katie@friendsoftheclearwater.org

March 4, 2021

Comments sent via email to the following: appeals-northern-regional-office@usda.gov
Comments and materials sent via US Mail to the following:

Objection Reviewing Officer
USDA Forest Service
Northern Region 26 Fort Missoula Road
Missoula, MT 59804

Re: Emerald Project Objection

Objection Reviewing Officer:

Pursuant to 36 CFR Part 218, Friends of the Clearwater (FOC) and Alliance for the Wild Rockies (AWR) file this objection to the final Environmental Assessment (EA) and draft Decision Notice and Finding of No Significant Impact (DN) for the Emerald Project on the St. Joe Ranger District on the Idaho Panhandle National Forests. The responsible official is Matthew Davis.

Pursuant to Part 218, FOC is the lead objector.

The Emerald Project proposes regeneration logging on approximately 2,478 acres, intermediate logging on 30 acres, constructing seven miles of temporary roads, twelve miles of new system road, and conducting road maintenance on 47 miles of and road reconstruction on 23 miles, and road reconstruction on 14 miles of road. Vegetation management may occur on 2,741 acres. Activities include regeneration harvest prescriptions on about 2,478 acres and intermediate harvest on about 30 acres. There would be post-harvest fuels reduction and shaded fuel break treatments. Road management activities include constructing about 7 miles of temporary roads and nearly 12 miles of new system road, and providing road maintenance on 47 miles, road reconditioning on 23 miles, and reconstruction on about 14 miles to ensure route safety.

When we refer to our Environmental Assessment for the Emerald logging project comments here, we mean our comments dated November 2, 2020. When we refer to our scoping comments, we refer to what Alliance for the Rockies submitted in October 2018, which was also adopted at the end of our November 2, 2020 EA comments.

We were disappointed that the Forest Service seemed to largely ignore our comments. The purpose of an environmental assessment is to analyze whether there could be significant impacts from a project, not to jump through a hoop to approve logging. We introduced science and points not considered in scoping and the draft environmental assessment and supporting documents, pointing out analytical problems and issues missed. The Forest Service's comment-response table took the points we raised about the initial problems and points the reader straight back to the documents with the issue. New analysis from the last round was sparse. As a result, most of the changes in the EA are not substantive—they are organizational and consist of minor edits to the text.

For the below reasons, this environmental assessment is unlawful. The Forest Service should choose the no-action alternative, withdraw the project, or prepare an environmental impact statement that analyzes the points raised.

Sincerely,

Gary Macfarlane
Ecosystem Defense Director
Friends of the Clearwater
PO Box 9241
Moscow, ID 83843
(208) 882-9755
gary@friendsoftheclearwater.org

Kate Bilodeau
Staff Attorney
Friends of the Clearwater
PO Box 9241
Moscow, ID 83843
katie@friendsoftheclearwater.org

And for
Mike Garrity, Executive Director
Alliance for the Wild Rockies
PO Box 505
Helena, MT 59624
406-459-5936
wildrockies@gmail.com

INTRODUCTION

Below Objectors refer to our draft environmental assessment comments. The scoping comments submitted by Alliance for the Wild Rockies during scoping were adopted into the draft environmental assessment comments. For ease of reference, we refer to objectors' scoping comments in their original page number and not the pdf page number from the EA comment. Some of the science to which this objection refers were submitted with the comments on the environmental assessment, so they are already before the agency. The supporting documents submitted with this objection are documents that, according to our records, were not previously submitted. If the reader sees a citation that isn't in the "Supplemental works cited," at the end of this objection, the reader will likely find the full citation in the "Works cited" of Objectors' EA comments or in the references for Objectors' scoping comments.

Because the response did not address our comments but just regurgitated them back and referenced the document where we had pointed out the problem, the same issues exist. For that reason, most of the points in this objection are similar if not identical to the problems with the EA, and we are not repeating our arguments verbatim for a third time, so often we just incorporated previous comments and points by reference.

ISSUE: PREMISE FOR PROJECT NOT SUPPORTED BY SCIENCE OR SUFFICIENT INFORMATION

Objectors raised this issue on pages 2-3 and again in the fire ecology section at pp. 115-119. Further connection to the Forest Service's "forest health" purpose and need is indirectly connected to Objectors' EA comments on the forest plan at pp. 3-6, "desired conditions" at pp. 8-12, the "alleged forest imbalance" at pp. 26-28, "viability and diversity" pp. 60-65, and are incorporated here.

There was insufficient information in the environmental assessment to give the public notice of the purpose and need of this project. "Forest health" and "resilience" goals have undefined, ambiguous and scientifically dubious terms. The purpose of "resilience" is contradicted by the moderate *adverse* impacts roadbuilding and logging will have on sensitive and threatened plants. Forest health seems to be, in part, based on the "desired conditions," in the forest plan, which we've challenged with science that contradicts agency assumptions at the pages above. There was no analysis responding to our inquiries on economic purpose and need, and we think the costs of this project, costs of losing ecosystem services to the general public, outweighs the benefits of selling the timber to the logging industry.

Also, objectors introduced science that makes the Forest Service's assumption of what project activities can achieve, both in fire and vegetation, minimally controversial. The Forest Service has failed to duty to disclose high-quality information, to honestly or adequately analyze whether the project can achieve its goals in light of science, properly consider the best science or controversial science in considering the assumptions that underlie the basis of the stated purpose and need, and this failure is a potentially significant impact that warrants the preparation of an environmental impact statement. By failing to consider objectors' comments the science and facts that relate to the purpose and need, the agency has failed to take a hard look at the impacts of the proposed project. As a result of these failures, the agency has violated the National Environmental Policy Act.

Remedies: Select the No Action alternative, withdraw the project or prepare an environmental impact statement.

ISSUE: UNLAWFUL FOREST PLAN AND UNCLEAR COMPLIANCE

Objectors raised the unlawful forest plan provisions in scoping comments on pp. 1, 7-19, 21, 24-25, 26, 30, 34, 35-37, 50, 51, 57-58, 61, 62-64, 68-69, 72, 81, 83, 86-88, 89, 90, 93, 95, 96-97, 99, 100, 101, 103. In the draft EA, Objectors noted on page 3 that this project would implement the 2015 Idaho Panhandle National Forests Forest Plan, and the forest-plan revision process violated NEPA and NFMA on page 3-7. Those comments are incorporated here.

The Forest Service responded that there is "no project- or site-specific comment to respond to." A project implements a forest plan, so they are related. Any part of the forest plan raised by Objectors that is implemented through this project is relevant.

There are so many cumulative effects of the agency's chosen way of achieving forest plan "Desired Conditions" for vegetation (manipulate the habitat using heavy-handed industrial activities). The Emerald EA simply does not view ecological damage through the same lens as it does for vegetation conditions. Here is a simple list other factors directly influencing biological diversity under the FS's management regime, and their historic range of variability, or "HRV":

FACTOR	HRV
Road density	zero
Noxious weed occurrence	zero
Miles of long-term stream channel degradation ("press" disturbance)	zero
Culverts	zero
Human-induced detrimental soil conditions	<1%
Maximum daily decibel level of motorized devices	zero
Acres of significantly below HRV snag levels for many decades	zero
Roadless extent	100%
Extent of veg. communities affected by exotic grazers (livestock)	zero
Extent of veg. communities affected by fire suppression	zero

Many of the forest-plan desired conditions, guidelines standards, and other measures are still not described in the EA, and a checklist does not adequately explain or describe how this project complies.

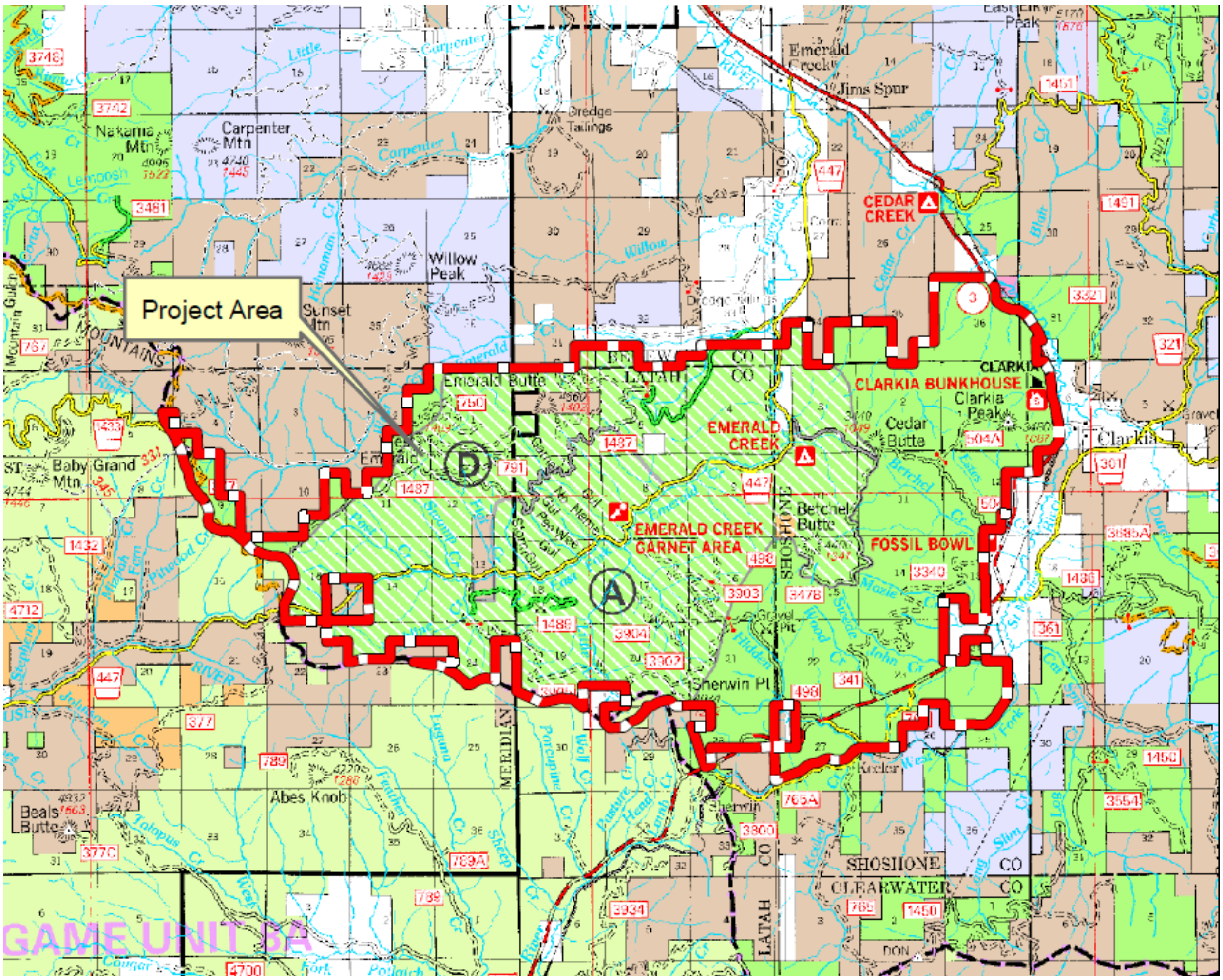
For the reasons above and more fully described in Objectors's scoping and EA comments, the Forest Service has violated the National Forest Management Act's various provisions and regulations because the forest plan's provisions are not specific, not scientifically able to ensure population viability for wildlife, fish, or various species of vegetation; additionally the EA does not adequately show compliance with the forest plan. For the reasons more fully described in Objectors scoping and EA comments, the Forest Service has violated the National Environmental Policy Act because it ignored relevant science when developing the forest plan, did not take a hard look at the consequences of planning actions, failed to consider cumulative effects, failed to be specific or substantive when developing forest-plan provisions, and failed to honestly or adequately analyze impacts of various forest-plan revisions

Remedy: Select the No Action alternative, withdraw the project and revise the forest plan to correct for these deficiencies or do an environmental impact statement that more fully examines the issues raised.

ISSUE: CUMULATIVE EFFECTS

Objectors raised concerns with cumulative effects of past, ongoing, and proposed actions for all land ownerships and the additive impacts on wildlife, fish, habitat, soil, and agency policies in their scoping comments on pages 1, 4, 5-7, 10, 13, 18, 19-21, 31, 34, 37, 39, 51, 59, 61-62, 66-67, 69-76, 79, 88, and 104, and again in Objectors' EA comments at pages 7-8, 11, 18-20, 29, 31-39, 43-47, 49, 52, 54, 57-59, 61, 62, 72, 76, 83, 90-92, 96, 99, 102-105, 108, 128, and 130, and pursuant to specific wildlife species (fisher, pine marten, lynx) or issues including—but not limited to—soil, climate change, roads, streams, terrestrial wildlife habitat, fire policy. In fact, many of the issues regarding cumulative effects discussed in the EA were verbatim of what was raised in the scoping comments as the draft EA ignored many points made. These page-excerpts and the context into which they fall are incorporated here.

The Forest Service has violated NEPA because the analyses on cumulative effects are either insufficient or entirely absent. For example, resources that need larger, regional analyses, such as greenhouse gas emissions, there was no consideration of the other projects on this forest. As another example, there was no recognition, that several projects in this region, including White Pine to the west of this project on the Clearwater National Forest or the Homestead Project, just north White Pine and a dozen or so miles west of this project, when combined, could actually eliminate the size of an entire fisher home range. It does not appear that the Forest Service took either of these nearby projects into account for habitat elimination for various species. And it doesn't appear that the Forest Service took into sufficient account what has happened on private lands surrounding these projects. These are only examples of what was raised on the pages above. In the Hidden Cedar project from 2007, which is the same area, the Forest Service conducted less logging and less road construction, and considered the impact to be potentially significant in an environmental impact statement. Yet here, with more logging and more roadwork and in the same area where the Forest Service hasn't appeared to follow through on its prior NEPA commitments to decommission roads, the Forest Service is analyzing with a lesser EA.



As one can see from the Forest Service's map above as well as the "Emerald vicinity map..."; "Emerald map for region St J and Clearwater" and "Emerald vicinity map legend..." that we provided in objection documents, the lands that surround this project area are owned privately (including timber companies) or the State of Idaho, who deals just about solely in the practice of clearcutting. And if the Forest Service reviews the "Timelapse – Emerald timber sale and region 1984-2018," the agency will see habitat eliminated and landscapes converted both within the project area and outside of it. This landscape transformation not only has smaller pockets of forest than ever, but when comparing this map and the Timelapse map and the logging units, the

Forest Service seems to be cutting into some of the last older, undisturbed forests that this region has. (And this doesn't include the White Pine or Homestead projects because they have either not been approved or implemented at the date of this writing.) Certainly the Clearwater National Forest just west of this area has been logged over in addition to private timber lands and the state, and one can see that from "Emerald map for region St J and Clearwater" and the Timelapse video. Through the Emerald timber sale, the Forest Service has proposed logging on some of the last parts of old forest in this area on the St. Joe Ranger District has. Just listing other activities is not enough. The openings created, and the length of the time one can see them remain on the landscape (by virtue of these areas not as dark green as the older forests) need to be analyzed, and cutting some of the last mature forests is certainly the frosting on a cumulative impact.

For the above reasons the Forest Service has not considered potentially significant impacts, has not take a hard look at likely impacts, and the environmental analysis insufficiently addresses the issues above.

Remedy: Select the No Action Alternative, withdraw the project or conduct an environmental impact statement that more fully examines cumulative effects in the manner raised by Objectors' scoping and then EA comments.

ISSUE: ECOLOGICALY DEFICIENT FOREST PLAN "DESIRED CONDITIONS"

Objectors raised this issue in detail at both the forest plan level and the project level in EA comments at page 8-12, and those are incorporated here.

For the reasons discussed in our comments, the Forest Service has violated NFMA because it cannot ensure species diversity and has violated NEPA for failing to take a hard look at the impacts of choosing static desired conditions not based on science, dynamic processes, or the changing climate.

Remedy: Select the No Action Alternative, withdraw the project, or prepare EIS that addresses the issues identified in our objection to the revised forest plan and in our comments on the Emerald EA.

ISSUE: GLOBAL WARMING, CARBON SEQUESTRATION, AND CARBON EMISSIONS

Objectors raised issues on global warming (climate change) and carbon emissions in great detail on pages 39-50, and 97, and in EA comments at pages 12-26. These are incorporated here.

Objectors have pointed out that climate change is irreversible, that removing forest biomass are anthropogenic contributions (past and present) to climate change by both eliminating carbon sequestering trees as well as emitting carbon in the cutting, hauling away, and processing of those trees. Objectors have pointed out that protecting trees and ending logging would mitigate for carbon emissions, and affordably so, and would be our best chance at preserving biodiversity.

Objectors have pointed out that fuel-reduction practices do not increase carbon storage in the western US; that Pacific Northwest forests hold live tree biomass equivalent or larger than tropical forests; and that harvesting wood represents most of the carbon losses from US forests. Objectors have pointed out that the Forest Service even cites to science (McKinley et al. 2011) that recommends avoiding deforestation reducing forest harvests as a climate-change mitigation strategy. Objectors pointed out that the Forest Service hasn't considered cumulative effects, locally, regionally, or nationally of how it has contributed to this or the actions it can take to mitigate global warming; and that there are serious unsupported scientific assumptions with the 2010 KIPZ Climate Change Report, which the agency relies upon. Objectors pointed out that the carbon emissions from logging in Idaho likely far exceed its economic contributions.

The Forest Service cited Depro et al. 2008 without acknowledging that the paper's finding was that ending commercial logging on US national forests and allowing forests to mature instead would remove an additional amount of carbon from the atmosphere equivalent to six percent of the US 2025 climate target of 28 percent emission reductions.

Objectors point out that global warming caused by these changes feed back into forest ecosystems, causing drought and longer fire seasons, pulling into serious question if the desired results of this project is even scientifically attainable.

Objectors provided science to support all of these assertions. This is the best science. The agency hasn't discussed why the science it cites is more applicable. At minimum, there is scientific controversy, but it is far likelier that the Forest Service simply ignored the best available science.

The agency hasn't accounted for the whole picture with the project in consideration of the points above. The EA reflects that these comments weren't taken seriously in scoping, and the Forest Service ignored the EA comments, as the final EA remained unchanged with how it considered carbon cycles.

The CEQ 2016 guidance on considering greenhouse gas emissions and effects of climate change in NEPA reviews has been re-implemented as national direction. *See* 86 Fed Reg. 10252 (Feb. 19, 2021). For the purposes of this analysis, it is new information because this directive didn't apply when the draft EA was released in 2020. The 2016 guidance acknowledges that "changes in our climate caused by elevated concentrations of greenhouse gases in the atmosphere are reasonably anticipated to endanger the public health and public welfare of current and future generations." p. 8. This guidance directs federal agencies to consider the extent to which a proposed action would contribute to climate change.

The Forest Service consideration for this project states that there would be no discernable impact on atmospheric concentrations of greenhouse gases because of "these few affected forest acres and the global scale of the atmospheric greenhouse gas pool and the multitude of natural events and human activities globally contributing to that pool." E10.3_Carbon cycling and storage report, p. 6

The CEQ guidance calls the agency's conclusion, that the action is small and global warming is large, inappropriate:

> Climate change results from the incremental addition of GHG emissions from millions of individual sources, which collectively have a large impact on a global scale. CEQ recognizes that the totality of climate change impacts is not attributable to any single action, but are exacerbated by a series of actions including actions taken pursuant to decisions of the Federal Government. Therefore, a statement that emissions from a proposed Federal action represent only a small fraction of global emissions is essentially a statement about the nature of the climate change challenge, and is not an appropriate basis for deciding whether or to what extent to consider climate change impacts under NEPA. Moreover, these comparisons are also not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations because this approach does not reveal anything beyond the nature of the climate change challenge itself: the fact that diverse individual sources of emissions each make a relatively small addition to global atmospheric GHG concentrations that collectively have a large impact.

CEQ 2016 guidance, pp. 10-11. Under this guidance, the Forest Service should attempt to quantify GHG emissions. The agency can only use a qualitative method if tools, methodologies, or data inputs are not reasonably available, and if that is the case, there needs to be rationale as to why a quantitative analysis is not warranted. There are plenty of quantitative tools for this analysis. *See* https://ceq.doe.gov/guidance/ghg-accounting-tools.html; USDA 2014. The Forest Service has not followed this guidance.

Additionally, there is no discussion of the effects of climate change on achieving things like desired ranges in the forest plan.

Millar et al. 2007 state the following:

> Over the last several decades, forest managers in North America have used concepts of historical range of variability, natural range of variability, and ecological sustainability to set goals and inform management decisions. An underlying premise in these approaches is that by maintaining forest conditions within the range of presettlement conditions, managers are most likely to sustainably maintain forests into the future. We argue that although we have important lessons to learn from the past, we cannot rely on past forest conditions to provide us with adequate targets for current and future management. This reality must be considered in policy, planning, and management. Climate variability, both naturally caused and anthropogenic, as well as modern land-use practices and stressors, create novel environmental conditions never before experienced by ecosystems. Under such conditions, historical ecology suggests that we manage for species persistence within large ecoregions.

Mildrexler, et al., 2020 state the following:

- Large-diameter trees store disproportionally massive amounts of carbon and are a major driver of carbon cycle dynamics in forests worldwide.

- We examined the proportion of large-diameter trees on National Forest lands east of the Cascade Mountains crest in Oregon and Washington, their contribution to overall aboveground carbon (AGC) storage, and the potential reduction in carbon stocks resulting from widespread harvest. We analyzed forest inventory data collected on 3,335 plots and found that large trees play a major role in the accumulated carbon stock of these forests. Tree AGC (kg) increases sharply with tree diameter at breast height (DBH; cm) among five dominant tree species. Large trees accounted for 2.0 to 3.7% of all stems (DBH ≥ 1" or 2.54 cm) among five tree species; but held 33 to 46% of the total AGC stored by each species. Pooled across the five dominant species, large trees accounted for 3% of the 636,520 trees occurring on the inventory plots but stored 42% of the total AGC. A recently proposed large-scale vegetation management project that involved widespread harvest of large trees, mostly grand fir, would have removed ~44% of the AGC stored in these large-diameter trees, and released a large amount of carbon dioxide into the atmosphere.

Given the urgency of keeping additional carbon out of the atmosphere and continuing carbon accumulation from the atmosphere to protect the climate system, it would be prudent to continue protecting ecosystems with large trees for their carbon stores, and also for their co-benefits of habitat for biodiversity, resilience to drought and fire, and microclimate buffering under future climate extremes.

For the above reasons, the agency hasn't disclosed high-quality information, hasn't honestly or accurately analyzed or discussed adverse impacts, did not engage in analysis on a local or a regional level, did not take a hard look at the consequences of its proposed actions, is not using the best or even the most generally accepted science, and has failed to consider cumulative effects.

Remedy: Choose the No Action Alternative or withdraw the project, revise the forest plan to take a hard look at the science of climate change, and prepare an EIS for this project if the agency still wants to pursue it. Conduct a quantitative analysis that examines climate change in the context of project activities, desired conditions, and the regional quantities of emissions that like projects will emit (cumulative effects at the regional level).

ISSUE: ALLEGED FOREST IMBALANCE

Objectors' EA comments raised this issue in detail at pages 26-28. They are incorporated here.

Please see Wuerthner's "Foresters and ecologists see forests differently" for a description of the huge difference between the Industrial Forestry worldview as demonstrated by the FS and an ecological perspective.

For the reasons discussed in our comments, the Forest Service has violated NFMA for failing to ensure species diversity and has violated NEPA for failing to take a hard look at its impacts, including cumulative impacts.

Remedy: Select the No Action alternative, or prepare an EIS that addresses the issues we raised in our EA comments on this subject.

ISSUE: SOIL AND SOIL PRODUCTIVITY

Objectors raised this issue in detail on pages 4, 39, 45-46, 62-63, 68-83, and 97-100 in their scoping comments and on pages 28-43 in their EA comments. These comments are incorporated here and raised again. Additionally, because one can see the soil disturbance from satellite imagery and the Timelapse, assuming the baseline condition is zero percent soil disturbance in an area that has already had logging, especially when the Forest Service admits that soil displacement can be permanent despite restoration, is arbitrary.

In response to our request about discussing myccorrhizal conditions, the Forest Service stated, "The forest does not collect or analyze site specific data that directly corresponds to mycorrhizal fungi," refencing "CWD," an abbreviation not explained or defined in the FS responses or the EA. In the Final Environmental Impact Statement for the Idaho Panhandle Forest Plan, the Forest Service acknowledges that key stressors within its control include "timber harvest [], prescribed fire, road and trail reconstructions, and other activities that could impact populations either directly through loss of individuals or indirectly through canopy removal or ground disturbance that disrupts soil mycorrhizae." p. 127. The desired condition is FW-DC-SOIL-03 is for soil organic matter and down woody debris support healthy mycorrhizal populations, yet there is no attempt to establish a baseline of these populations. the agency is going to pick a feature for importance in its forest plan, then it cannot, at the site-specific level, state that it is impractical to measure this feature or attempt to establish a baseline condition so as to know the project's impacts on the Forest Service's attempt to move toward the desired condition. Plus, the Forest Service never explained how gathering such data necessary to demonstrate a trend towards desired conditions is impractical.

For the above reasons, the Forest Service has violated the National Forest Management Act for soil compaction and for failing to ensure soil productivity, especially in light of a warming planet. The desired conditions FW-DC-SOIL-01 and FW-DC-SOIL-02 are unclear provisions—but to the extent we interpret them at a finer scale, if the Forest Service admits these areas do not fully recover after logging, then proposing projects in areas with disturbed soils, the Forest Service has violated these desired conditions. The Forest Service is likely violating FW-DC-SOIL-03 because it cannot move towards desired conditions of healthy mycorrhizae communities while acknowledging many of the activities that make up this project will adversely impact those communities. The Forest Service has also violated this desired condition because it is starting with no baseline of the mycorrhizae in this area. Mycorrhizae is discussed in the FEIS as it pertains to rare plants in the both the dry and wet plant species groups. FEIS p. 127. Because the Forest Service discussed mycorrhizae only in the context of rare plants, the desired condition seems to have been developed to ensure species diversity in ensuring the survival of these rare plants. To the extent the Forest Service has created a desired condition it never planned to measure before any proposed impacts (FW-DC-SOIL-03), the Forest Service has violated the National Forest Management Act for failing to ensure species diversity.

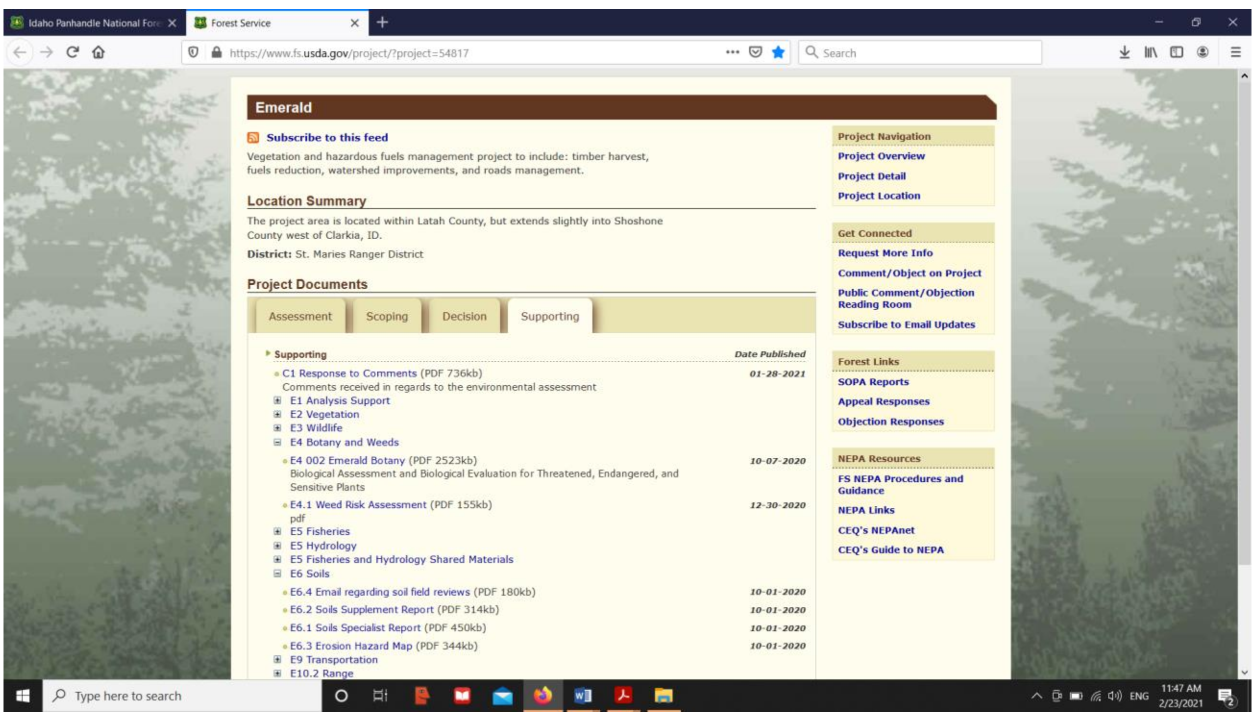
The National Environmental Policy Act has been violated for insufficient analysis, failing to consider the points raised in the scoping and environmental assessment comments, failing to take a hard look at proposed impacts, failing to consider the best science, failing to disclose (or even seek) high-quality information that would inform the action alternative, and failing to consider cumulative effects.

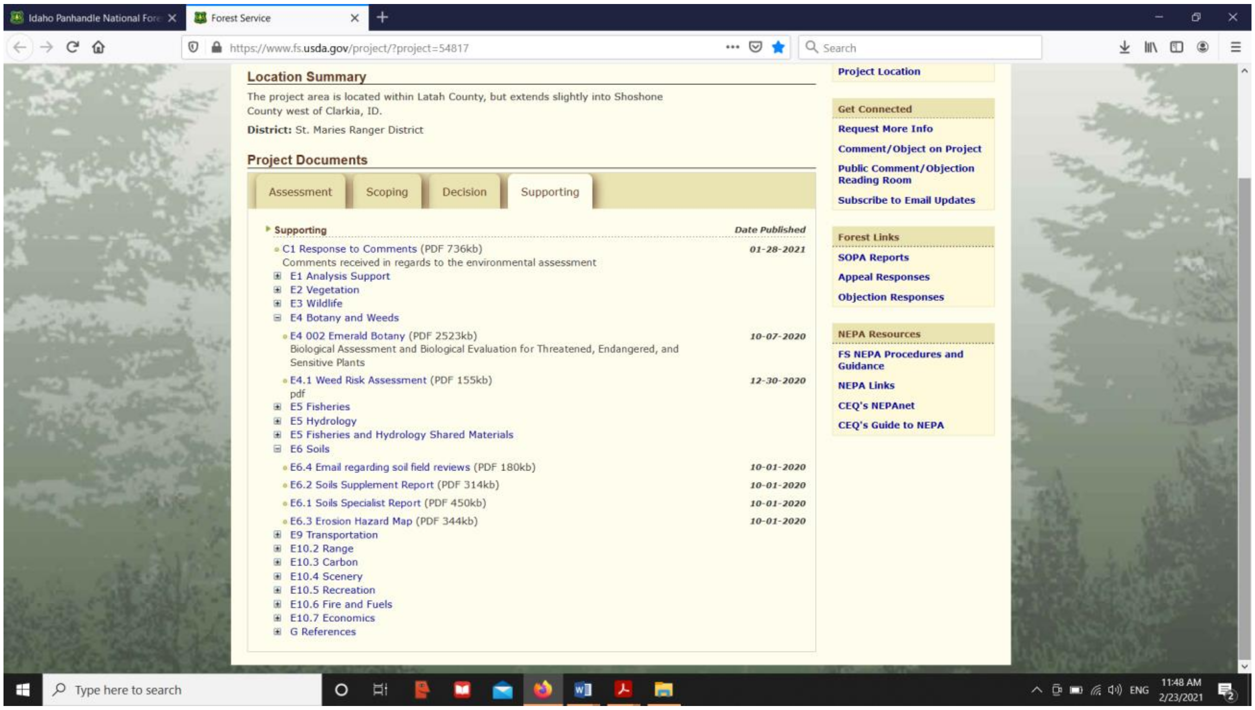
Remedy: Select the No Action alternative, or prepare an EIS that addresses the issues we raised in our EA comments on this subject.

ISSUE: NOXIOUS PLANTS

Objectors raised the issue noxious plants at pages 4, 57, 81-82, and 98 (in context of the forest plan) in the scoping comments, and pages 27, 43-44, 84, 120, and 127 in Objectors' EA comments in detail. These comments are re-raised and incorporated here.

In one response to the comments raised, the Forest Service answered in its comment-response table on page 64 that "The effects of noxious weed infestations on the production of Forest Types found within the St. Joe Ranger district is analyzed in Chapter III, *the Affected Environment*, of the St. Joe Weeds EIS found in the project file." Below are snapshots of the supporting documents for the Emerald project with what was available on the date this section was written:





The EIS the Forest Service referred to in the "project file" What the Forest Service responded to was not posted in the project file on the Emerald timber project webpage. Under botany and weeds, there are two reports, and neither of them are the EIS that the Forest Service mentioned. As a result, the public is still missing a current pieces of information to more meaningfully comment on this particular issue in this particular area.

While the agency directed the reader back to the weeds assessment drafted before our EA comments, there has been no recognition of several of our points. For example, *Ventenata dubia* is a weed better prevented than treated once it gains hold. In the risk assessment, the Forest Service said that "given [*Ventenata dubia's*] relative abundance on non-NFS lands at this time, the efficacy of treatments on NFS land would be limited, unless it is listed/managed by the state/counties as well." (Risk assessment p. 4). But, the risk assessment also discusses that this weed spreads to areas that are disturbed, and specifically includes logged areas. This baseline knowledge (that *Ventenata dubia* spreads to disturbed areas) is supported by the documents submitted with our EA comments that discuss finding *Ventenata dubia* in units logged within the past decade on the Clearwater National Forest. The Clearwater National Forest is comparable because this area is also surrounded by private lands, including timber lands and farm lands. Prevention likely means not disturbing areas in the first place instead of trying to eradicate a very pervasive noxious weed, yet this was not seriously considered. What's more, treating the weed with herbicides have other environmental effects not considered and the level at which this would happen, in addition to what impact that herbicide would have on meadow wildlife and habitat, is ambiguously discussed.

For the above reasons, the agency has violated NEPA by failing to disclose basic information to the public, including a true accounting of existing conditions. Without knowing existing conditions any analyses about significant or cumulative impacts would be insufficient. The agency has failed to take a hard look at its proposed actions and failed to comply with the National Forest Management Act because the agency isn't providing for a diversity of plant and animal communities, and noxious weeds threatens ecosystem integrity in a way that neither the forest plan nor this project considers.

Remedy: Select the No Action alternative, or prepare an EIS that addresses the issues we raised in our EA comments on this subject.

ISSUE: WATER QUALITY AND FISHERIES

We raised the issue of watersheds, water quality, watersheds, and impacts to aquatics and fisheries in detail for the forest-plan level and the project level in our scoping comments on pages 2-3, 6, 9, 10, 37-39, 47-48, 50, 53, 56, 61-62, 64-68, 71-74, 76, 83-85, 86, 90, 93 (roads), 98, 99, and in our EA comments on pages 44-60. They are incorporated here and re-raised.

Perry & Jones (2016) looked at decades of hydrologic data from paired watersheds in the Western Cascades and found:

> ABSTRACT: Analysis of 60-year records of daily streamflow from eight paired-basin experiments in the Pacific Northwest of the United States (Oregon) revealed that the conversion of old-growth forest to Douglas-fir plantations had a major effect on summer streamflow. Average daily streamflow in summer (July through September) in basins with 34- to 43-year-old plantations of Douglas-fir was 50% lower than streamflow from reference basins with 150- to 500-year-old forests dominated by Douglas-fir, western hemlock, and other conifers. …. Young Douglas-fir trees, which have higher sapwood area, higher sapflow per unit of sapwood area, higher concentration of leaf area in the upper canopy, and less ability to limit transpiration, appear to have higher rates of evapotranspiration than old trees of conifer species, especially during dry summers. Reduced summer streamflow in headwater basins with forest plantations may limit aquatic habitat and exacerbate stream warming, and it may also alter water yield and timing in much larger basins. Legacies of past forest management or extensive natural disturbances may be confounded with effects of climate change on streamflow in large river basins. ...
>
> **Discussion** - This study showed that, relative to mature and old-growth forest dominated by Douglas-fir and western hemlock or mixed conifers, forest plantations of native Douglas-fir produced summer streamflow deficits within 15 years of plantation establishment, and these deficits have persisted and intensified in 50-year-old forest stands . … This finding has profound implications for understanding of the effects of land cover change, climate change, and forest management on water yield and timing in forest landscapes. The size of canopy opening explained the magnitude and duration of initial summer streamflow surpluses and subsequent streamflow deficits, consistent with work on soil moisture dynamics of canopy gaps. … Together, the paired basin and experimental gap results indicate that even-aged plantations in 8 ha or larger clearcuts are likely to develop summer streamflow deficits, and these deficits are unlikely to be

substantially mitigated by dispersed thinning or small gap creation. Relatively high rates of summer evapotranspiration by young (25 to 45 years old) Douglas-fir plantations relative to mature and oldgrowth forests apparently caused reduced summer streamflow in treated basins. Young Douglas-fir trees (in AND 1) had higher sapflow per unit sapwood area and greater sapwood area compared to old Douglas-fir trees (in AND 2; Moore, Bond, Jones, Phillips, & Meinzer, 2004). In summer, young Douglas-fir trees have higher rates of transpiration (sapflow) compared to old Douglas-fir trees, because their fast growth requires high sapwood area and because their needles appear to exercise less stomatal control when vapor pressure deficits are high. Leaf area is concentrated in a relatively narrow height range in the forest canopy of a forest plantation, whereas leaf area is distributed over a wide range of heights in a mature or old-growth conifer forest. In summer, these factors appear to contribute to higher daily transpiration rates by young conifers relative to mature or older conifers, producing pronounced reductions in streamflow during the afternoons of hot dry days (Bond et al., 2002). At sunset, transpiration ceases, and streamflow recovers. Hence, daily transpiration produces large diel variations in streamflow in AND 1 (plantation) relative to AND 2 (reference). … Reduced summer streamflow has potentially significant effects on aquatic ecosystems. Summer streamflow deficits in headwater basins may be particularly detrimental to anadromous fish, including steelhead and salmon, by limiting habitat, exacerbating stream temperature warming, and potentially causing large-scale die-offs … Reductions in summer streamflow in headwater basins with forest plantations may affect water yield in much larger basins. Much of the Pacific Northwest forest has experienced conversion of mature and old-growth forests to Douglas-fir plantations over the past century. Climate warming and associated loss of snowpack is expected to reduce summer streamflow in the region (e.g., Littell et al., 2010). Declining summer streamflows in the Columbia River basin may be attributed to climate change (Chang, Jung, Steele, & Gannett, 2012; Chang et al., 2013; Hatcher & Jones, 2013), but these declines may also be the result of cumulative forest change due to plantation establishment, … Despite summer streamflow deficits, young forest plantations in the Andrews Forest yield more water in winter, contributing to increased flooding (Harr & McCorison, 1979; Jones & Grant, 1996; Beschta, Pyles, Skaugset, & Surfleet, 2000; Jones, 2000; Jones & Perkins, 2010).

Conclusions … Long-term paired-basin studies extending over six decades revealed that the conversion of mature and old-growth conifer forests to plantations of native Douglas-fir produced persistent summer streamflow deficits of 50% relative to reference basins, in plantations aged 25 to 45 years. This result challenges the widespread assumption of rapid "hydrologic recovery" following forest disturbance …

The Forest Service's response on best management practices illustrates how ill-suited the new forest plan is set up to understand any impacts from activities.

Specifically, we noted that designating BMPs is not sufficient for compliance with NFMA. In raising our issues on BMPs, the Forest Service replied, "Neither we nor the authors of these studies assert that BMPs eliminate sediment inputs to streams—only that they can effectively minimize sediment delivery and maintain the beneficial uses of water when they are used appropriately." (FS response to EA comments.) If BMPs can only minimize sediment delivery, they cannot improve watersheds, and so the agency cannot use these practices to achieve its goal to improve watersheds or move those that need to be improved toward an existing condition—it cannot inform on whether the goals or desired conditions in this forest plan can or will be achieved—we agree with this. Because this is the case, monitoring MON-WTR-01-01 cannot instruct on whether watersheds can meet goals or conditions—it is an entirely arbitrary monitoring scheme. It doesn't appear there is any other monitoring on this subwatershed, as the Forest Service also acknowledged in its EA responses that it's "trend" it observed here wasn't a "monitored trend." p. 45. For these reasons, the Forest Service has violated NFMA by failing to set up monitoring programs that can test progress towards achieving desired conditions and by not actually doing any monitoring in watersheds. Many watershed-related monitoring items set out were supposed to be annual, yet six years after the forest plan was revised, there is nothing. This lack of information also fails to establish a baseline condition, which means that the Forest Service doesn't understand the existing the condition and the likely conditions this project will have.

The Forest Service has failed to quantify, estimate, analyze the cumulative effects of sediment delivery on current sediment delivery in an area where sediment limits water quality. There is no discussion about whether the Forest Service has money to maintain these roads—and it practice it seems they don't. The Forest Service failed to do some of the road decommissioning likely connected to the Hidden Cedar project in this area 14 years ago. The Forest Service never discussed at what point roads start increasing sediment if not upkept. Roads that fall into a level of disrepair will increase sediment delivery, and there is no discussion about how often new road maintenance or reconstruction needs to occur to keep sediment delivery at the level which the specialist predicted in the long-term for sediment delivery. There is no genuine discussion on how to reduce sediment loads in the project area over the long term. This project—with its temporary roads and new system roads—does not accomplish this. In a moderately disturbed watershed like this one, this could be a potential significant impact. EA does not consider the fact that roads increase the efficiency of water transport during storm or snowmelt events, elevating water yields well above natural, with damaging effects. The EA ignores water yield and peak flows as factors. FS hydrologist Johnson, 1995 discusses many forms of road-related and other cumulative impacts the EA fails to consider.

The IPNF's Camp Robin timber sale Hydrology Report explains why this is important: "Runoff from rain falling on snow has been associated with increased risk of damage to stream banks and flooding. Available data indicates that rain falling on snow in open areas produces more water available for runoff than rain falling in forested areas. Much of the project area (~80%) falls in the rain-on-snow zone based on elevation (between 3500' and 4500')."

The FS's conclusion that there will be no significant increase in sediment is not supported by facts. PACFISH/INFISH buffers cannot stop the sedimentation once it inters the stream, and skid trails, landings, and temporary roads link to existing roads and ditches, where runoff goes down the ditch to a culvert and is conducted into small streams, which carry sediment into larger streams. Below is an illustration of this; the hillside ditch of the road is filled with fine sediment.

It was taken on the Clearwater National Forest in the Lowell WUI project in 2018 (before the road in this exact same area was blown out from a landslide).

At center-top-third of this picture is a culvert, which you can't see because of the sediment. Below is a detail shot of the above picture where the culvert is.

FS hydrologist Johnson (1995) points out older roads feature ditches on the inside of the road which greatly increases drainage efficiency, causing peak flows to go far beyond any modeled predictions.

The sediment surrounding the culvert is abundant. If one were to walk to what is depicted on at the top of the above picture and turn around to take a picture of the culvert, the picture that follows is that angle.

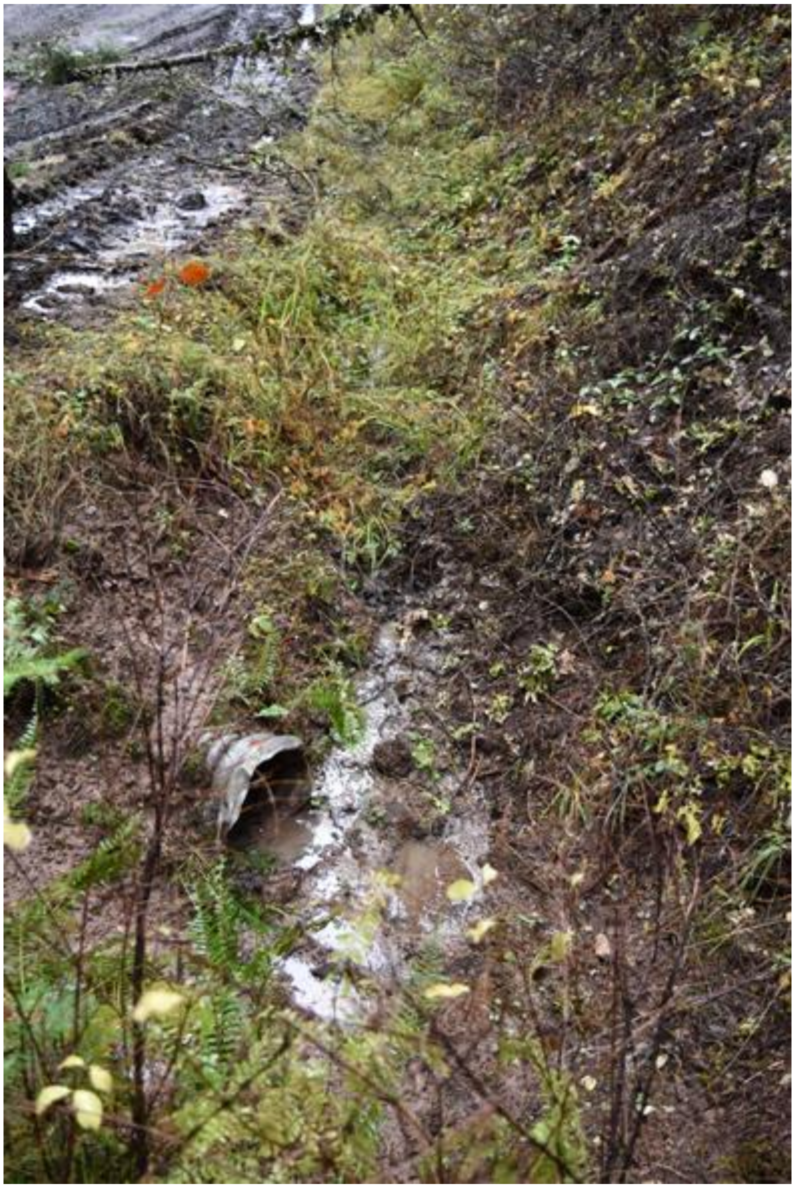
The following photos also illustrate a few of the problems associated with inadequate road maintenance. On July 7, 2019 an intense thunderstorm dropped rain and hail on portions of the Bitterroot National Forest. These photos are of an open Forest Service Road just south of Lake Como, probably FSR #550. All three were taken a few feet from one another. The first photo shows a stream of stormwater flowing down the road, where water flows off the surface into a draw in the landscape. The length of this stream of water on the road surface was over a quarter-mile—even around curves—essentially cutting a gully instead of flowing off the road within a short distance.

The second photo (above) shows this “stream” at the beginning of its flow off of the road at the location of the discharge of a small culvert (the culvert is not visible in the photo).

The third photo (below) shows the inlet of the culvert—empty of water despite the storm because of the tempering effect of the native forest vegetation in the draw above the road. (It also shows the culvert has begun to plug up since the time of installation or previous maintenance, meaning it is becoming vulnerable to a blowout during a subsequent storm event.)

The flow was not followed downslope to any water body destination, which it may or may not have reached before soaking into the soil. However, the photos show problems typical of roads without proper drainage features and/or lacking frequent enough maintenance, leading to accelerated erosion during storm or spring runoff events and necessitating more imminent maintenance steps needed to keep the road usable by the public.


Below is a second culvert in that same area, conducting sediment:



This is how sedimentation gets into the stream, which can be upstream of any logging buffers next to the stream. Yet, the FS bases its conclusion that there won't be sedimentation because INFISH buffers will stop it.

For the above reason and the reasons raised in our scoping and EA comments, the project violates NFMA and violates NEPA for not having baseline conditions, not properly considering all it should be for cumulative effects, and for not analyzing for a likely outcome—not having the money to keep these roads in a state of repair that they won't increase their sediment delivery, and not having the money to decommission the roads that were promised in earlier NEPA documents but never done.

Remedy: Do a supplemental environmental impact statement on the revised forest plan, and withdraw this project, choose the no-action alternative, or do an environmental impact statement that addresses above and the issues in our scoping comments and environmental impact statement.

ISSUE: VIABILITY AND DIVERSITY

We raised the issue of viability and diversity at pages 61-65 of Objectors draft EA comments. These are incorporated here and re-raised.

For the reasons outlined in the EA comments, the Forest Service has violated the National Environmental Policy Act by failing to take a hard look at the impacts at implementing this management plan and impacts that plan has on ensuring species viability and diversity, including the cumulative effects of implementation projects. The Forest Service has also violated the National Forest Management Act because it is not providing for species viability and diversity. There are also cumulative effects at the forest plan level for failing to comply with preserving species diversity by failing to monitor species that would ensure diversity—this is discussed in their sections and in the monitoring section in this objection as well as raised here.

Remedy: Select the No Action Alternative. Otherwise, prepare an EIS that addresses the analytical and scientific issues we raised in our EA comments on this issue.

ISSUE: OLD GROWTH

Objectors raised this issue in detail at pages 4-6, 9, 12-18, 20, 22-28, 33, 44, 47, 54, 57-58, 71, 80, 87-88, 90-93, and 98 in their scoping comments and pages 65-78 in their EA comments. These comments are incorporated here and issues re-raised.

It is unclear as to whether old-growth will be logged. While the Forest Service states no old growth will be logged, but the Forest Service also states that fisher habitat will be lost. The Forest Service cites Raley et al. 2012, and that scientific review engages in a lengthy discussion on the type of habitat that fisher select, which include large, old trees: "The large size of these structures is likely related to tree age and the long time periods required for various microstructures to develop...Compared with available sites, those used by fishers for resting had ≥ 1 of these structural components: greater average tree diameter or greater abundance of large-diameter trees, presence of large-diameter snags or greater abundance of snags, greater average size of logs or greater abundance of logs (primarily British Columbia and Oregon studies), and greater average diameter or greater abundance of hardwood trees (primarily California studies)...." *See also* Powell and Zielinski (1994). Raley et al. 2012 also states, "In general, active fishers were associated with the presence, abundance, or a greater size of ≥1 of the following characteristics: logs, snags, live hard-wood trees, and shrubs." Based this science, fisher uses trees that are a size achieved only when old. So, the Forest Service cannot represent both an abundance of fisher habitat (thus logging some would be negligible impact) and also represent that logging is not planned for old growth and old growth recruitment. If fisher are truly present, then what we know about their denning and resting preferences suggests there is more old growth in the area than the Forest Service has represented.

It is also unclear as to how the Forest Service concludes that activities can proceed in old-growth without destroying old growth characteristics. The very nature of the activities eliminates both living and dead trees and the decadence that old-growth creates. There is no evidence that such activities can move forward without destroying the features that define old growth. This is the seventh year of this forest plan—where is the monitoring on this?

Old growth is important for more than just the specialist habitat it provides. The public enjoy visiting these groves, for the mystery it invokes:

> The birth of "old growth" as the iconic forest can be encapsulated in a few words describing social meanings, time and space: re-enchantment trumped rationality; the eternal present absorbed the chronology of forest growth; mystical places colonized the choreography of sustained yield operations.

(Lee, 2009.) That opportunity doesn't exist in logging plantations, even if some of the larger, older trees are retained. We find nothing in the FS's perspective on old growth that recognizes these societal values.

Marcot, et al., 1991 make several points about old growth:

- In current planning and management activities on National Forests, old growth has several values (Sirmon 1985), and one of them is its importance as wildlife habitat (Meehan and others 1984, Meslow and others 1981, Raphael and Barrett 1984, Thomas and others 1988). Old growth provides optimal habitat for some management indicator species, including spotted owl, pileated woodpecker, and marten, and for many other species of plants, fish, amphibians, reptiles, birds, and small mammals (Harris and others 1982, Meslow and others 1981, Raphael 1988c, Raphael and Barrett 1984). It also provides thermal and hiding cover for ungulates, especially in winter (Schoen and others 1984, Wallmo and Schoen 1980). Old growth, therefore, plays an important role in providing for productive populations of some species of special ecological and administrative interest. For some of these species, old growth may be a key factor in providing for continued population viability.

- Additional values of old growth are as natural research areas for scientific study (Greene 1988, Sheppard and Cook 1988) and its ecological role in providing long-term forest productivity (Franklin and others 1981, Perry and others 1988). Other interests in old growth include its recreational, aesthetic, and spiritual significance (Anderson 1988), its contribution to watershed protection (Sedell and Swanson 1984), and its importance as a contributor to biological diversity (Harris 1984, Luman and Neitro 1980, Norse and others 1986).

- Without adequate inventories and without a clear understanding of the amount and distribution of old growth it is difficult for the decision maker to determine what is practical or feasible (Ham 1984:69).

- An old-growth inventory must be designed with a specified degree of reliability. The degree of error and confidence in the statements of amount and distribution should be known, at least qualitatively. The reliability of an inventory is a function of many factors. These include the correctness and usefulness of the classification scheme used; the quality of the sampling design by which remote-sensing images are interpreted and vegetation surveys in the field are conducted; the consistency with which inventory criteria are applied across various land units, taking into account the need to vary criteria by forest type and land form; the availability and quality of remotely sensed images: the expense and training involved in having people interpret the remotely sensed images; the experience and training of field crews; and the sample sizes used in field verification testing and from which subsequent classification strata are derived.

- Some wildlife species may have co-evolved with, and depend on, specific amounts and conditions of old-growth forests. Specific kinds, sizes, and patterns of old-growth environments are, therefore, keys to the long-term survival of these species. Land allocations affect the distribution of old growth across the landscape over time and the effectiveness of old growth as habitat for wildlife. Resulting spatial patterns of old growth influence the viability of many wildlife species that depend on the ecological conditions of old forests. Old growth may provide population "reservoirs" for species that find early successional stages of second-growth conifer stands marginal habitat.

- Landscape attributes affecting the perpetuation of old-growth dependent and associated wildlife include the spatial distribution of old growth; the size of stands; the presence of habitat corridors between old-growth or old-forest stands; proximity to other stands of various successional stages and especially for well-developed mature-forest stages and species with different seasonal uses of habitats; and the susceptibility of the old-growth habitat to catastrophic loss (such as wildfire, insects, disease, wind and ice storms, and volcanic eruptions.

- Stand size, in combination with its landscape context (the condition, activities, or both on the adjacent landscape that affect the stand), is of major significance in perpetuating old-growth resources and can have a major effect on their use by wildlife. Wide-ranging species may be able to use stands of various structural- , size- , and age-classes. If such stands are separated by unsuitable habitat or disruptive activities, however, the remaining old-growth stands become smaller in effective (interior) size, more fragmented, and possibly not suitable for occupancy or for successful reproduction. An old-growth inventory that quantifies such stand and landscape attributes is a prerequisite for evaluating possible context and landscape effects on species' presence.

Foster et al., 1996 state the following:

The maintenance of many natural ecosystems requires the protection not only of current old-growth areas, but also of naturally disturbed forests that represent future old-growth. To ensure the continued presence of old growth, these areas must be maintained within a landscape that is adequate in size to allow for the continuing mosaic of disturbance and for the dispersal of organisms and processes among patches. The protection and value of naturally disturbed old-growth patches is often a point of controversy among natural resource managers, conservationists and ecologists. Many of the most intensively studied and revered old-growth forest areas have been recently disturbed in catastrophic ways (for example, in the USA: Tionesta Scenic Area in Pennsylvania, Cathedral Pines in Connecticut, Five Ponds Wilderness Area in New York's Adirondack Park). Pressure to salvage-log such areas to reduce fire hazard or to recoup economic loss is often intense and yet preservation of damaged old-growth ecosystems provides important ecological lessons and forms a critical element in old-growth research and preservation.

Franklin and Spies, 1991 make several relevant points about old growth:

- Old-growth forest is a biological or ecological concept that presumes ecosystems systematically change as they persist over long periods. An ecosystem has, in effect, a series of linked life stages …which vary in composition, function, and structure. Such progressions can take a very long time in forests because the dominant organisms, trees, typically live very long.

- Characterizing old-growth forests is possible based on these concepts. Obviously, a series of ecological attributes must be considered because of the many relevant compositional, functional, and structural features. For practical reasons, however, a working definition—one for everyday use in gathering stand data—emphasizes structural and compositional rather than the conceptually important functional features that are difficult to measure.

- Old-growth forests are later stages in forest development that are often compositionally and always structurally distinct from earlier successional stages.

- The age at which forests become old growth varies widely with forest type or species, site conditions, and stand history.

- Structurally, old-growth stands are characterized by a wide within-stand range of tree sizes and spacing and include trees that are large for the particular species and site combination. Decadence is often evident in larger and older trees. Multiple canopy layers are generally present. Total organic matter accumulations are high relative to other developmental stages. Functionally, old-growth forests are characterized by slow growth of the dominant trees and stable biomass accumulations that are constant over long periods.

- Our failure to study old-growth forests as ecosystems is increasingly serious in considerations of old-growth issues. Without adequate basic knowledge of the ecosystem, we risk losing track of its totality in our preoccupation with individual attributes or species. Definitional approaches to old growth based on attributes, including those that we have presented here, predispose us to such myopia. The values and services represented by old-growth ecosystems will be placed at ever greater risk if we perpetuate our current ignorance about these ecosystems. It will also increase doubts about our ability to manage for either old-growth ecosystems or individual attributes (for example,

> species and structures) associated with old growth. We must increase ecosystem understanding and management emphasis on holistic perspectives as we plan for replacement of old-growth forests. How can we presume to maintain or re-create what we do not understand? Some may presume that ignorance (on ecological values of old growth) is bliss, but this attitude creates high risk that we will continue to be blindsided by subsequent discoveries.

Bollenbacher and Hahn, 2008 discuss "Maintaining Resilient Old Growth Forests: Impacts of Forest Management on Wildlife":

> When OG stands are treated to increase their resilience, how do these treatments affect wildlife? Few studies have rigorously tested this question, despite the persistent need for information. Inferring causation from treatment effects requires an experiment. Experimental standards—randomization, replication, and controls—are not routinely incorporated into project planning, nor are the funding and time needed to examine population responses.

Bollenbacher and Hahn, 2008 make further points:

- Relative to harvested forests, OG stands had higher species richness (Mazurek and Zielinski 2004; birds: Beese and Bryant 1999), supported more small mammal individuals and biomass (Rosenberg and Anthony 1993; Carey 1995; Carey and Johnson 1995), and allowed for greater movement and genetic diversity (tailed frog *Ascaphus truei*: Wahbe et al. 2004, 2005).

- Related studies examining wildlife responses in OG stands compared to younger stands revealed extensive variability, which may be attributed to differences among studies in location; stand type, treatment and size; and pre- and post-treatment stand conditions. Clearly, more work is needed; in particular, we need to rigorously investigate OG treatment effects on forest structure and composition and wildlife populations in the Northern Region.

For the reasons above, the Forest Service's analysis violates the National Forest Management Act because it is not based on the best science and cannot ensure diversity. What is not demonstrated is whether this project can support FW-DC-VEG-03, can comply with FW-STD-VEG-01, FW-GDL-VEG-01, FW-GDL-VEG-02, FW-DC-WL-12, or has complied with the monitoring the forest plan has set out. For the reasons above, the Forest Service analysis violates NEPA for finding no significant impact without an accurate or confirmed baseline or monitoring results, for failing to take a hard look at the impacts of the proposed action, and for failing to consider science on old growth development, pathways, and persistence.

Remedy: Select the No Action Alternative. Otherwise, prepare an EIS that addresses the analytical and scientific issues we raised in our scoping and EA comments on this subject in consideration of the augmented discussion above.

ISSUE: SNAGS AND DEAD TREE HABITAT

Connected to our old growth discussion (but also present outside of old growth) are the snags and dead-tree habitat. Snags and dead trees are important for forest structure and composition, and provide important habitat characteristics for various species. Objectors raised this issue in both the forest-plan context and the context of this project on pages 9, 12-13, 16-20, 26-28, 54, and 58 of our scoping comments and pages 75-78 of our EA comments. They are incorporated and re-raised here.

Rose, et al., 2001 is scientific information on dead wood in forest ecosystems. They make several good points, citing dozens of other scientific sources (internal citations omitted):

- Decaying wood has become a major conservation issue in managed forest ecosystems. Of particular interest to wildlife scientists, foresters, and managers are the roles of wood decay in the diversity and distribution of native fauna, and ecosystem processes. Numerous wildlife functions are attributed to decaying wood as a source of food, nutrients, and cover for organisms at numerous trophic levels. Principles of long-term productivity and sustainable forestry include decaying wood as a key feature of productive and resilient ecosystems. (Internal cites omitted.)

- Inputs of decaying wood are crucial to most aspects of stream processes, such as channel morphology, hydrology, and nutrient cycling.

- Wood decay in forests of the Pacific Northwest has recently become a topic of renewed interest at national and global scales, regarding the role of terrestrial carbon storage in the reduction of atmospheric CO2 (a greenhouse gas).

- New research over the past three decades has emphasized the significance of decaying wood to many fish and wildlife species, and to overall ecosystem function. The importance of decaying wood to ecosystem biodiversity, productivity, and sustainability is a keynote topic in two recent regional ecosystem assessments in Oregon and Washington. These, and other publications address both the specific roles of wood decay in ecosystem processes and functions, as well as ecological functions of wildlife species associated with wood decay.

- Interactions among wildlife, other organisms, and decaying wood substrates are essential to ecosystem processes and functions. In the process of meeting their needs, animals accomplish ecosystem work with respect to transformation of energy and cycling of nutrients in wood. For example, chipmunks and squirrels disperse mycorrhizal fungi which play key roles in nutrient cycling for tree growth; birds, bats, and shrews consume insects that decompose wood or feed on invertebrates and microbes; beavers and woodpeckers create habitats by modifying physical structures; arthropods build and aerate soil by decomposing wood material. Relations between wood decay and wildlife have been examined in several recent analyses.

- Managed forests, on average, have lower amounts of large down wood and snags than do natural forests.

- Emphasis on concepts of long-term productivity in this chapter reflects an underlying principle that habitat functions of decaying wood are inextricably linked to ecosystem processes. Careful attention to the whole ecosystem is a prerequisite to successful management of decaying wood for wildlife.

Wood Legacies in Managed Forests

John Hayes

Legacies are structures or components of ecosystems that exist prior to a disturbance and are "inherited" by the post-disturbance community. Legacies can provide important temporal connectivity within a stand, allowing organisms present in a pre-disturbance community to persist in an area following disturbance. In addition, legacy wood can provide structural elements and complexity in a stand that would otherwise require very long periods of time to develop. In managed forests, wood legacies, including large diameter trees, snags, and down wood, are ecologically important structures that play central roles in diverse ecosystem processes and functions, such as geomorphic processes, hydrology, nutrient cycling, and habitat for fish and wildlife. The ecological value of wood legacies has begun to gain widespread recognition only within the past two decades.[122, 164]

As a result of a variety of operational, safety, and economic considerations, application of intensive forest management practices often results in removal of legacy structures from stands and minimal retention of future legacy structures. Growing replacement structures with similar characteristics (e.g., large diameter trees with large diameter branches, thick and deeply-furrowed bark, and complex crown structure) requires decades or longer. Moreover, unless special provisions are made, large diameter trees, snags, and logs with these characteristics may never be produced in forests managed intensively on short- to moderate-length rotations. Habitat quality for species that depend upon or are closely associated with these structures can be seriously diminished with their loss from forest stands. The ecological importance of wood legacies combined with the difficulties of creating replacement structures provide convincing reasons to conserve legacy structures during management activities.

Managing wood legacies through time in managed forests is a multi-staged process. Existing structures that will serve as legacy structures in the post-disturbance environment should be identified prior to a disturbance event, such as logging. In some cases, it may be adequate to rely on the timber sale administrator or loggers to identify appropriate structures and implement the management strategy in the field. Since one intent of legacy structures is to provide various functions through time, it will often be valuable to either individually mark important legacy structures, or to document their location and purpose so that future managers can take the structures into account. Of equal importance, plans for recruitment of future legacy structures should be prepared to ensure that legacy structures will be available in future stands. Innovative silvicultural practices can be employed to create conditions favorable to development of future legacy structures.

- Of the biological agents of wood decay, insects and fungi are the principal players in coniferous forest ecosystems.

- Down wood, snags, and live trees with decay serve vital roles in meeting the life history needs of wildlife species in Oregon and Washington.

- Woodpeckers, sapsuckers, and nuthatches are highly specific in their selection of tree species for nesting and roosting, and this selectivity is attributed to the presence of decay fungi.

- To be useful to most cavity excavators, live trees usually must contain wood in a Class 2 stage of decomposition. For example, strong excavators, such as Williamson's sapsuckers, pileated woodpeckers, and black-backed woodpeckers, select trees with a sound exterior sapwood shell and decaying heartwood to excavate their nest cavities.

- Hollow trees larger than 20 inches (51 cm) in diameter at breast height (dbh) are the most valuable for denning, shelter, roosting, and hunting by a wide range of animals. Hollow chambers are used as dens by black bears, as night roosts by woodpeckers, and as dens, shelter, roosts, and hunting sites by a variety of animals, including flying squirrels, wood rats, bats, American marten, northern flickers and Vaux's swift.

- Hollow trees and down wood are formed from only a few tree species that can maintain bole structural integrity as the heartwood decays. Western redcedar is especially valuable in providing hollow trees because the decay-resistant sapwood remains structurally sound for centuries. In the Interior Columbia Basin, grand fir and western larch form the best hollow trees for wildlife uses.

- Broomed trees caused by mistletoe, rust, or needlecast fungi may remain alive for decades, and have attributes distinct from decay patches in live trees. Abundant forage is produced from mistletoe shoots and fruits. Regardless of the extent of decay, broom infections provide various habitat functions to wildlife depending on how and where they form along the bole. For example, mistletoe brooms form platforms used for nesting, roosting, and resting sites by owls, hawks, and song birds; roosting by grouse; and resting cover by squirrels, porcupines, and marten.

- The abundance of cavity-using species is directly related to the presence or absence of suitable cavity trees. Habitat suitability for cavity-users is influenced by the size (diameter and height), abundance, density, distribution, species, and decay characteristics of snags. In addition, the structural condition of surrounding vegetation determines foraging opportunities.

- Stumps provide a variety of wildlife habitats. Stumps with sloughing bark (Class 2) provide sites for bat roosts, and foraging sites for flickers, and downy, hairy and pileated woodpeckers. In openings, tall stumps with advanced decay (Class 3) provide nest sites for flickers, and subsequently for blue birds and other secondary cavity-nesters associated with openings. Squirrels and chipmunks also use stumps as lookouts and platforms for cone-shredding.

- Down Woody Material (logs). Down wood affords a diversity of habitat functions for wildlife, including foraging sites, hiding and thermal cover, denning, nesting, travel corridors, and vantage points for predator avoidance. Larger down wood (diameter and length) generally has more potential uses as wildlife habitat. Large diameter logs, especially hollow ones are used by vertebrates for hiding and denning structures. Bears forage for invertebrates in logs during summer and fall. Fishers use large logs to a limited degree as den sites.

- Lynx select dense patches of downed trees for denning. Jackstrawed piles of logs form a habitat matrix offering thermal cover, hiding cover, and hunting areas for species such as marten, mink, cougar, lynx, fishers, and small mammals (Figure 8). Smaller logs benefit amphibians, reptiles, and mammals that use wood as escape cover and shelter. Small mammals use logs extensively as runways (Figure 9). California red-backed voles use Class 2-3 down logs for cover, and feed on fungi (especially truffles) and lichens growing in close association with down wood.

- The moist environment beneath loose bark, bark piles and in termite channels of logs with advanced decay provides a protected area for foraging by salamanders. The cool, moist environment of rotten wood may be required for some species of salamanders to survive heat stress during summer. Decaying wood also provides habitat for invertebrates on which salamanders and other foraging vertebrates feed (e.g., collembolans, isopods, millipedes, mites, earthworms, ants, beetles, flies, spiders and snails). The folding-door spider constructs a silk tube within the cracks and crevices of wood with advanced decay.

- Habitat structures in upper layers of the forest floor (soil, litter, duff) result from processes involving organic material (litter, decaying roots, vertebrate and invertebrate carrion, and fecal matter) and a diverse community of organisms, including bacteria, fungi, algae, protozoa, nematodes, arthropods, earthworms, amphibians, reptiles, and small mammals. The complex trophic web supported by nutrient and moisture conditions within the litter and duff layers transforms plant material into a variety of degradation products, thereby storing and releasing nutrients within the ecosystem.

- Decaying wood forms many habitat structures in riparian forests. Accumulations of large wood on stream banks provide habitat for small mammals and birds that feed on stream biota, and provide structural diversity in streamside forests.

- The role of down wood in salmon habitat has received much attention over the past two decades. Large wood is a key component of salmonid habitat both as a structural element and as cover and refugia from high flows. Large wood serves key functions in channel morphology, as well as sediment and water routing. The importance of wood to salmon habitat varies from headwater to stream mouth. As stream order increases and gradient decreases in third- to fifth-order streams, down wood is a dominant channel-forming feature. Larger wood deflects water and increases hydraulic diversity, producing a range of pool conditions that serve as habitats for juvenile salmonids in summer. Diverse channel margins are a primary aspect of rearing habitat. Flow obstructions created by large wood provide foraging areas for young salmonid fry that are not yet able to swim in fast currents, and provide refugia to juvenile salmonids at high flow. In higher order streams, flow deflections created by large wood trap sediments and nutrients, and enhance the quality of gravels for spawning. Down wood is less of a channel-forming feature along large rivers, but defines meander cutoffs and provides cover and increased invertebrate productivity for juvenile salmonids.

- Processes that sustain the long-term productivity of ecosystems have become the centerpiece of new directives in ecosystem management and sustainable forestry. Given the key role of decaying wood in long-term productivity of forest ecosystems in the Pacific Northwest, the topic should remain of keen interest to scientists and managers during the coming decade. Below, we highlight functions of decaying wood directly linked to long-term productivity, including influences on the frequency and severity of disturbances such as fire, disease, and insect outbreaks.

- **Nutrient Cycling and Soil Fertility.** Decaying wood has been likened to a savings account for nutrients and organic matter, and has also been described as a short-term sink, but a long-term source of nutrients in forest ecosystems.

- Nutrient cycling via foliage and fine litter has been well-described. Substantial amounts of nitrogen are returned to the soil from coarse wood inputs, yet even where annual rates of wood input are high, 4 to 15 times more nitrogen is returned to the forest floor from foliage than from large wood. This is a consequence of the higher nutrient concentrations and shorter turnover times of leaf litter compared to wood. The relative contribution of large wood to the total nutrient pool in an ecosystem depends to a large extent, on the size of other organic pools in the system.

- The slow rate of nutrient release from decomposing wood may serve to synchronize nutrient release with nutritional demands in forests, and also to minimize nutrient losses via leaching to the ground water. In addition to nitrogen bound chemically within wood, down wood reduces nutrient losses from ecosystems by intercepting nutrients in litterfall and throughfall. Favorable temperature and moisture conditions also makes large decaying wood sites of significant nitrogen inputs via N-fixation.

- Soil is the foundation of the forest ecosystem. Large wood is a major source of humus and soil organic matter that improves soil development.

- **Moisture Retention.** Water stored in large decomposing wood accelerates microbial decay rates by stabilizing temperature and preventing dessication during the summer...Moist conditions within the wood favor decay by attracting burrowing and tunneling mammals and invertebrates that improve aeration of wood, and by providing colonization substrate and moisture for mycorrhizae and other fungi. Moist. nurse logs. also provide excellent sites for seedling establishment and production of sporocarps. These processes increase retention and cycling of nutrients within ecosystems and contribute to higher biodiversity and biomass production.

- **Mycorrhizae**. Mycorrhiza, meaning fungus-root, is a symbiotic association of fungi with plant roots. The fungus improves nutrient and water availability to the host in exchange for energy derived from plant sugars. Mycorrhizae are necessary for the survival of numerous tree families, including pine, hemlock, spruce, true fir, Douglas-fir, larch, oak, and alder. Mycorrhizal associations are a source of nutrients to promote wood decay. By the time a log reaches more advanced stages of decomposition (Class 3) fungal colonization leads to the accumulation of nutrients in hyphae, rhizomorphs and sporocarps, especially for ectomycorrhizal fungi, where >90% of the fungal activity is associated with organic material. Ectomycorrhizal fungi decrease the ratio of carbon to nitrogen in decomposing wood, and mediate nutrient availability to plants while improving nutrient retention by forest ecosystems.

- The energy derived from falling or flowing water is the driving force behind erosion processes in Pacific Northwest forests. By covering soil surfaces and dissipating energy in flowing and splashing water, logs and other forms of coarse wood significantly reduce erosion. Large trees lying along contours reduce erosion by forming a barrier to creeping and raveling soils, especially on steep terrain. Material deposited on the upslope side of fallen logs absorbs moisture and creates favorable substrates for plants that stabilize soil and reduce runoff.

- **Stand Regeneration and Ecosystem Succession.** Decomposing wood serves as a superior seed bed for some plants because of accumulated nutrients and water, accelerated soil development, reduced erosion, and lower competition from mosses and herbs. In the Pacific Northwest, decaying wood influences forest succession by serving as nursery sites for shade-tolerant species such as western hemlock, the climax species in moist Douglas-fir habitat. Wood that covers the forest floor also modifies plant establishment by inhibiting plant growth, and by altering physical, microclimatic, and biological properties of the underlying soil. For example, elevated levels of nitrogen fixation in Ceanothus velutinus and red alder have been reported under old logs.

- **Streams and Riparian Forests.** Long-term productivity in streams and riparian areas is closely linked to nutrient inputs, to attributes of channel morphology, and to flow dynamics created by decaying wood. Small wood contributes to nutrient dynamics within streams and provides substrates to support biological activity by microorganisms, as well as invertebrates and other aquatic organisms. Much of the organic matter processed by the aquatic community originates in riparian forests and is stored as logs.

- Large wood is the principal factor determining the productivity of aquatic habitats in low- and mid-order forested streams. Large wood stabilizes small streams by dissipating energy, protecting streambanks, regulating the distribution and temporal stability of fast-water erosional areas and slow-water depositional sites, shaping channel morphology by routing sediment and water, and by providing substrate for biological activity. The influence of large wood on energy dissipation in streams influences virtually all aspects of ecological processes in aquatic environments, and is responsible for much of the habitat diversity in stream and riparian ecosystems. The stair-step gradients produced by wood in small stream basins supports higher productivity and greater habitat diversity than that found in even-gradient streams lacking wood structure.

- The input rates and average piece size of dead wood generally increase with stand age, although the amount of decaying wood can follow a U-shaped pattern if young forests inherit large amounts of decaying wood and live trees from preceding stands.346

- Insects and pathogens play a key role in maintaining diverse and productive forests by creating habitat and stimulating nutrient cycling.

- Intensive forest management activities that have decreased the density of large snags in early forest successional stages (sapling/pole and small tree stages) may have had adverse impacts on the 61 associated wildlife species (Figure 12). Similarly, the lesser amount of large down wood in early forest successional stages may not provide as well for the 24 associated wildlife species. Such results suggest the continuing need for specific management guidelines to provide large standing and down dead wood in all successional stages.

- These silvicultural practices clearly altered the abundance and recruitment of large down wood and snags in managed forests of the Pacific Northwest, including:
    1. Lower abundance of large diameter snags and down wood legacies in managed forests (and streams); e.g. lack of the U-shaped pattern; higher accumulation of smaller-diameter fuels in eastside forests.
    2. Reduced recruitment and retention of large trees to provide future legacies.
    3. Shorter mean residence time for down wood (i.e. faster decomposition as a function of reduced log diameter).
    4. Altered species composition of forests (westside: more Douglas-fir, less western red cedar; eastside: less pine, more true fir species).

- Several major lessons have been learned in the period 1979-1999 that have tested critical assumptions of these earlier management advisory models:
    - Calculations of numbers of snags required by woodpeckers based on assessing their biological potential. (that is, summing numbers of snags used per pair, accounting for unused snags, and extrapolating snag numbers based on population density) is a flawed technique. Empirical studies are suggesting that snag numbers in areas used and selected by some wildlife species are far higher than those calculated by this technique.
    - Setting a goal of 40% of habitat capability for primary excavators, mainly woodpeckers, is likely to be insufficient for maintaining viable populations.
    - Numbers and sizes (dbh) of snags used and selected by secondary cavity-nesters often exceed those of primary cavity excavators.
    - Clumping of snags and down wood may be a natural pattern, and clumps may be selected by some species, so that providing only even distributions may be insufficient to meet all species needs.
    - Other forms of decaying wood, including hollow trees, natural tree cavities, peeling bark, and dead parts of live trees, as well as fungi and mistletoe associated with wood decay, all provide resources for wildlife, and should be considered along with snags and down wood in management guidelines.
    - The ecological roles played by wildlife associated with decaying wood extend well beyond those structures per se, and can be significant factors influencing community diversity and ecosystem processes.

- Furthermore, although the analysis of inventory data presents data on dead wood abundance, management actions at the local level may best be focused on the ecological processes that lead to development of these forest structures rather than on the abundance of structures themselves. Management decisions also may require information on the spatial distribution (landscape pattern) of dead wood, which cannot be estimated from sample-based inventories.

- If detailed data on the current and historical range of natural conditions is lacking (which is likely), it may be preferable to substitute functional target values for specific wildlife species. For example, to provide maximum habitat elements for specific cavity-nesting species, a designated quantity and distribution of snags

- Effective management of decaying wood must do more than simply provide for inputs of dead trees. Rather, management should strive to provide for diversity of tree species and size classes, in various stages of decay and in different locations and orientations within the stand and landscape.

- Green trees function as a refugium of biodiversity in forests. For example, many species of invertebrate fauna in soil, stem, and canopy habitats of old-growth forests do not disperse well, and thus, do not readily recolonize clear-cut areas. The same concept holds for many mycorrhizae-forming fungal species. Added benefits of green tree retention include moderated microclimates of the cutover area, which may increase seedling survival, reduce additional losses of biodiversity on stressed sites, and facilitate movement of organisms through cutover patches of the landscape.

- In situations where forest management objectives extend beyond wood production to broader biological and human values, intensive forestry practices by themselves may inadequately maintain or restore biodiversity, especially in early and late successional forest development phases. Species, processes, and values associated with older stages of stand development (transition and shifting gap stages) are likely impaired or absent from intensively managed stands. Species and processes associated with the early establishment phase also have shorter duration than may occur naturally. This does not mean that intensive forest management practices are incompatible with multiple forest objectives at a landscape scale, but rather that species and processes associated with early and late stages of forest development should be assessed over large areas such as landscapes, subregions, and regions.

- Management for certain species must consider habitat requirements at different spatial and temporal scales. It may then be possible to modify silvicultural practices at the stand scale to meet multiple objectives at landscape and larger scales. The landscape perspective also is pertinent to managing riparian systems, where the role of wood decay in riparian environments varies according to the type and geography of the associated water body.

- The decline of species associated with late-successional forest structures, as well as the prolonged time needed to produce wood legacies, suggests that it is both ecologically and economically advantageous to retain legacy structures across harvest cycles wherever possible, rather than attempt to restore structures that have been depleted. This is especially obvious for slow-growing tree species and very large wood structures.

> Retention of old- growth structural legacies has been identified as critical to conservation of biodiversity between large reserves and conservation areas.

For the reasons raised in Objectors' scoping and EA comments in addition to what we have augmented above, this project and its analysis violated the National Forest Management Act for not ensuring diversity and having forest-plan components not based on the best science and failing to disclose the science relied upon for the forest-plan guideline for a snag minimum. For the reasons raised in Objectors' scoping and EA comments in addition to what we have augmented above, this project and its analysis has violated the NEPA for failing to use the best science, failing to have an accurate idea of existing conditions, failing to consider science controversial to the science upon which the Forest Service relies, failing to consider the cumulative impacts of the loss of snags and dead trees, and failing to take a hard look at possible impacts.

Remedy: Select the No Action Alternative, withdraw the project, or prepare an EIS that addresses the analytical and scientific issues we raised in our scoping and EA comments on this subject.

HABITAT FRAGMENTATION AND CONNECTIVITY

Objectors raised this issue in detail for both the forest plan and this specific project at pages 20, 22, 34, 37, 56, 84, 90-91, 92, and in our EA at pages 78-82. Those are re-raised and incorporated here.

For the reasons enumerated in the EA and scoping, the Forest Service has failed to take a hard look at the impacts of this project and has failed to consider cumulative effects of this project.

Remedy: Select the No Action Alternative, withdraw the project, or prepare an EIS that addresses the analytical and scientific issues we raised in our scoping and EA comments on this subject.

WILDLIFE POPULATION TREND MONITORING

We raised concerns about wildlife populations and the agency's monitoring of them at both the forest-plan level and this specific comment in our scoping comments at pages 5, 21-24, 31, 33-34, 56, 64, 84, 86, 88, 89, 90, 93, 99, 102, 103, and in our EA comments at page 82. They are re-raised and incorporated here. Using models for habitat when the agency consistency fails to validate those models cannot substitute for

There was no attempt to discuss macroinvertebrate assemblage anywhere in this project. The Forest Service never explained how FW-DC-AQS-01 can inform on fish populations in the forest plan revision. Nor does it indicate it's been done even thought the agency notes it will do it every five years and we are six years into this forest plan.

For the reasons above, the forest plan cannot ensure for a diversity and viability of species in violation of NFMA, nor does it comply with NEPA because it fails take a hard look the impacts of implementing the plan or the cumulative effects of doing so without informative measures actually executed when the agency claims them to be. The project violates NFMA for failing to show it is complying with the forest plan and the agency has failed to take a hard look at the impacts of this project, including cumulative effects.

Remedy: Select the No Action Alternative, withdraw the project, or conduct an EIS on the impacts of this proposal that addresses the issues raised in our scoping comments, our EA comments, and augmented above. For the forest plan, do a supplemental environmental impact statement that analyzes the points considered in our scoping and EA comments and augmented above.

ISSUE: ELK AND OTHER BIG GAME SPECIES

We raised our concerns about elk in great detail in our scoping comments at pages 5-6, 89-90, and 99, and in our EA comments on pages 83-84. In particular, we are concerned about hiding cover, winter range, and security in the project area in addition to what will be available after project implementation.

The agency's statements of existing conditions for elk and what this species needs is whiplash, contradictory, and not based on science. The agency states in its wildlife report that forage isn't the scarce resource in this area, but that it is habitat security. The Forest Service asserts that "forage is not generally limited but cover and security habitat can be" and goes on to say, "The juxtaposition of industrial timber lands and private ownership in relation to NFS land [the Emerald timber sale area] *heightens the value of cover and mature forest within this sub-watershed*." E3.1 p. 42. The agency states only paragraphs later, "Rocky Mountain elk forage in the project area will continue to decline over time as some of those openings grow into denser closed-canopy conifer stands," which seems to be what the agency is using to justify the project from an elk perspective.

The agency statements on fire in the context of elk are also whiplash, contradictory, and not based on science. The agency states that stand densities have "led to hazardous fuel accumulations. These issues have compromised our ability to meet management objectives in the project area and pose an increasing risk of *large-scale losses of security habitat*." E3.1. Yet, one paragraph later, the agency also states, "Therefore, restoration and maintenance of big game populations and their productivity requires sufficiently recurrent and *widespread disturbance to replenish nutritionally adequate forage*." The takeaway message seems to be that forage is not the scarce resource, but habitat security is, and despite this the agency plans to eliminate scarcer habitat security and create yet more forage with logging. The other takeaway message seems to be that losses from security habitat from a remotely possible fire affecting the logging units is unacceptable while guaranteed losses in security habitat from logging is fine. (One can see the reduction in security habitat from vegetation removal over the last four decades in the Timelapse video provided.) The fire ecology statements are not supported by science, and this is more fully discussed in Objectors' EA comments at pages 115-119 and in the objection on fire ecology.

Elk security is defined better by science than by the Idaho Panhandle forest plans, but the science we introduced shows that "generally timbered areas" can be devoid of the hiding cover and security that elk utilize. Our science that is at odds with the agency's new basic assumptions—minimally this science is controversial and needs to be addressed in an EIS.

The Forest Service admits there is no guidance on a species the Forest Service chose to focus on in the forest plan beyond reducing net security for elk ("Although there are no Forest Plan guidelines or thresholds to guide management...", E3.1) But, the Forest does have a guideline, FW-GDL-WL-13, that states the following: "Management activities in elk management units should *maintain existing levels* of elk security." The Forest Service isn't doing that. First, these levels of elk security are artificially low because previous NEPA decisions were never implemented from the Hidden Cedar timber sale in 2007. The starting point for existing levels of elk security should be at the level that previous NEPA promises have been implemented. Hidden Cedar discusses decommissioning portions of Road 498 and Road 341 (see final SEIS p. 200), and the Emerald EA notes that, six years after the project was projected to be completed, this hasn't been done. If that hasn't been done in the earlier round of logging in this area, what is the Forest Service's guarantee that this will actually happen this time? The Forest Service could keep doing this: promising something in NEPA, not fulfilling that commitment, and make another NEPA promise that the first mitigating actions will really be done this time. Promising measures never done is a cumulative impact.

The EA and Wildlife Report insufficiently addresses Forest Plan guideline FW-GDL-WL-14: "Management activities should avoid or minimize disturbance to native ungulates during the birthing/parturition period." The Idaho Department of Game and Fish has not mapped calving habitat, and the Forest Service hasn't followed up or otherwise tried to confirm where this might be.

For the reasons enumerated in Objectors' EA, scoping comments, and above, the Forest Service has violated the National Forest Management Act by violating forest plan provisions, and has violated the National Environmental Policy Act by failing to consider cumulative effects of not following through on prior NEPA mitigations, has not taken a hard look at impacts of the proposed timber sale, and has not considered the best science for those impacts.

Remedy: Select the No Action alternative or prepare an EIS that addresses the legal, scientific and analytical deficiencies identified in our EA comments and above.

ISSUE: FISHER

Objectors raised their concerns about the fisher and its habitat in great detail at pages 19-22, 29, 90, and 102 of scoping comments and pages 85-92 in Objectors' EA comments; they are incorporated and re-raised here. The concerns for fisher are connected to old growth, so our objection on old growth above and the scoping and EA comments (noted in the old-growth section above) apply here as well. For example, with two projects to the west of this one (Homestead in the Idaho Panhandle and White Pine on the Clearwater), the cumulative effects of disappearing old mature forests is reducing one entire fisher home range, possibly more considering the surrounding state and private lands. There has been no effort to consider the logging south across the border on the Clearwater and its impact. Because no cumulative effects have been considered, the modeling is likely inaccurate. As the Forest Service was not responsive to these points raised in scoping and EA comments, we incorporate them here and re-raise all issues. We augment the discussion on trapping impacts with a study published in 2021, after the draft EA comment period. Allen et al. 2020 discuss that fishers scavenge more in the winter than in the summer. This places cumulative effects from increases trapping, particularly where baiting is allowed. *See* IDFG, IDAPA 13.01.17.

The IPNF (USDA Forest Service, 1999a) states: "Hudson Bay trapping records indicate that furbearers, including these two species, were trapped in the area, particularly in the northern portion of the Coeur d'Alenes. It would be reasonable to infer the numbers of animals were greater than what occurs currently given the number of records within the last 10 years in the Geographic Assessment area." Also, "Extensive alteration of forest structure as a result of natural and human-caused disturbances (i.e. reduction in canopy closure, snags, old growth, and down woody material) has altered the habitat value for fisher and marten." (Id.) Also, "Analysis of the fisher reflects changes in habitat for the marten, since their habitat needs are similar." (Id.)

The IPNF has recognized the impacts of past management actions on the Forest have been in fact significant: "Based on past reductions of suitable habitat and security, the cumulative effects would be considered high." (USDA Forest Service, 1999a) This conclusion was reached even though action alternatives analyzed "would result in a minor reduction of security and suitable fisher habitat." (Id.)

For the reasons above, the Forest Service has violated the National Environmental Policy Act for failing to take a hard look at impacts to fisher or knowing the baseline population numbers, for failing to consider cumulative analysis, for failing to consider the best science, and has violated the National Forest Management Act for failing to ensure this species viability.

Remedy: Select the No Action alternative. withdraw the project, or prepare an EIS that addresses the concerns identified in our scoping and EA comments and in the above discussions.

GOSHAWK

Objectors raised this issue in detail at both the forest-plan level and the project-specific level in their scoping comments at pages 23-24, 90, 102, and their EA comments at pages 61, 63, 66-68, 92-94. They are incorporated and re-raised here.

For the reasons described in our comments, the forest plan fails to comply with the NFMA for ensuring species diversity and NEPA for failing to consider the cumulative effects of the lack of provisions and logging allowances on the goshawk. The project fails to comply with NFMA for ensuring species diversity and NEPA for failing to take a hard look at the project's proposed impacts, including cumulative effects, on the goshawk.

Remedy: Choose the No Action Alternative or do an environmental impact statement for . Do a supplemental EIS for the forest-plan addressing the issues raised in our scoping and EA comments.

PILEATED WOODPECKER

Objectors raised this issue in detail at both the forest-plan level and the project level in their scoping comments at pages 14, 24-28, and 90, and our EA comments at pages 63, 66-68, 72, and 94-96. They are incorporated and re-raised here.

The word "pileated" does not appear in the EA, it does not appear in the Wildlife Report. In 1983 the IPNF said the pileated woodpecker finds optimum habitat in old growth on the IPNF. The IPNF stood by those words apparently until 2015, and then they never provided any explanation as to why pileated woodpeckers' reliance on old-growth habitat had become irrelevant.

Remedy: Select the No Action alternative. Alternatively, prepare an EIS that addresses the legal, scientific and analytical deficiencies in our comments on the EA.

WOLVERINE

We raised our concerns related to the wolverine at both the forest-planning level and the project level in our scoping comments at pages 20, 28-31, and 90, and in our EA comments at pages 61, 96-99. They are incorporated and re-raised here.

Forest-wide the agency is doing things that may likely result in a trend towards listing. The Buckskin Saddle Project, the Westside Project, and the Homestead Project (EAs from these projects are included with our supplementary materials) all admit to negatively impacting wolverine habitat in some way while all proclaiming they won't contribute to listing. How is there a fragmented island of maternal dispersal habitat on the map the Forest Service has for wolverine? And why there and nowhere else in the project area. There is absolutely no discussion about this.

This current forest plan could have a 30-year life, so is easy to see how the plan's failure to account for wolverine, will end up helping to list the species. While climate change is impacting wolverine, so is increasing development, and this is having a cumulative effect on the species that may very well result in listing. There is litigation on this now. Science suggests that human development influence wolverine, and this project proposes new roads and temporary roads, which fragment some of the last habitat in the area and provide more trapping access. It is time for a proper cumulative analysis that recognizes all of this, both at the project level and the forest-plan level. Locally, the Hidden Cedar Project noted that development around this general area impact wolverine dispersal, and we are 15 years on down that development trend, so the surrounding area is more impactful now than ever. This makes undeveloped parts of the Emerald

Project area—places where the Forest Service is proposing to re-plow road or add new roads—even more important. And the loss of these potential areas is especially important because the Fish and Wildlife Service's has a new definition of habitat that considers only non-degraded habitat. The Forest Service has recognized or explained none of this in light of their "may impact but won't trend towards listing decision."

For the above reasons that augment the reasons repeated discussed and raised in Objectors' scoping comments and EA comments, the Forest Service has created a forest-plan that has violated NFMA for failing to ensure the diversity of species. The Forest Service has violated NEPA for failing to take a hard look at the impacts of its plan and failing to consider the cumulative impacts of what its plan will allow, including how climate change will augment those impacts. The Forest Service has violated NFMA because the project cannot ensure the diversity of species. The Forest Service has violated NEPA for failing to take a hard look at the impacts to the wolverine, and for failing to consider the cumulative effects of surrounding development, the science we introduced, development in the project area, and climate change for this species.

Remedy: For the forest-plan issue, do a supplemental environmental impact statement and choose strategies that will conserve the wolverine using what we augmented above with what we've repeatedly raised in our scoping and EA comments. For the project issues, choose the No Action Alternative, withdraw the project, or conduct an EIS that addressed the issues we've discussed in scoping, in our EA comments, and what we've augmented above.

BLACK-BACKED WOODPECKER

Objectors raised this for both the forest level and the project level in their scoping comments at pages 31-34, 51, 58, 89, and 102 and their EA comments at pages 4-5, 60, 63, and 99-103. These comments are incorporated here and re-raised.

The Forest Service has violated NFMA for failing to ensure species diversity. The Forest Service has violated NEPA at the plan level for failing to take a hard look at the impacts and cumulative effects the land-management plan will have on this species and failing to monitor for baseline populations from which any management impacts can be measured. The Forest Service has violated NEPA at the project level for failing to take a hard look at the impacts the project will on this species and for failing to know the existing conditions for population.

Remedy: Choose the no action alternative. Alternatively, seek to monitor for baseline conditions, then supplement the forest plan EIS and conduct an EIS for this project.

CANADA LYNX

Objectors raised this issue and science associated with this issue at both the forest-plan level and the project level in their scoping comments on pages 1, 20, 29-30-31, 34-36, 90, and 99, and Objectors' EA comments on pages 61, 66-68, 97-98, and 103-106. These issues are re-raised and incorporated here.

The IPNF's Camp Robin Wildlife Report states that "Lynx presence has been historically reported **throughout the Idaho Panhandle...**" (Emphasis added). Yet the EA assumes, without analysis, that the Homestead project area never had lynx.

The Idaho Department of Fish and Game acknowledges verified sightings of Canada lynx in counties down through Latah and further south and east. *See* IDFG 2021 (https://idfg.idaho.gov/species/taxa/16860).

For the above reasons, the agency has failed to comply with the ESA because lynx may be present and the Forest Service hasn't consulted with the Fish and Wildlife Service. The Forest Service has also violated NFMA for failing to ensure species diversity and viability. The Forest Service has violated NEPA because the science we provided demonstrates adverse impacts on any present lynx, so the agency has failed to take a hard look at the impacts of its proposed actions.

Remedy: Select the No Action alternative. Alternatively, undergo formal consultation with the U.S. Fish & Wildlife Service and prepare an EIS that addresses the science we provided, that considers our scoping comments, and that addresses the legal, scientific and analytical deficiencies in our comments on the EA.

WESTERN BOREAL TOAD

Objectors raised this issue in our scoping comments at pages 18-19, and 90, and in our EA comments on pages 61, and 106-108. Those comments are incorporated here and re-raised.

Bartelt and Peterson, 1994 noted the amount of time that western (boreal) toads spend away from water in one subject group:

> After breeding, most Stamp Meadows toads left the pond to forage, and after the pond dried, all toads were restricted to using terrestrial habitats. They used a variety of habitats and spend most of the season away from water. Because of this, selecting particular habitats may have been important for providing these toads with their temperature and moisture needs, as well as with their food requirements.

Bartelt and Peterson, 1994 also tentatively concluded, based on the physiological needs of this amphibian, that logging open areas forest eliminate its suitability as habitat: "Although toads selected a combination of open and shaded habitats, extremely open habitats (e.g., clearcuts) may have been avoided by toads. These habitats may be too hot and dry of these wet-skinned ectotherms."

The FS has no scientifically-based viability strategy for this Sensitive species, no metrics for describing the quantity and quality of habitat need to assure viability, and no way of quantifying cumulative effects. USDA Forest Service, 2011c states:

> According to historical records, the western (boreal) toad … was widely distributed and very common in Montana and other western states, but the species may have undergone severe population decreases in the past 25 years (Currim 1996).

The FS doesn't really know why western toad populations have declined so drastically, except that it is associated with activities such as those approved by the Homestead DN: **"**Timber harvest, increased vehicle use, road maintenance, and road construction may kill individual adult and juvenile boreal toads using upland habitats." (USDA Forest Service, 2011c at 3-304.)

The Lolo NF's Sunrise Fire Salvage EA states, "The critical factor in whether toads can exploit open habitats appears to be the presence of adequate retreat sites [refugia] where toads can escape predators and maintain water balance (Guscio et al. (2007)." The EA doesn't consider this science.

The FS provides no assurances that a viable population of boreal toads exists now in the IPNF, and fails to provide a proper cumulative effects analysis on boreal toad viability. The EA violates NEPA and NFMA.

For the reasons in our scoping and EA comments, the Forest Service has violated NFMA with its forest plan because it cannot ensure species diversity and NEPA for not considering the impacts, including cumulative impacts, of its forest plan on the boreal toad. The Forest Service has violated NFMA and NEPA in the project for not considering the impacts, including cumulative impacts, on the species.

Remedy: Select the No Action alternative. Alternatively, prepare an EIS that addresses the legal, scientific and analytical issues discussed above and in our comments on the EA.

TRAVEL MANAGEMENT

Objectors raised this issue at the forest-plan level and the project level in their scoping comments at pages 3, 38-39, 93-95, and their EA comments at pages, 2-3, 26, 108-114. Those issues are re-raised incorporated here. This specific project, with road maintenance, new roads, and temporary roads highlight the problem with a forest plan inconsistent with the travel management rule.

We had pointed out that the agency has failed to analyze an inadequate road maintenance budget and the persistence of the backlog of this maintenance and its resulting impacts on water quality and fish habitat (also discussed in the water and fisheries section of this objection). This project is going to reconstruct over 14 miles of road, add over 11 miles of new permanent roads, over 8 miles of undetermined roads, and over 6 miles of temporary roads—over five miles of those temporary roads will create entirely new road prisms, so they will be on the landscape permanently after the logging company is done with the temporary road. Anything that results in a road prism, which is a structure upon which a road was once built and could be built again, is a permanent addition. As discussed in the water quality section of this objection, roads gradually fall into disrepair and sediment increases over time, which was not considered or analyzed at all. We pointed out in our comments that the EA does not analyze how the IPNF's road maintenance budget will impact water quality and fish habitat going forward, and we urged the agency to conduct a minimum-road-system initiative. This project continues to head the agency in the wrong direction with no identified funding sources—just counting what is added to Forest

System Roads and subtracting what the Forest Service claims it will decommission for real this time and what the agency will even put into storage, this project *adds* over nine miles of Forest System Road to a backlog and underfunded system. As time moves forward, these nine miles will need road maintenance, so you will have added to a growing backlog. All of this mileage adds to an increase in road density, which the EA fails to even mention.

Also, as mentioned elsewhere in this objection and the Forest Service acknowledged in the EA, some of this proposed road decommissioning should have already happened with earlier NEPA analysis, but it never did. There is no post-mortem discussion on this finding. How did that happen? Because if that answer is funding, this situation seems primed for a repeat.

For the reasons augmented above and discussed more fully in our scoping and EA comments, the Forest Service has violated the NFMA, NEPA, and the Travel Management Rule. The Forest Service cannot promise productive soils or a diversity or viability of various animal and plant species by adding roads that fragment, compact soils, and deliver sediment. The Forest Service has violated the NEPA for failing to disclose information we've repeatedly ask for and failing to consider that information when analyzing the long-term impacts of its proposed project.

<u>**Remedy**</u>:

1. Disclose the following information concerning the project area:

- Why the roads that were supposed to be decommissioned in earlier projects analyzed by NEPA never were and what is different this time that the same result won't happen again
- The deferred road maintenance backlog
- The annual road maintenance funding needs
- The annual road maintenance budget
- The capital improvement needs for existing roads
- The road density in the project area
- The number of miles of project area roads that fail to meet BMP standards or design standards
- If adequate maintenance funding will exist for the <u>post-project</u> road network, and disclose how deferred maintenance costs might increase or decrease post-project.

2. Choose the No Action Alternative or withdraw the project. Alternatively, prepare an EIS for this project which is tiered to a science-based forestwide Travel Analysis Process so that it is fully consistent with the Travel Management Regulations and related directives. Prepare an EIS that incorporates the revised forest-wide TAP and includes alternatives that implement the minimum road system. Prepare a supplemental EIS and ensure the forest plan follows the direction mandated by the Travel Management Regulations.

ISSUE: FIRE ECOLOGY

Objectors raised this issue in detail, both at the forest plan level and this project-specific level in our scoping comments on pages 5, 7-11, 15, 26, 31-33, 36, 42-44, 46, 47, 49, 50-63, 82, 89, 91, 97, and in our EA comments on pages 115-119. These comments are incorporated here and re-raised because much of them went unaddressed. For example, we've already raised serious controversial science and issues with many of the assumptions the Forest Service is making for both the underpinnings of why this project is necessary in addition to how effective "fuels reduction" or "fuels management" is.

The Wild Urban Interfaces are not established under any process like NEPA, so establishing these areas are a completely arbitrary exercise because they do not consider any science, much less the best available science, nor are they established with transparent, public participation.

The Timelapse video provided with our objection material shows that logging is the management activity that has altered the landscape. When trees grow back on an area logged with clearcuts, they grow in dense patches. Here are two pictures of such examples of old regeneration cuts on the neighboring Nez Perce-Clearwater National Forests.

Any layperson can tell what has been clearcut. The trees growing back look like seedlings, are not taller than about twenty feet, and are packed together. The Forest Service discusses a wildfire risk from dense vegetation. Please look at the pictures above—this is the dense vegetation about which you speak—dense vegetation resulting approximately two decades after regeneration logging the Forest Service has approved. And, discussed in our prior comments, science suggests that these kinds of areas are the one with the characteristics to heighten fire severity. Also in our prior comments, science suggests that the older, mature forests have mixed-severity patches, but the higher instances of high-severity are found in the (Forest Service) managed areas.

Also, the Forest Service ignored our comments on the fuel models, just stating that it used the "best" one without more. *See* FS responses to EA comments, p. 30. If you refer to Ottmar et al. 2019, p. 28 (PDF p. 30) you will find that Forest Service researchers say this about the same model in their conclusions:

> Advanced model output is now routinely available to managers, as seen with the incorporation, use and adoption of the BlueSky modeling framework and the Interagency Fuel Treatment Decision Support System (IFTDSS). ***These systems provide value added information but are simplistic in their treatment of complex fire dynamics and need to be thoroughly evaluated and advanced.***

There is no indication that this model has been evaluated, or its weaknesses or gaps discussed.

Baker, 2017 discusses the limitations of tree-ring and fire scar studies, noting biases that result in significant underestimates of average between-fire intervals on landscapes in western U.S. dry forests.[1] He notes,

> Past reconstructions of low-severity fire in dry forests, using tree-rings, focused on long records of dated fire years in small plots, and most were not intended to accurately estimate key rate parameters of low-severity fire needed to restore and manage low-severity fire across large landscapes. These small-plot reconstructions have known inaccuracies and biases if inappropriately used for this purpose...

Baker, 2017 determined that roughly only 14% of historical dry forests in the western U.S. had average between-fire intervals of less than 25 years. This 14% was "concentrated in Arizona and New Mexico (and) were scattered across parts of all other states."

Kelly and Hodges 2020 found:

- Salvage-logged areas were not used by snowshoe hares… and squirrels were not present in post-fire salvage-logged habitat.

- The large scale and intensity of post-fire salvage logging removes important regenerating post-fire habitat and has detrimental impacts on these important prey species, likely leading to consequences for avian and mammalian predators.

Hutto et al., 2008 make several important points:

- (T)ree-ring studies …can inform us about recent fire history from within only those forest types that typically experience relatively frequent, low-severity fire. Thus, tree-based studies are necessarily biased toward surface fires that scar, but do not kill, trees (Whitlock 2004). Because a disproportionately large number of historical studies are conducted in forests that support low-severity fire regimes, we may have unwittingly painted a biased broader perspective of what constitutes the dominant fire regime in the majority of conifer forests of North America. In the western United States, for example, the vast majority of forest types lie outside the ponderosa pine (Pinus ponderosa) vegetation type (about 85% of forested land within the contiguous western United States, according to the LANDFIRE database) and are dominated by mixed- and high-severity fires rather than low-severity fires (see also Agee [1993:Figure 1.4] and Arno and Fiedler [2005:Table 3.1]). This fact is not widely appreciated…

- (T)wo lines of evidence suggest that it is the more severe fires that are needed to create conditions most suitable for this fire specialist: (1) not only is the black-backed woodpecker restricted to burned forests, but its distribution within burned forests is also

[1] "Dry forests in the western USA cover 25.5 million ha and include dry pine forests, dominated by ponderosa pine (Pinus ponderosa) or other dry pines, and dry mixed-conifer forests that also have firs (Abies concolor , A. grandis , Pseudotsuga menziesii) and other trees."

relatively restricted to the more severely burned conditions (Kotliar et al. 2002, Smucker et al. 2005, Russell et al. 2007, Hutto 2008); (2) black-backed woodpecker nest sites occur in locations that harbor significantly larger and more numerous trees than occur around randomly selected sites within a burn (Saab and Dudley 1998, Kotliar et al. 2002, Russell et al. 2007). Such nesting locations would be difficult to find in forests maintained as low-density, open, park-like stands due to frequent, low-severity fire.

- If we rely entirely on tree-ring and other historical approaches without considering the needs of fire-dependent plants and animals to determine what constitutes a natural fire regime, we run the risk of producing forest conditions that lead to decreases in, rather than the maintenance of, populations of native fire-dependent species. … Living plants and animals carry adaptations that indicate the kind of environment within which they do well, and it would behoove us to pay close attention to what plants and animals are telling us about fire regimes. Once a fire-dependent species demonstrates that a particular kind of fire is necessary for its persistence or success, that information should be used to help guide management and restoration decisions.

- Because different bird species respond positively to different fire severities within the low- to mid-elevation forest zones (Smucker et al. 2005), maintaining all fire severities within a mixed-severity fire regime in those vegetation types is an important fire management practice.

- (D)espite recent calls for developing restoration guidelines that are compatible with the evolutionary history of fire-dominated systems (Moore et al. 1999, Mitchell et al. 2006), restoration practices are not generally driven by a solid understanding of the evolutionary history of indigenous species. Instead, management practices tend to be focused on the use of mechanical treatments either to enhance wood production or to modify forest structure in a way that will reduce fire severity in the future (Fall et al. 2004, Loehle 2004, Arno and Fiedler 2005, Mason et al. 2006). The negative consequence of concentrating on altering fire behavior to the exclusion of ecological considerations is sometimes evidenced by bird community changes that are clearly unfavorable to the more fire-dependent species (Allen et al. 2006, Maron and Kennedy 2007). Forest restoration efforts should be based on a sound understanding of the ecological role of fire as an integral process; we need to develop the methods required to restore the full range of fire severities that plants and animals inform us were historically and evolutionarily associated with any given forest type (Johnson et al. 2003, DellaSala et al. 2004, Pierce et al. 2004, Fischer et al. 2006). … The ecology of selected species (in the present case, fire-dependent species) should be used to understand and embrace the natural processes that prehistorically produced conditions necessary for their maintenance, and not be used to devise artificial means to circumvent those natural processes.

As discussed in previously submitted comments, Meddens, et al., 2018 discuss fire refugia, not considered in IPNF project or programmatic planning:

- Fire is a global disturbance process that interacts with landscape pattern to create mosaics of ecosystem effects, including patches that remain both unburned and only minimally affected by low-intensity burning. These patches are increasingly of interest to ecologists and are often referred to as fire refugia (Kolden et al. 2012, Robinson et al. 2013, Krawchuk et al. 2016).

- The term *fire refugia* has various definitions (e.g., Gill 1975, Camp et al. 1997, Mackey et al. 2002, Krawchuk et al. 2016), all of which focus on the idea of locations disturbed less frequently or less severely by wildfire relative to the surrounding vegetation matrix. Fire refugia provide habitat for individuals or populations in which they can survive fire, in which they can persist in the postfire environment, and from which they can disperse into the higher-severity burned landscape (Robinson et al. 2013). In this way, fire refugia can function similarly to islands in a biogeographic context, particularly in severely burned areas, recognizing that the matrix of burned areas still provides some habitat to many taxa. Mosaics of fire effects spanning the full range of burn severity—including refugial patches—influence succession, ecosystem processes, and the distribution of biological legacies (Franklin et al. 2000, Turner 2010, Johnstone et al. 2016). Locations in which biota survive fire have been shown to strongly influence postfire recovery and ecosystem dynamics (e.g., Haire and McGarigal 2010, Robinson et al. 2013, Stevens-Rumann et al. 2017). Uniquely, however, fire refugia are not purely ecological or biophysical phenomena; they are also a socioecological construct—for example, because of human manipulation of vegetative fuels and fire suppression activities that can both facilitate and impede their formation.

- Fire refugia are defined and characterized variably in the literature. Other terms used to describe them include *unburned islands*, *habitat refugia*, *remnants*, *residual vegetation*, *fire shadows*, *skips*, *stringers*, *refuges*, *islands*, *biological legacies*, and *late-successional forest.*

- Climate-change refugia have been defined as “areas relatively buffered from contemporary climate change that allow for habitat stability and species persistence over time” (Morelli et al. 2016). However, climate refugia identified for conservation and management purposes require that these areas also be buffered from severe disturbance events if they are to function as holdouts within a changing environment. Accordingly, fire refugia are a necessary complement to climate change refugia in fire-prone landscapes.

- To meet regulatory mandates to preserve such species under global change, however, habitat requirements must be embedded in more comprehensive landscape processes that facilitate specific ecosystem functions, particularly when multiple management objectives must be met.

- Over multiple fire-return intervals, fire refugia that last through only a single fire event are defined in the present article as *ephemeral*, whereas refugia that survive through multiple fires are defined as *persistent* refugia.

- (P)ersistent fire refugia are those that remained intact through multiple fire events (including reburns; Prichard et al. 2017), and this persistence suggests that they are more likely to be predictably associated with stable landscape features.

- Persistent fire refugia may also be more vulnerable to losses associated with anthropogenic climate change and changing fire regimes (Kolden et al. 2017), because the climatic conditions that previously sustained persistent refugia may give way to conditions that support and facilitate fire spread into a previously persistent patch. This novel introduction or reintroduction of fire would have considerable implications for ecosystems that have been dependent on such refugia.

- Remnant vegetation following fire provides functional habitat and other crucial ecological functions days to months after fire. Refugia can supply food resources (Schwilk and Keeley 1998, Henriques et al. 2000) that are otherwise consumed by fire in the surrounding landscape, provide cover or protection from predators, or reduce influences from exposure to abiotic stressors (e.g., wind and solar radiation). Competition within refugia may increase from before to after a fire, because of decreases in available resources in the surrounding burned landscape (Banks et al. 2012). In addition, these refugia can function as buffers against erosion and landslides that can occur following fires (Shakesby and Doerr 2006), mediating detrimental habitat loss.

- There is a crucial need to prioritize fire refugia for conservation and management under global change. The fire refugia taxonomic dichotomies presented in the present article provide a framework to consider conservation values and potential trends in fire refugia characteristics. Understanding the distribution, abundance, composition, and function of fire refugia may help in prioritizing land management activities on the basis of the concepts of resistance and resilience to fire and of the vulnerability to further disturbances. This prioritization will likely require a comprehensive understanding of both the spatial and the temporal predictors of refugia, integrated with conservation needs and policy limitations.

- Because fire activity is projected to increase under future climate scenarios, fire refugia will likely be important to preserving ecosystem resiliency for a variety of taxa (tables S1 and S2). Therefore, future management actions should focus on identifying, maintaining, or promoting fire refugia within landscapes holistically. For example, the actual locations of ephemeral fire refugia may be less important than their aggregate area and their spatial configuration. On the other hand, understanding the location and environmental determinants of predictable, persistent, and semipersistent fire refugia may be vital for increasing the resilience of both natural and human-occupied landscapes (Smith et al. 2016).

- (O)ne management strategy that would have clear positive outcomes for conserving fire refugia could be reducing the use of backfires and burnouts (or “blackout burning”) as wildfire suppression tactics where feasible. During large fire events, firefighters routinely use firing operations to consume available fuel ahead of an advancing fire front; as the flaming front passes or reaches containment lines, they subsequently burn out any

> remnant green vegetation (i.e., fire refugia) to reduce the potential for flare-ups and ember-ignited spot fires across the containment line. Although this operation tactic is highly effective for protecting crucial infrastructure and resources, it may not be necessary to achieve containment on fires that are remote or being managed to meet natural resource objectives.

Camp, et al., 1997 add, "Locating probable sites of historical fire refugia across a landscape will assist managers in determining an appropriate level of late-successional connectivity. Connectivity is a term that describes the connectedness or spatially continuity of a patch type (Merriam, 1984). It has been stated that, without connectivity, disjunct patches may not function as habitat (Harris, 1985: Noss and Harris, 1986)."

Fire refugia should not be equated to old growth as it is weather and sometimes land-forms (not what the Forest Service has not decided to cut) that influence that. *See* Forest Service response to EA comments p. 30 and compare with the science provided with the EA comments on this. The Forest Service has anecdotally, unscientifically, and arbitrarily connected refugia with the old growth it is currently choosing not to cut.

For the above reasons, the Forest Service has violated the National Forest Management Act because it has failed to ensure species diversity and has treated fire as fuels to be managed and not the source of ecological diversity that it can represent. The strategy that this project aims to propose cannot satisfy FW-DC-SES-04. Further, MON-FIRE-01-01 is monitoring based on unscientific assumptions discussed in our scoping and EA comments. The Forest Service has also violated NEPA for failing to consider the best science, for failing to explain the science it is relying upon, for failing to disclose to the public information, and for failing to take a hard look at the impacts of this proposed project.

Remedy: Choose the No Action Alternative, withdraw the project, or supplement the Forest Plan EIS to take a hard look at the cumulative effects of fire suppression policies. Prepare an EIS for this project if the FS still wants to pursue it, which addresses the scientific perspectives on fire we present above and in our scoping and EA comments.

MONITORING

Monitoring touches just about all aspects of NEPA and NFMA because it informs on the existing condition as well as informs whether projects have the impacts that the agency has predicted or expected. Even though monitoring is more important than ever, we see the Forest Service doing less of it then ever. Objectors raised monitoring in various other places in this objection incorporated here as well as at the forest plan and project level in their scoping comments on pages 3, 5-6, 13, 16, 21, 23-24, 28, 56, 66-67, 77-78, 81, 86-89, 93, 97-100, and 104, and in our EA comments at pages 7-8, 19, 28, 30, 34-35, 37-38, 42, 48, 50, 51-53, 55, 61-63, 66-67, 69, 70, 72-73, 77, 82-84, 93-94, 106, 119-122, 124, and 128-129.

In the Hidden Cedar final Supplemental EIS there was a monitoring plan: "Monitoring is conducted on a sample basis and is designed to verify that the projects are implemented as designed, are effective and most efficient in meeting the project and Forest Plan objectives, and determine whether the project and Forest Plan goals and objectives for the area are still appropriate." Disclosure of monitoring has been so deficient or doesn't exist, and the public cannot tell what the baseline is for many resources or if the agency's aims have any proven track record for success (some of them in contravention with science).

Because of the deficiency in monitoring, many baselines were missing, the EA failed to adequately analyze cumulative effects of past, ongoing, and reasonably foreseeable actions. As discussed in other sections of this objection, the problem is evident in the analyses of most resources supposedly analyzed in the EA.

Following the January 2015 Record of Decision adopting the Revised Forest Plan, in 2016 the FS carried out an "administrative" change of its forest plan monitoring, altering the monitoring program outlined in the 2015 Revised Forest Plan without undertaking a NEPA process. This violated both NEPA and NFMA. The process did not conform to 2012 Planning Rule requirements.

The Revised Forest Plan states:

> An interdisciplinary team will develop a **biennial** Monitoring Evaluation Report which will summarize the results of completed monitoring, evaluate the data, consider relevant information from broad-scale or other monitoring efforts, and make recommendations to the responsible official. The monitoring evaluation report will indicate whether or not a change to the Forest Plan, management activities, or the monitoring program, or a new assessment, may be warranted based on the new information. The monitoring evaluation report is used to inform adaptive management of the Plan area. The Monitoring Evaluation Report will be made available to the public. (Emphasis added.)

Five years after adoption of the Revised Forest Plan, the FS has yet to issue a single "biennial" monitoring and evaluation reports.

Roger Sedjo, member of the Committee of Scientists, expresses his concerns in Appendix A of their 1999 Report about the discrepancy between forest plans and Congressional allocations, leading to issues not considered in forest plans such as the IPNF's:

> (A)s currently structured there are essentially two independent planning processes in operation for the management of the National Forest System: forest planning as called for in the legislation; and the Congressional budgeting process, which budgets on a project basis. The major problem is that there are essentially two independent planning processes occurring simultaneously: one involving the creation of individual forest plans and a second that involves congressionally authorized appropriations for the Forest Service. Congressional funding for the Forest Service is on the basis of programs, rather than plans, which bear little or no relation to the forest plans generated by the planning process. There is little evidence that forest plans have been seriously considered in recent years when the budget is being formulated. Also, the total budget appropriated by the Congress is typically less than what is required to finance forest plans. Furthermore, the Forest Service is limited in its ability to reallocate funds within the budget to activities not specifically designated. Thus, the budget process commonly provides fewer resources than anticipated by the forest plan and often also negates the "balance" across activities that have carefully been crafted

> into forest plans. Balance is a requisite part of any meaningful plan. Finally, as noted by the GAO Report (1997), fundamental problems abound in the implementation of the planning process as an effective decision making instrument. Plans without corresponding budgets cannot be implemented. Thus forest plans are poorly and weakly implemented at best. Major reforms need to be implemented to coordinate and unify the budget process.

Any FS claims to be implementing "adaptive management" are not credible as long as the FS's chronic political problems include inadequate funding for monitoring.

Our previous comments requested, "Please provide an analysis of how well those past FS projects met the goals, objectives, desired conditions, etc. stated in the corresponding NEPA documents, and how well the projects conformed to forest plan standards and guidelines." It's a sensible, reasonable request so to be able to understand the cumulative effects of management and also the current baseline from which the Forest Service is anticipating impacts, but the FS would rather wear blinders in terms of its performance with past projects.

For the reasons discussed in our scoping and EA comments as well as what we've augmented above, the Forest Service has violated NFMA for failing to have monitoring that complies with NFMA and for failing to have biennial evaluations under 36 CFR 219.12, which means a failure to comply with 16 USC 1604(g) and a forest plan that fails NEPA for failing to take a hard look at the widespread and cumulative impacts this land-management plan will have at a forest level. The Forest Service has violated NFMA at the project level for failing to monitor, which in turn cannot show the agency is complying with NFMA. The Forest Service has violated NEPA by failing to take a hard look it its proposed impacts or otherwise sufficiently analyze the likely impacts because there are a lot of missing baselines and current existing conditions. If the Forest Service had this information and did not disclose to the public, then the Forest Service has also violated NEPA by failing to provide the public with high-quality information.

<u>Remedy:</u> Select the no-action alternative. Otherwise, prepare an EIS for the project, based upon genuine monitoring as we have discussed.

ALTERNATIVES

Objectors raised this issue in their scoping comments at pages 2-3, and in their EA comments on pages 3, 14, 19, and 54. They are incorporated and re-raised here.

There has been no analysis on reasonable alternatives that take into account climate change and reducing—or minimally not *adding* to—permanent roads on the National Forest System. We weren't the only commenters that asked the Forest Service to consider that. In the Hidden Cedar Project 15 years ago, which is in the same area, the Forest Service conducted an environmental impact statement because *less* logging and *less* roadbuilding would significantly impact the area. Now the Forest Service is saying *more* logging and *more* roadbuilding than what was proposed in Hidden Cedar on top of what has already happened in Hidden Cedar *won't* have a significant impact? It seems you are doing this because of the political direction from Region 1 to only do EAs and the side benefit that an EA means you don't have to have reasonable alternatives. The facts support this is a significant impact, and the Forest Service should be considering more than one action alternative. Given the impacts the Forest Service has cumulatively had on climate change with emissions associated with logging, roadbuilding, and eliminating carbon sequestration, and given the impacts the Forest Service has had on everything roads impact (wildlife, fisheries, vegetation, fire, etc.), it's amazing there are no alternatives that properly consider either or try to address either issue.

For the reasons raised in our scoping comments and EA comments and augmented above, the Forest Service has violated NEPA by failing to consider alternatives because these impacts are significant and an environmental impact statement should have been done, as the Forest Service would also have agreed with us about in 2007.

Remedy: Do an environmental impact statement and consider more than one paltry action alternative.

Supplemental works cited

Allen, M.L., Elbroch, L.M., Wittmer, H.U. 2021. Scavenging by fishers in releation to season and other scavengers. Ecological Research pp. 1-7.

Baker, William L. (2017) Restoring and managing low-severity fire in dry-forest landscapes of the western USA. PLoS ONE 12(2): e0172288. doi:10.1371/journal.pone.0172288

Bartelt, Paul E. and Charles R. Peterson, 1994. Riparian habitat utilization by Western Toads (Bufo boreas) and Spotted Frogs (Rana pretiosa) on the Targhee National Forest. Final Report: Contract #INT-93780-CCSA between Idaho State University and the Intermountain Research Station of the USDA Forest Service. 11 July 1994.

Bollenbacher, Barry and Beth Hahn 2008g. USFS Northern Region Old Growth Management Considerations. Unpublished USDA Forest Service Northern Region Paper, July 2008.

Brunsfeld, S., J. Sullivan, D. Soltis, and P. Soltis. 2001. Comparative phylogeography of northwestern North America: A synthesis. In (J. Silvertown and J. Antonovics, eds.) Integrating ecological and evolutionary processes in a spatial context. Pp. 319-339. Blackwell Science, Oxford.

Buckskin Saddle Project EA 2019

Council on Environmental Quality, Greenhouse Gas (GHG) Accounting Tools, https://ceq.doe.gov/guidance/ghg-accounting-tools.html.

Emerald map for region St J and Clearwater (scanned map).

Emerald vicinity map from St J NF map (scanned map).

Emerald vicinity map legend St J NF (scanned map).

Gorzelak MA, Asay AK, Pickles BJ, Simard SW. 2015. Inter-plant communication through mycorrhizal networks mediates complex adaptive behaviour in plant communities. AoB PLANTS 7: plv050; doi:10.1093/aobpla/plv050.

Homestead Project EA 2020

Idaho Department of Game and Fish Lynx website (last visited 3/2/21): https://idfg.idaho.gov/species/taxa/16860

Foster DR, Orwig DA, McLaughlan JS. 1996. Ecological and conservation insights from reconstructive studies of temperate old-growth forests. TREE 11(10):419-423.

Franklin, J.F.; Spies, T.A. 1991. Ecological definitions of old-growth Douglas-fir forests. In Wildlife and Vegetation of Unmanaged Douglas-fir Forests. Gen. Tech. Rep. PNW-GTR-285. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 61-69.

Hutto, Richard L. 2008. The Ecological Importance of Severe Wildfires: Some Like it Hot. Ecological Applications, 18(8), 2008, pp. 1827–1834.

Idaho Department of Fish and Game 2020. Idaho Administrative procedure Act (IDAPA) 13.01.17

Johnson, Steve, 1995. Factors Supporting Road Removal and/or Obliteration, Memo from Kootenai Forest Hydrologist, February 6, 1995

Kelly, Angelina J. and Karen E. Hodges, 2020. Post-fire salvage logging reduces snowshoe hare and red squirrel densities in early seral stages. Forest Ecology and Management 473 (2020) 118272

Lee, Robert G., 2009. Sacred Trees. In: Spies, Thomas A. and Sally L. Duncan. 2009. Old Growth in a New World: A Pacific Northwest Icon Reexamined. Island Press.

Marcot, B.G.; Hothausen, R.S.; Teply. J., Carrier, W.D. 1991. Old-growth inventories: status, definitions, and visions for the future. In Wildlife and Vegetation of Unmanaged Douglas-fir Forests. Gen. Tech. Rep. PNW-GTR- 285. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 47-60.

McRae D.J., L.C. Duchesne, B. Freedman, T.J. Lynham, and S. Woodley 2001. Comparisons between wildfire and forest harvesting and their implications in forest management. Environ. Rev. 9: 223–260 (2001) DOI: 10.1139/er-9-4-223 © 2001 NRC Canada.

Ottmar, R., Larkin, S., Brown, T., French, N. 2019. Fire and Smoke Model Evaluation Experiment Final Report. 15-S-01-01.

Page-Dumroese, D.S., Abbott, A.M., and Rice, T.M. 2009a. Forest Soil Disturbance Monitoring Protocol, Vol. I: Rapid Assessment. USDA Forest Service General Tech. Report WO-82a.

Page-Dumroese, D.S., Abbott, A.M., and Rice, T.M. 2009b. Forest Soil Disturbance Monitoring Protocol, Vol. I: Rapid Assessment. USDA Forest Service General Tech. Report WO-82b.

Perry, T. D., and Jones, J. A. (2016) Summer streamflow deficits from regenerating Douglas-fir forest in the Pacific Northwest, USA. Ecohydrology, doi: 10.1002/eco.1790. http://onlinelibrary.wiley.com/doi/10.1002/eco.1790/full.

Powell, R. A., and W. J. Zielinski. 1994. Fisher. Pages 38-73 in L. F. Ruggiero, K. B. Aubry, S.W. Buskirk, and W. J. Zielinski, editors. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine. USDA Forest Service, Rocky Mountain Forest and Range Experimental Station, Fort Collins, Colorado, USA.

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).

USDA Forest Service 1987c. Idaho Panhandle National Forests Forest Plan.

USDA 1999a. Douglas-fir Beetle Project Final Environmental Impact Statement for the Idaho Panhandle National Forests and Colville National Forest

USDA Forest Service, 2012a. Doc Denny Vegetation Management Project Environmental Assessment, Salmon River Ranger District, Nez Perce National Forest, August 2012.

USDA Forest Service, 2016a. Categorical Exclusion Worksheet: Resource Considerations-Soils. Smith Shields Forest Health Project, Yellowstone Ranger District, Custer Gallatin National Forest.

Westside Project 2020 EA

Wuerthner, G. 2018. Foresters and ecologists see forests differently. Montana Standard (Apr. 3, 2018), at https://mtstandard.com/opinion/columnists/foresters-and-ecologists-see-forests-differently/article_3974b654-bac4-5aac-af25-199e428d5bea.html.

Folders

Google Timelapse

Hidden Cedar Timber Sale (2007)

USDA Forest Service 2004a