November 12, 2019

Sent via email to: appeals-northern-regional-office@usda.gov and via US Mail

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

RE: OBJECTION to End of the World Environmental Assessment and Draft Decision Notice-Finding of No Significant Impact

Responsible Official: Cheryl Probert, Forest Supervisor, Nez Perce-Clearwater National Forests

Pursuant to 36 C.F.R. Part 218, Friends of the Clearwater (FOC) and Alliance for the Wild Rockies (AWR) in addition to the undersigned individuals, file this objection to the environmental assessment (EA) and draft decision notice with a finding of no significant impact (DN-FONSI) issued by Forest Supervisor Cheryl Probert for the End of the World project. This timber sale is proposed for the Salmon River Ranger District of the Nez Perce National Forest (a portion of the administratively combined Nez Perce-Clearwater National Forests).

Pursuant to Part 218, FOC is the lead objector whose contact person is Gary Macfarlane, FOC Ecosystem Defense Director, P.O. Box 9241, Moscow, ID 83843 (Tel: 209-882-9755). Attachments, references, and other incorporated documents are included on the data CD with the version sent to the Forest Service (FS) via US mail postmarked this date.

The draft decision notice selected Alternative B, which proposes logging approximately 144 million board feet, as described in the EA:

- precommercial thinning of 1,098 acres
- intermediate harvest of 16,340 acres
- regeneration harvest 1,568 acres
- 12 units of over 40-acre openings
- up to 17,908 acres of post vegetation treatment fuels reduction
- fifteen miles of temporary roads

FOC, AWR, and undersigned, filed timely comments or provided input during the scoping period, which ended on March 19, 2018. The Forest Service provided no comment period on the environmental assessment.

Pursuant to 36 C.F.R. part 218.8, the Objectors state that the following content of this Objection demonstrates connections with previous comments for all issues raised herein, unless the issue or statement arose after the opportunity for comment. For some of the following content, as noted specifically below, we have raised issues where we have been prejudiced because the Forest Service provided no open comment period on the environmental assessment. Pursuant to 36

C.F.R. section 218.8(b), the previous comments mentioned above are incorporated by reference. Any statute or regulation cited in this document is also incorporated by reference.

Sincerely submitted,

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NEPA PROCEDURAL VIOLATIONS

In our scoping comments, we raised direct concerns, e.g. pp. 1-2, with the Forest Service's threat that there would be only one opportunity—scoping—to participate in the NEPA process. We expressed concern that the Forest Service "has largely committed itself to a course of action well before engaging the public." We noted that, without another comment period, "there will be no opportunity for the public to comment on a genuine direct, indirect, or cumulative effects analysis or to comment on the comparisons of alternatives, including potential alternatives to the PA. Nor would there be an opportunity for the public to comment on the FS's analysis demonstrating consistency with all applicable Forest Plan direction." We also noted there "will be no opportunity for the public to comment on what the EIS might identify as the best available science influencing project actions. There is nothing in the PA which identifies what the FS is replying upon as best available science." The remaining NEPA objections below happened after the scoping period or are happening now, so we could not have raised them in scoping. The violations have resulted in prejudice in having concerns on this project considered.

NEPA mandates federal agencies to encourage and facilitate public involvement, use practical means to minimize any possible adverse effects actions that impact the environment, and demonstrating that the agency has made the necessary environmental analysis. *See, e.g.*, 40 C.F.R. 1500.2. NEPA requires federal agencies do this to the "fullest extent possible," which means that, unless agency operations prohibit an action or makes compliance impossible. *See, e.g.*, 40 C.F.R. 1500.6.

The first time the Forest Service released any draft of an environmental assessment for this project, where some of these questions might have first been answered, is for a Forest Service-deemed objection period (which the Forest Service also calls a "predecisional administrative review" process, *see* 36 C.F.R. part 218). Neither the National Environmental Policy Act nor the Healthy Forest Restoration Act allows the Forest Service to abrogate the topics upon which the public may comment on a draft Environmental Assessment in the public's first look at that document. By skipping a comment period and going straight to an objection period, the Forest Service is constructively limiting comments that would otherwise assist the Forest Service from taking a hard look at its action or comment on whether the analysis, project specs, or both, are indeed complying with the forest plan. As discussed further below, skipping a full public comment on the EA and moving straight into an objection process is a violation of the National Environmental Policy Act and not permitted by the Healthy Forest Restoration Act.

This project's procedural process had a scoping document comment period and an objection period. The proposed action released in February of 2018 was a scoping action because "Scoping is required for all Forest Service proposed actions, including those that would appear to be categorically excluded from further analysis and documentation in an EA or EIS." 36 CFR §220.4(e) and 40 CFR §1501.7. The Forest Service called this a scoping document in various places in the record, and it appears under the "scoping" tab on the website. There was also no analysis in the document—only some existing conditions, the actions planned, and optimistic results.

The next document released, an environmental assessment draft—the first environmental assessment that the public has seen on this project—opened a comment period that the Forest Service stated would be an "objection" period. Under Forest Service regulations, an objection period is also known as a "Project-Level Predecisional Administrative Review Process" governed by 36 C.F.R. § 218. Unlike other comment periods, objection comments are limited to earlier commenters and their earlier comments. In this case, that earlier public-comment opportunity was limited by what the Forest Service disclosed during scoping. By limiting the public to comment on the limited information provided scoping, the Forest Service is undermining the intent and requirements of the National Environmental Policy Act.

Under NEPA, the purpose of an environmental assessment is not to "rubber stamp" a project; it is to provide a preliminary analysis that will either help determine whether there would be environmental impacts that would warrant an environmental impact statement (and thus a starting analysis to proceed to that impact statement) or whether there would be no significant environmental impact. An environmental assessment serves to

(1) Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact;
(2) Aid an agency's compliance with the Act when no environmental impact statement is necessary;
(3) Facilitate preparation of a statement when one is necessary.

40 C.F.R. § 1508.9(a).

The National Environmental Policy Act mandates the public get a full chance to comment on an environmental assessment—a full chance to comment means allowing everyone, even individuals who did not participate in the scoping comments, to raise any issue in response to the EA, including those that may not have been raised in scoping. The purpose of NEPA procedures is to ensure that "environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA." 40 C.F.R. § 1500.1(b). Even the Forest Service's regulations contemplate open comment periods for, minimally, the first EA released. *See* 36 C.F.R. § 215.6(a); compare with part 218 (project-level predecisional administrative review process). Because public scrutiny is essential to NEPA, the agency is required to "make diligent efforts to involve the public in preparing and implementing NEPA procedures" and must "solicit appropriate information from the public." 40 CFR § 1506.6. Public scrutiny cannot happen until better information is disclosed, presumably with the environmental assessment.

While HFRA gives the Forest Service permission to amend regulations specific to the predecisional administrative review process (i.e., the objection process per 36 C.F.R. part 218), under 16 U.S.C. §6515(a)(1), that permission does not extend to allowing the Forest Service to skip an EA comment period and move straight to the objection period. *See also* 36 C.F.R. § 215.6(a). For environmental assessments prepared under the Healthy Forest Restoration Act, "In accordance with section 102(2) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332(2)) and the applicable regulations and administrative guidelines, the Secretary shall provide an opportunity for public comment during the preparation of any environmental assessment or environmental impact statement for an authorized hazardous fuel reduction project." That should be this comment period. In other words, this comment period should be an open comment period that does not restrict the public to only those who provided scoping comments or, for those who provided scoping comments, only what they raised in scoping.

Further support that HFRA contemplates the public to have an open comment period in response to the first draft released of an environmental assessment can be found under the same HFRA section, section 6515. HFRA defines who is eligible for the objection process is a person who submitted comments "during scoping or the public comment period for the draft environmental analysis for the project...." 16 U.S.C. 6515(a)(3). This language implies there is a public comment period for an environmental analysis draft that is distinct from the predecisional administrative review process. The public gets two chances to inform the Forest Service of all issues: once in the scoping process, and once in the public comment period for an environmental assessment when it discloses the further shape and analysis of the project. Objections are limited to comments provided during either of those two periods. The Forest Service has not provided the public these two opportunities.

Objection periods are normally open to those who participated in scoping or the EA comment period. Because the public has gotten only one opportunity to comment—in scoping—and because the Forest Service has skipped a normal comment period and proceeded to the objection period, it has prejudiced public comment in two ways: 1) it has constructively frustrated new commenters who might have otherwise commented in that second comment period; and 2) it has constructively frustrated commenters from raising issues that might have otherwise assisted the agency in taking a hard look at its action, as it is required to do under NEPA.

Because this procedural violation has prejudiced the public by constructively frustrating public scrutiny on otherwise meritorious issues, this has been an unlawful process under both NEPA and HFRA. If the Forest Service has utilized the 2014 Farm Bill amendment as the authority to justify one scoping comment, this project has well exceeded the statutory limits that the statute has placed on Farm Bill projects.

In addition to this procedural violation, we noticed that the Forest Service sent out a news release on the End of the World project open for public comment a week after it was advertised in the newspaper.[1] For those who rely on information from news releases and only have 30 days to comment on project with a 45,000-acre boundary, shorting the comment period with late notice is not diligently including the public as NEPA requires.

NEPA also requires the Forest Service to refrain from taking actions that will limit the choice of reasonable alternatives. The Forest Service has laid out the timber sale before NEPA was released,[2] which means the Forest Service was sinking employee time and money into

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[1] Goodland, G. email: "Nez Perce-Clearwater NFs News Release: USFS End of the World Project Open for Public Objection (10-17-19). The start of the objection period was October 10, 2019.

[2] Sept. 6, 2019 email from Stephanie Ridley to Zoanne Anderson, Jeffrey Shin, Nathan Millet, Karen Smith, Drea Em, Alexandra Rozin. Compare with the environmental assessment, which was released to the public for an objection over a month later.

developing timber-sale layouts for an alternative before the analysis was finalized (after an objection period that could raise issues with analysis). By doing so, this has prejudiced non-action alternatives, effectively limiting any action to the agency's preferred alternative. By doing so, this also prejudices any input the public can give, even in this unlawfully limited comment period. This violates NEPA. This is also not a diligent effort to involve the public and fails to solicit appropriate information from the public. This also violates NEPA. Because of the investment the agency has already made into laying out sales to advertise before the analysis was released and before further public comment period, we have no confidence that our comments will be considered.

Remedy:
1) Drop the project;
2) Choose the no-action alternative;
3) Release the EA with a regular comment period open to the entire public on all issues, to diligently notify through the avenues used, to take those comments and update the EA, and *then* to release an EA with an objection period.

THIS PROJECT IS LIKELY SIGNIFICANT AND REQUIRES AN ENVIRONMENTAL IMPACT STATEMENT

In FOC's comments, we noted on page one the necessity for conducting an environmental impact statement.

> As we discuss below, multiple aspects of the End of the World PA raise questions of significant and/or cumulative effects, necessitating the preparation of an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA). The effects of over 18,800 acres of logging, including 1,700 acres of clearcut-type logging would be "significant" under any reasonable definition, even without cumulative effects.

Under the NEPA, environmental impact statements are required for all actions that have the potential to significantly impact the quality of the environment. The End of the World Project, upon which the Forest Service has proposed to log over 17,000 acres, has this potential, and so an environmental impact statement should be done. We understand that Region 1 of the Forest Service has prohibited all Region 1 forests from conducting analysis in an environmental impact statement.[3] However, this is an illegal policy direction, as NEPA, NEPA-implementing regulations, and the scope and potential impacts of each project are the features that direct whether an environmental impact statement should be conducted—the Region 1 Forester cannot arbitrary direct the forests under her jurisdiction to simply not conduct an EIS if the situation requires one. Here, the situation requires one.

"Significantly" is defined by NEPA-implementing regulations:

[3] USDA, Forest Service (2019). *Region 1 Decisions and Agreements to implement our Environmental Analysis and Decision Making Effort* memo (April 26, 2019).

Significantly as used in NEPA requires considerations of both context and intensity:

(a) *Context.* This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

(b) *Intensity.* This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

(1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.
(2) The degree to which the proposed action affects public health or safety.
(3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
(4) The degree to which the effects on the quality of the human environment are likely to be highly controversial.
(5) The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
(6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
(7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
(8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.
(9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
(10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

The sheer size of this project, where the Forest Service has proposed cutting down trees on 17,000+ acres, with the impacts to wildlife that depend upon unfragmented pieces of forest that have dead and downed logs and hiding cover, creates a context and intensity that warrants the preparation of an environmental impact statement. We have given science below that suggests this project will have a significant impact on the environment. The EA, however, only cites three references that it relies upon, EA p. 64, and none of those three references provide compelling evidence as to why 20,000 acres of various levels of logging would create no significant impact.

Remedy:
1) Drop the project
2) Prepare an EIS.

CLIMATE CHANGE AND CARBON SEQUESTRATION

This highly relevant issue was raised on page 23 of our comments on the Proposed Action. We also incorporate herein our discussion on climate change in the HFRA section of the objection.

The EA provided a pittance of information on climate change effects on project area vegetation. The EA provides no analysis as to the veracity of the project's Purpose and Need, the project's objectives, goals, or desired conditions. The FS has the responsibility to inform the public that climate change is and will be bringing forest change. For the EOTW project, this did not happen, in violation of NEPA.

The EA fails to consider that the effects of climate change on the project area, including that the target "historical" or desired vegetation conditions will likely not be achievable or sustainable. The EA fails to provide any credible analysis as to how realistic and achievable its objectives are in the context of a rapidly changing climate, along an unpredictable but definitely changing trajectory.

Hayward, 1994 essentially calls into question the entire manipulate and control regime, as represented in project design. The managed portion of the NPCNF has been fundamentally changed, as has the climate, so the FS must analyze how much land has been fundamentally changed forest wide compared to historic conditions, and disclose such information to the public in the context of an EIS.

And as the Kootenai NF's March 2017 Galton Final Environmental Impact Statement explains:

> This analysis identifies specific disturbance processes, together with landform and other environmental elements, which have influenced the patterns of vegetation across the Decision Area. Vegetative Response Units (VRUs) were used to define and describe the components of ecosystems. VRUs are used to describe an aggregation of land having similar capabilities and potentials for management. These ecological units have similar properties in natural communities: soils, hydrologic function, landform and topography, lithology, climate, air quality, and natural processes (nutrient and biomass cycling, succession, productivity, and fire regimes).
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> Each VRU has a characteristic frequency and type of disturbance based on its climate, soils, vegetation, animals, and other factors. Populations of native plants and animals have responded and adapted to these characteristic disturbance regimes over time (~2500 years) and the resulting vegetation patterns, processes, and structure within a historical range of variability. These characteristic processes, patterns, and structure are termed "Reference Conditions".

The EOTW EA fails to analyze and disclose how climate change is already, and is expected to be even more in the future, influence forest ecology. This has vast ramifications as to whether or not the forest in the project area will respond as the FS assumes.

The EA fails to acknowledge the likelihood that "…high seedling and sapling mortality rates due to water stress, competing vegetation, and repeat fires that burn young stands," which will likely lead to a dramatic increase in non-forest land acres. (Johnson, et al., 2016.)

The District Court of Montana ruled in Case 4:17-cv-00030-BMM that the Federal government was required to evaluate the climate change impacts of the federal government coal program.

In March 2019, U.S. District Judge Rudolph Contreras in Washington, D.C., ruled that when the U.S. Bureau of Land Management (BLM) auctions public lands for oil and gas leasing, officials must consider emissions from past, present and foreseeable future oil and gas leases nationwide.

In March of 2018 the Federal District Court of Montana found the Miles City (Montana) and Buffalo (Wyoming) Field Office's Resource Management Plans unlawfully overlooked climate impacts of coal mining and oil and gas drilling.

In the recent revised Forest Plan Draft EIS for the Custer-Gallatin National Forest, the FS states, "Climate change is expected to continue and have profound effects on the Earth's ecosystems in the coming decades (IPCC 2007)." USDA 2019. As alarming as that might sound, perhaps the EOTW IDT members should familiarize themselves with the most recent report from the Intergovernmental Panel on Climate Change, which makes that 2007 report seem optimistic. *See* IPCC 2014.

That landmark report from the United Nations' scientific panel on climate change paints a much darker picture of the immediate consequences of climate change than previously thought and says that avoiding the damage requires transforming the world economy at a speed and scale that has "no documented historic precedent."

The report, issued late 2018 by the Intergovernmental Panel on Climate Change, a group of scientists convened by the United Nations to guide world leaders, describes a world of worsening food shortages and wildfires, and a mass die-off of coral reefs as soon as 2040 — a period well within the lifetime of much of the global population.

The report "is quite a shock, and quite concerning," said Bill Hare, an author of previous I.P.C.C. reports and a physicist with Climate Analytics, a nonprofit organization. "We were not aware of this just a few years ago." The report was the first to be commissioned by world leaders under the Paris agreement, the 2015 pact by nations to fight global warming.

The authors found that if greenhouse gas emissions continue at the current rate, the atmosphere will warm up by as much as 2.7 degrees Fahrenheit (1.5 degrees Celsius) above preindustrial levels by 2040, inundating coastlines and intensifying droughts and poverty. Previous work had focused on estimating the damage if average temperatures were to rise by a larger number, 3.6

degrees Fahrenheit (2 degrees Celsius), because that was the threshold scientists previously considered for the most severe effects of climate change.

The new report, however, shows that many of those effects will come much sooner, at the 2.7-degree mark.

Past conditions will not predict the future in the wake of climate change. The Montana Climate Assessment (MCA) (Found at http://montanaclimate.org/) is an effort to synthesize, evaluate, and share credible and relevant scientific information about climate change in Montana. Following are key messages and conclusions:

KEY MESSAGES

- Annual average temperatures, including daily minimums, maximums, and averages, have risen across the state between 1950 and 2015. The increases range between 2.0-3.0°F (1.1-1.7°C) during this period. [high agreement, robust evidence]

- Winter and spring in Montana have experienced the most warming. Average temperatures during these seasons have risen by 3.9°F (2.2°C) between 1950 and 2015. [high agreement, robust evidence]

- Montana's growing season length is increasing due to the earlier onset of spring and more extended summers; we are also experiencing more warm days and fewer cool nights. From 1951-2010, the growing season increased by 12 days. In addition, the annual number of warm days has increased by 2.0% and the annual number of cool nights has decreased by 4.6% over this period. [high agreement, robust evidence]

- Despite no historical changes in average annual precipitation between 1950 and 2015, there have been changes in average seasonal precipitation over the same period. Average winter precipitation has decreased by 0.9 inches (2.3 cm), which can mostly be attributed to natural variability and an increase in El Niño events, especially in the western and central parts of the state. A significant increase in spring precipitation (1.3-2.0 inches [3.3-5.1 cm]) has also occurred during this period for the eastern portion of the state. [moderate agreement, robust evidence]

- The state of Montana is projected to continue to warm in all geographic locations, seasons, and under all emission scenarios throughout the 21st century. By mid century, Montana temperatures are projected to increase by approximately 4.5-6.0°F (2.5-3.3°C) depending on the emission scenario. By the end-of-century, Montana temperatures are projected to increase 5.6-9.8°F (3.1-5.4°C) depending on the emission scenario. These state-level changes are larger than the average changes projected globally and nationally. [high agreement, robust evidence]

- The number of days in a year when daily temperature exceeds 90°F (32°C) and the number of frost-free days are expected to increase across the state and in both emission scenarios studied. Increases in the number of days above 90°F (32°C) are expected to be greatest in the eastern part of the state. Increases in the number of frost-free days are expected to be greatest in the western part of the state. [high agreement, robust evidence]

- Across the state, precipitation is projected to increase in winter, spring, and fall; precipitation is projected to decrease in summer. The largest increases are expected to occur during spring in the southern part of the state. The largest decreases are expected to occur during summer in the central and southern parts of the state. [moderate agreement, moderate evidence]

We incorporate the Battle Creek Alliance et al., 2017 comments on the January 20, 2017 Draft California Forest Carbon Plan within this Objection. (Attachment 1.) It contains headings such as "The …assertion that increased thinning/logging will increase carbon storage in forests is unsupported by the best available science."

In a literature review, Simons (2008) states, "Restoration efforts aimed at the maintenance of historic ecosystem structures of the pre-settlement era would most likely reduce the resilient characteristics of ecosystems facing climate change (Millar 1999)." The project area and NPCNF have been fundamentally changed, so the agency must consider how much native forest it has fundamentally altered compared to historic conditions forestwide before pursuing "treatments" here.[4] And that includes considering the effects of human-induced climate change. Essentially, this means considering new scientific information on all kinds of changes away from historic conditions.

The FS's position on project impacts on climate change is that the project would have a miniscule impact on global carbon emissions. The obvious problem with that viewpoint is, once can say the same thing about every source of carbon dioxide and other greenhouse gas emission on earth, and likewise justify inaction as does this EA. In their comments on the KNF's Draft EIS for the Lower Yaak, O'Brien, Sheep project, the EPA rejected that sort of analysis, basically because that cumulative effects scale dilutes project effects. *See* Lower Yaak, O'Brien, Sheep FEIS pp. 818-19. We would add that, if the FS wants to refer to a wider scope to analyze its carbon footprint, we suggest that it actually conduct such a cumulative effect analysis and disclose it in a NEPA document.

The FS (in USDA Forest Service, 2017b) discusses some effects of climate change on forests, including "In many areas, it will no longer be possible to maintain vegetation within the historical range of variability. Land management approaches based on current or historical conditions will need to be adjusted." The EA has no scientific basis for its claims that proposed vegetation "treatments" will result in sustainable vegetation conditions under likely climate change scenarios. It also fails to provide a definition of "increasing resilience" that includes metrics for valid and reliable measurement of resilience. The scientific literature even debates if the same tree species mix that has historically inhabited sites can persist after disturbances, including the types of disturbances proposed under project action alternatives.

[4] A satellite image from 1984 suggests that the Forest Service has altered much of this area. *See* Google Timelapse image of EOTW area, taken in 1984.

The EA ignores scientific opinion on forest management's negative effects on carbon sequestration. Best available science supports the proposition that forest policies must shift away from logging if a priority is carbon sequestration. Forests should be preserved indefinitely for their carbon storage value.

We incorporate the following article from the *Missoulian* ("Fire study shows landscapes such as Bitterroot's Sapphire Range too hot, dry to restore trees") written by Rob Chaney (March 11, 2019):

> Burned landscapes like this drainage in the Sapphire Mountains hasn't been able to grow new trees since the Valley Complex fire of 2000, due to lack of soil moisture, humidity and seed trees, as well as excess heat during the growing season. University of Montana students Erika Berglund and Lacey Hankin helped gather samples for a study showing tree stands are getting replaced by grass and shrubs after fire across the western United States due to climate change.

Courtesy Kim Davis

Fire-scarred forests like the Sapphire Range of the Bitterroot Valley may become grasslands because the growing seasons have become too hot and dry, according to new research from the University of Montana.

“The drier aspects aren’t coming back, especially on north-facing slopes,” said Kim Davis, a UM landscape ecologist and lead investigator on the study. “It’s not soil sterilization. Other vegetation like grasses are re-sprouting. It’s too warm. There’s not enough moisture for the trees.”

Davis worked with landscape ecologist Solomon Dobrowski, fire paleoecologist Philip Higuera, biologist Anna Sala and geoscientist Marco Maneta at UM along with colleagues at the U.S. Forest Service and University of Colorado-Boulder to produce the study, which was released Monday in the Proceedings of the National Academy of Sciences journal.

“What’s striking is if you asked scientists two decades ago how climate warming would play out, this is what they expected we’d see,” Higuera said. “And now we’re starting to see those predictions on the impact to ecosystems play out.”

The study concentrated on regrowth of Ponderosa pine and Douglas fir seedlings in Montana, Idaho, Colorado, New Mexico, Arizona and northern California. Field workers collected trees from 90 sites, including 40 in the northern Rocky Mountains, scattered within 33 wildfires that had occurred within the past 20 years.

“We did over 4,000 miles of road-tripping across the West, as well as lots of miles hiking and backpacking,” Davis said. The survey crews brought back everything from dead seedlings to 4-inch-diameter tree rings; nearly 3,000 samples in total. Then they analyzed how long each tree had been growing and what conditions had been when it sprouted. Before the 1990s, the test sites had enough soil moisture, humidity and other factors to recruit new seedlings after forest fires, Dobrowski said.

> “There used to be enough variability in seasonal conditions that seedlings could make it across these fixed thresholds,” Dobrowski said. “After the mid-‘90s, those windows have been closing more often. We’re worried we’ll lose these low-elevation forests to shrubs or grasslands. That’s what the evidence points to.”
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> After a fire, all kinds of grasses, shrubs and trees have a blank slate to recover. But trees, especially low-elevation species, need more soil moisture and humidity than their smaller plant cousins. Before the mid-90s, those good growing seasons rolled around every three to five years. The study shows such conditions have evaporated on virtually all sites since 2000.
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> “The six sites we looked at in the Bitterroots haven’t been above the summer humidity threshold since 1997,” Higuera said. “Soil moisture hasn’t crossed the threshold since 2009.”
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> The study overturns some common assumptions of post-fire recovery. Many historic analyses of mountain forests show the hillsides used to hold far fewer trees a century ago, and have become overstocked due to the efforts humans put at controlling fire in the woods. Higuera explained that some higher elevation forests are returning to their more sparse historical look due to increased fires.
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> “But at the lower fringes, those burn areas may transition to non-forest types,” Higuera said, “especially where climate conditions at the end of this century are different than what we had in the early 20th Century.”
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> The study also found that soil sterilization wasn’t a factor in tree regrowth, even in the most severely burned areas. For example, the 2000 Sula Complex of fires stripped forest cover in the southern end of the Bitterroot Valley. While the lodgepole pine stands near Lost Trail Pass have recovered, the lower- elevation Ponderosa pine and Douglas firs haven’t.
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> Another factor driving regeneration is the availability of surviving seed trees that can repopulate a burn zone. If one remains within 100 meters of the burned landscape, the area can at least start the process of reseeding. Unfortunately, the trend toward high-severity fires has reduced the once-common mosaic patterns that left some undamaged groves mixed into the burned areas.
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> Higuera said he hoped land managers could use small or prescribed fires to make landscapes more resilient, as well as restructure tree-planting efforts to boost the chances of heavily burned places.

The Resources Planning Act of 1974 (RPA) and National Forest Management Act of 1976 (NFMA) mandate long-range planning which impose numerous limitations on timber extraction practices and the amount of timber sold annually. These long range plans are based on assumptions, which are based on data, expert opinion, public participation and other factors which mostly view from a historical perspective. So it's time to peer into the future to examine closely (NEPA: "take a hard look at") those assumptions.

Clearly, the FS is not considering best available science on this topic.

The FS has not reexamined assumptions in the relating to timber suitability, resilience and sustainability as a result of recent fires, past regeneration success/failures, and climate-risk science.

Conventional wisdom dictates that forests regenerate and recover from wildfire. If that's true, then it's logical to conclude that forests can regenerate and recover from logging. And these days, "resilience" is a core tenant of FS planning. Unfortunately, assumptions of the EA and Forest Plan FIS relating to historic and desired conditions are incorrect. NEPA requires a "hard look" at the best available science relating to future concentrations of greenhouse gases and gathering climate risk as we move forward into an increasingly uncertain and uncharted climate future. This has not been done. The Forest Plan and EOTW EA do not include a legitimate climate-risk analysis.

Scientific research indicates that increasing CO_2 and other greenhouse gas concentrations may preclude maintaining and attaining the anticipated forest conditions in the project area and across the NPCNF. The agency downplays the implications across the entire Northern Rockies bioregion and beyond, seeming unaware of the likelihood that its desired conditions are at great risk.

No amount of logging, thinning and prescribes burning will cure the cumulative effects (irretrievable loss) already baked into the foreseeably impending climate chaos. "Treatments" must be acknowledged for what they are: adverse cumulative environmental effects. Logging can neither mitigate, nor prevent, the effects of wildfire or logging. Both cause disturbance to forests that cannot be restored or retrieved—the assumed resilience no longer exists. It is way too late in the game to pretend to ignore the elephant in the room.

The FS ignores best available science indicating prescribed fire, thinning and logging are actually cumulative with the dominant forces of increased heat, drought, and wildfire.

NEPA requires analysis of an alternative that reflects our common understanding of climate risk. A considerable amount of data and scientific research repeatedly confirms that we may be looking in the wrong direction (back into history, e.g., "historic conditions") for answers to better understand our forest future.

The FS fails to analyze an alternative projecting climate science into the forest's future. It fails to adequately consider that the effects of climate risk represent a significant and eminent loss of forest resilience already, and growing risk into the "foreseeable future."

Funk et al., 2014 indicate that at least five common tree species, including aspens and four conifers, are at great risk unless atmospheric greenhouse gases and associated temperatures can be contained at today's levels of concentration in the atmosphere. It is indeed time to speak honestly about unrealistic expectations relating to desired conditions.

And according to scientific literature it seems highly unlikely that greenhouse gas concentrations and the heat they trap in the atmosphere will be held at current levels.

The FS fails to analyze and disclose conditions we can realistically expect as heat trapped by increasing greenhouse gas concentrations steadily tightens its grip—and impacts on forests accrue locally, regionally, nationally, and globally.

The EA fails to assess and disclose all risks associated with vegetative-manipulation as proposed.

NEPA requires disclosure of impact on "the human environment." Climate risk presents overarching adverse impacts on cultural, economic, environmental, and social aspects of the human environment—people, jobs, and the economy—adjacent to and near the Forests. Challenges in predicting responses of individual tree species to climate are a result of species competing under a never-before-seen climate regime that we have not seen before—one forests may not have experienced before either.

Golladay et al., 2016 state, "In an uncertain future of rapid change and abrupt, unforeseen transitions, adjustments in management approaches will be necessary and some actions will fail. However, **it is increasingly evident that the greatest risk is posed by continuing to implement strategies inconsistent with and not informed by current understanding of our novel future**… (Emphasis added).

In the face of increasing climate risk, growing impacts of wildfire and insect activity, plus scientific research findings, the FS must disclose the significant trend in post-fire regeneration failure. The EA fails to do so. The national forests have already experienced considerable difficulty restocking on areas that have been subjected to clear-cut logging, post-fire salvage logging and other even-aged management "systems." NFMA (1982) regulation 36CFR 219.27(c)(3) implements the NFMA statute, and requires restocking in five years.

The EA doesn't address the question of if lands are actually suitable for the type of management ongoing or proposed. This has become an open question, due to ongoing and expected climate change impacts.

It's time to analyze and disclose the fact that the NPCNF can no longer "insure that timber will be harvested from the National Forest system lands only where…there is assurance that such lands can be restocked within five years of harvest." [NFMA §6(g)(3)(E)(ii)].

Davis et al., 2019 state: "At dry sites across our study region, seasonal to annual climate conditions over the past 20 years have crossed these thresholds, such that conditions have become increasingly unsuitable for regeneration. High fire severity and low seed availability further reduced the probability of postfire regeneration. Together, our results demonstrate that climate change combined with high severity fire is leading to increasingly fewer opportunities for seedlings to establish after wildfires and may lead to ecosystem transitions in low-elevation ponderosa pine and Douglas-fir forests across the western United States."

Forests are already experiencing emissions-driven deforestation, on both the post-fire and post-logging acreage.

The EA does not disclose restocking monitoring data and analysis.

Stevens-Rumann, et al., (2018) state: "In the US Rocky Mountains, we documented a significant trend of post-fire tree regeneration, even over the relatively short period of 23 years covered in this analysis. Our findings are consistent with the expectation of **reduced resilience of forest ecosystems to the combined impacts of climate warming and wildfire activity**. Our results suggest that predicted **shifts from forest to non-forested vegetation**. (Emphases added.)

The Forest Plan and EOTW EA are based on assumptions largely drawn from the past. These assumptions must be rejected where overwhelming evidence demonstrates a change of course is critical. It is time to take a step back, assess the future and make the necessary adjustments, all in full public disclosure to the Congress and the public. The FS must finally accept scientific research and opinion that recognizes the critical challenge posed by climate change to global ecosystems and the NPCNF.

The EA fails to analyze how proposed management actions would be affected by likely climate change scenarios. The FS doesn't quantify all human-caused CO_2 emissions for all project activities. The FS doesn't quantify carbon sequestration for each alternative. The FS doesn't disclose how climate change has affected ecological conditions in the project area, and include an analysis of these conditions under climate change scenarios.

Some politicians, bureaucrats, and industry profiteers pretend there's nothing to do about climate change because it isn't real. The FS acknowledges it's real, pretends it can do nothing, provides but a limited focus on its symptoms and—like those politicians and profiteers—ignores and distracts from the causes of climate change they enable.

Global climate change is a massive, unprecedented threat to humanity and forests. Climate change is caused by excess CO_2 and other greenhouse gases transferred to the atmosphere from other pools. All temperate and tropical forests, including those in this project area, are an important part of the global carbon cycle. There is significant new information reinforcing the need to conserve all existing large stores of carbon in forests, in order to keep carbon out of the atmosphere and mitigate climate change. The agency must do its part by managing forests to maintain and increase carbon storage. Logging would add to cumulative total carbon emissions so is clearly part of the problem, so it must be minimized and mitigated. Logging would not only transfer carbon from storage to the atmosphere but future regrowth is unlikely to ever make up for the effects of logging, because carbon storage in logged forests lags far behind carbon storage in unlogged forests for decades or centuries. And before recovery, the agency plans even more activities causing greenhouse gas emissions.

Clearly, the management of the planet's forests is a nexus for addressing the largest crisis ever facing humanity. This is an issue as serious as nuclear annihilation (although at least with the latter we're not already pressing the button).

There is no cumulative effects analysis of NPCNF carbon sequestration over time.

Respected experts say that the atmosphere might be able to safely hold 350 ppm of CO_2.[5] So when the atmosphere was at pre-industrial levels of about 280 ppm, there was a cushion of about 70 ppm which represents millions of tons of greenhouse gas emissions. Well, now that cushion is completely gone. The atmosphere is now over 400 ppm CO_2 and rising. Therefore the safe level of additional emissions (from logging or any other activity) is negative. There is no safe level of additional emissions that our earth systems can tolerate. We need to be removing carbon from the atmosphere—not adding to it.[6] How? By allowing forest to grow. Logging moves us away from our objective while conservation moves us toward our objective.

Pecl, et al. 2017 "review the consequences of climate-driven species redistribution for economic development and the provision of ecosystem services, including livelihoods, food security, and culture, as well as for feedbacks on the climate itself." They state, "Despite mounting evidence for the pervasive and substantial impacts of a climate-driven redistribution of Earth's species, current global goals, policies, and international agreements fail to account for these effects. … To date, all key international discussions and agreements regarding climate change have focused on the direct socioeconomic implications of emissions reduction and on funding mechanisms; **shifting natural ecosystems have not yet been considered in detail**." (Emphasis added.)

Pecl, et al. 2017 conclude:

> The breadth and complexity of the issues associated with the global redistribution of species driven by changing climate are creating profound challenges, with species movements already affecting societies and regional economies from the tropics to polar regions. Despite mounting evidence for these impacts, current global goals, policies, and international agreements do not sufficiently consider species range shifts in their formulation or targets. Enhanced awareness, supported by appropriate governance, will provide the best chance of minimizing negative consequences while maximizing opportunities arising from species movements—movements that, with or without effective emission reduction, will continue for the foreseeable future, owing to the inertia in the climate system.

Moomaw and Smith, 2017 identify the need for forest protection to be an urgent, national priority in the fight against climate change and as a safety net for communities against extreme weather events caused by a changing climate. As those authors explain,

> Global climate change is caused by excess CO_2 and other greenhouse gases transferred to the atmosphere from other pools. Human activities, including combustion of fossil fuels and bioenergy, forest loss and degradation, other land use changes, and industrial processes,

[5] http://www.350.org/about/science.

[6] "To get back to 350 ppm, we'll have to run the whole carbon-spewing machine backwards, sucking carbon out of the atmosphere and storing it somewhere safely. … By growing more forests, growing more trees, and better managing all our forests…" (https://cleanenergy.org/blog/exploring-biocarbon-tools/)

> have contributed to increasing atmospheric CO_2, the largest contributor to global warming, which will cause temperatures to rise and stay high into the next millennium or longer.
>
> The most recent measurements show the level of atmospheric carbon dioxide has reached 400 parts per million and will likely to remain at that level for millennia to come. Even if all fossil fuel emissions were to cease and all other heat-trapping gases were no longer emitted to the atmosphere, temperatures close to those achieved at the emissions peak would persist for the next millennium or longer.
>
> Meeting the goals of the Paris Agreement now requires the implementation of strategies that result in negative emissions, i.e., extraction of carbon dioxide from the atmosphere. In other words, we need to annually remove more carbon dioxide from the atmosphere than we are emitting and store it long-term. Forests and soils are the only proven techniques that can pull vast amounts of carbon dioxide out of the atmosphere and store it at the scale necessary to meet the Paris goal. Failure to reduce biospheric emissions and to restore Earth's natural climate stabilization systems will doom any attempt to meet the Paris (COP21) global temperature stabilization goals.
>
> The most recent U.S. report of greenhouse gas emissions states that our forests currently "offset" 11 to 13 percent of total U.S. annual emissions. That figure is half that of the global average of 25% and only a fraction of what is needed to avoid climate catastrophe. And while the U.S. government and industry continue to argue that we need to increase markets for wood, paper, and biofuel as climate solutions, the rate, scale, and methods of logging in the United States are having significant, negative climate impacts, which are largely being ignored in climate policies at the international, national, state, and local levels.
>
> The actual carbon stored long-term in harvested wood products represents less than 10 percent of that originally stored in the standing trees and other forest biomass. If the trees had been left to grow, the amount of carbon stored would have been even greater than it was 100 years prior. Therefore, from a climate perspective, the atmosphere would be better off if the forest had not been harvested at all. In addition, when wood losses and fossil fuels for processing and transportation are accounted for, carbon emissions can actually exceed carbon stored in wood products.

Like all forests, the NPCNF is an important part of the global carbon cycle. Clear scientific information reinforces the critical need to conserve all existing stores of carbon in forests to keep it out of the atmosphere. Given that forest policies in other countries and on private lands are politically more difficult to influence, the FS must take a leadership role to maintain and increase carbon storage on publicly owned forests, in order to help mitigate climate change effects.

Depro et al., 2008 found that ending commercial logging on U.S. national forests and allowing forests to mature instead would remove an additional amount of carbon from the atmosphere equivalent to 6 percent of the U.S. 2025 climate target of 28 percent emission reductions.

Forest recovery following logging and natural disturbances are usually considered a given. But forests have recovered under climatic conditions that no longer exist. Higher global temperatures and increased levels of disturbance are contributing to greater tree mortality in many forest ecosystems, and these same drivers can also limit forest regeneration, leading to vegetation type conversion. (Bart et al., 2016.)

The importance of trees for carbon capture will rise especially if, as recent evidence suggests, hopes for soils as a carbon sink may be overly optimistic. (He et al., 2016.) Such a potentially reduced role of soils doesn't mean that forest soils won't have a role in capture and storage of carbon, rather it puts more of the onus on aboveground sequestration by trees, even if there is a conversion to unfamiliar mixes of trees.

The Kootenai NF Forest Plan draft EIS defines carbon sequestration: "The process by which atmospheric carbon dioxide is taken up by trees, grasses, and other plants through photosynthesis and stored as carbon in biomass (trunks, branches, foliage, and roots) and soils."

The analysis fails to quantify CO_2 and other greenhouse gas emissions from other common human activities related to forest management and recreational uses. These include emissions associated with machines used for logging and associated activities, vehicle use for administrative actions, recreational motor vehicles, and emissions associated with livestock grazing. The FS is simply ignoring the climate impacts of these management and other authorized or allowed activities.

Kassar and Spitler, 2008 provide an analysis of the carbon footprint of off-road vehicles in California. They determined that:

> Off-road vehicles in California currently emit more than 230,000 metric tons — or 5000 million pounds — of carbon dioxide into the atmosphere each year. This is equivalent to the emissions created by burning 500,000 barrels of oil. The 26 million gallons of gasoline consumed by off-road vehicles each year in California is equivalent to the amount of gasoline used by 1.5 million car trips from San Francisco to Los Angeles.
>
> . . . Off-road vehicles emit considerably more pollution than automobiles. According to the California Air Resources Board, off-road motorcycles and all-terrain vehicles produce 118 times as much smog-forming pollutants as do modern automobiles on a per-mile basis.
>
> . . . Emissions from current off-road vehicle use statewide are equivalent to the carbon dioxide emissions from 42,000 passenger vehicles driven for an entire year or the electricity used to power 30,500 homes for one year.

Also, Sylvester, 2014 provides data on the amount of fossil fuel being consumed by snowmobiles in Montana, from which one can calculate the carbon footprint. The study finds that resident snowmobilers burn 3.3 million gallons of gas in their snowmobiles each year and a similar amount of fuel to transport themselves and their snowmobiles to and from their destination. Non-residents annually burn one million gallons of gas in snowmobiles and about twice that in related transportation. So that adds up to 9.6 million gallons of fuel consumed in the pursuit of snowmobiling each year in Montana alone. Multiply that by 20 pounds of carbon dioxide per gallon of gas (diesel pickups spew 22 pounds per gallon) and snowmobiling releases 192 million pounds (96 thousand tons) of climate-warming CO_2 per year into the atmosphere. Can we really afford this?

The FS distracts from the emerging scientific consensus that removing wood or ***any*** biomass from the forest only worsens the climate change problem. Law and Harmon, 2011 conducted a literature review and concluded …

> Thinning forests to reduce potential carbon losses due to wildfire is in direct conflict with carbon sequestration goals, and, if implemented, would result in a net emission of CO2 to the atmosphere because the amount of carbon removed to change fire behavior is often far larger than that saved by changing fire behavior, and more area has to be harvested than will ultimately burn over the period of effectiveness of the thinning treatment.

Best available science supports the proposition that forest policies must shift away from logging if carbon sequestration is prioritized.[7] Forests must be preserved indefinitely for their carbon storage value. Forests that have been logged should allowed to convert to eventual old-growth condition. This type of management has the potential to double the current level of carbon storage in some regions. (*See* Harmon and Marks, 2002; Harmon, 2001; Harmon et al., 1990; Homann et al., 2005; Law, 2014; Solomon et al., 2007; Turner et al., 1995; Turner et al., 1997; Woodbury et al., 2007.)

Kutsch et al., 2010 provide an integrated view of the current and emerging methods and concepts applied in soil carbon research. They use a standardized protocol for measuring soil CO_2 efflux, designed to improve future assessments of regional and global patterns of soil carbon dynamics:

> Excluding carbonate rocks, soils represent the largest terrestrial stock of carbon, holding approximately 1,500 Pg (1015 g) C in the top metre. This is approximately twice the amount held in the atmosphere and thrice the amount held in terrestrial vegetation. Soils, and soil organic carbon in particular, currently receive much attention in terms of the role they can play in mitigating the effects of elevated atmospheric carbon dioxide (CO_2) and associated global warming. Protecting soil carbon stocks and the process of soil carbon sequestration, or flux of carbon into the soil, have become integral parts of managing the global carbon balance. This has been mainly because many of the factors affecting the flow of carbon into and out of the soil are affected directly by **land-management practices**. (Emphasis added.)

Moomaw and Smith, 2017 state:

> Multiple studies warn that carbon emissions from soil due to logging are significant, yet under-reported. One study found that logging or clear-cutting a forest can cause carbon emissions from soil disturbance for up to fifty years. Ongoing research by an N.C. State University scientist studying soil emissions from logging on Weyerhaeuser land in North

[7] "More logging and reforestation occur annually in the U.S., including on our public lands, than in any other nation in the world." John Muir Project of Earth Island Institute 2018. *Protecting Forests from Logging: The Missing Piece Necessary to Combat Climate Change*. *See also* Hansen et al 2013 High-resolution Global Maps of 21st-Century Forest Cover Change. Science 342: 850-853; Prestemon, J.P., et al. 2015. The global position of the U.S. forest products industry.

> Carolina suggests that "logging, whether for biofuels or lumber, is eating away at the carbon stored beneath the forest floor."

Moomaw and Smith, 2017 examined the scientific evidence implicating forest biomass removal as contributing to climate change:

> All plant material releases slightly more carbon per unit of heat produced than coal. Because plants produce heat at a lower temperature than coal, wood used to produce electricity produces up to 50 percent more carbon than coal per unit of electricity.
>
> Trees are harvested, dried, and transported using fossil fuels. These emissions add about 20 percent or more to the carbon dioxide emissions associated with combustion.

In 2016, Professors Mark Harmon and Bev Law of Oregon State University wrote the following in a letter to members of the U.S. Senate in response to a bill introduced that would essentially designate the burning of trees as carbon neutral:

> The [carbon neutrality] bills' assumption that emissions do not increase atmospheric concentrations when forest carbon stocks are stable or increasing is clearly not true scientifically. It ignores the cause and effect basis of modern science. Even if forest carbon stocks are increasing, the use of forest biomass energy can reduce the rate at which forest carbon is increasing. Conservation of mass, a law of physics, means that atmospheric carbon would have to become higher as a result of this action than would have occurred otherwise. One cannot legislate that the laws of physics cease to exist, as this legislation suggests.

Nitrous oxide, a by-product generated by the microbial breakdown of nitrogen in livestock manure, is a potent greenhouse gas completely ignored by the FS. Also, the digestion of organic materials by livestock is a large source of methane emission—another greenhouse gas not even mentioned. Methane is a far more potent substance than CO_2 causing climate change.

Gerber, et al., 2013 state, "Livestock producers, which include meat and dairy farming, account for about 15 percent of greenhouse gas emissions around the world. That's more than all the world's exhaust-belching cars, buses, boats, and trains combined."

Saunois et al., 2016a note "the recent rapid rise in global methane concentrations is predominantly biogenic—most likely from agriculture—with smaller contributions from fossil fuel use and possibly wetlands. …Methane mitigation offers rapid climate benefits and economic, health and agricultural co-benefits that are highly complementary to CO_2 mitigation." (Also see Saunois et al., 2016b; Gerber et al., 2013; and the Grist articles "Why isn't the U.S. counting meat producers' climate emissions?" and "Cattle grazing is a climate disaster, and you're paying for it" and Stanford News article "Methane from food production could be wildcard in combating climate change, Stanford scientist says".)

Ripple et al. 2014 provide some data and point out the opportunities available for greenhouse gas reductions via change in livestock policy:

- At present non-CO_2 greenhouse gases contribute about a third of total anthropogenic CO_2 equivalent (CO_2e) emissions and 35–45% of climate forcing (the change in radiant energy retained by Earth owing to emissions of long-lived greenhouse gases) resulting from those emissions.

- Methane (CH4) is the most abundant non- CO_2 greenhouse gas and because it has a much shorter atmospheric lifetime (~9 years) than CO_2 it holds the potential for more rapid reductions in radiative forcing than would be possible by controlling emissions of CO_2 alone.
- We focus on ruminants for four reasons. First, ruminant production is the largest source of anthropogenic CH_4 emissions (Fig. 1c) and globally occupies more area than any other land use. Second, the relative neglect of this greenhouse gas source suggests that awareness of its importance is inappropriately low. Third, reductions in ruminant numbers and ruminant meat production would simultaneously benefit global food security, human health and environmental conservation. Finally, with political will, decreases in worldwide ruminant populations could potentially be accomplished quickly and relatively inexpensively.
- Worldwide, the livestock sector is responsible for approximately 14.5% of all anthropogenic greenhouse gas emissions3 (7.1 of 49 Gt $CO_2$2e yr–1). Approximately 44% (3.1 Gt CO_2e yr–1) of the livestock sector's emissions are in the form of CH4 from enteric fermentation, manure and rice feed, with the remaining portions almost equally shared between CO_2 (27%, 2 Gt CO_2e yr–1) from land-use change and fossil fuel use, and nitrous oxide (N_2O) (29%, 2 Gt CO_2e yr–1) from fertilizer applied to feed-crop fields and manure.
- Globally, ruminants contribute 11.6% and cattle 9.4% of all greenhouse gas emissions from anthropogenic sources.
- Lower global ruminant numbers would have simultaneous benefits for other systems and processes. For example, in some grassland and savannah ecosystems, domestic ruminant grazing contributes to land degradation through desertification and reduced soil organic carbon. Ruminant agriculture can also have negative impacts on water quality and availability, hydrology and riparian ecosystems. Ruminant production can erode biodiversity through a wide range of processes such as forest loss and degradation, land-use intensification, exotic plant invasions, soil erosion, persecution of large predators and competition with wildlife for resources.
- Roughly one in eight people in the world are severely malnourished or lack access to food owing to poverty and high food prices. With over 800 million people chronically hungry, we argue that the use of highly productive croplands to produce animal feed is questionable on moral grounds because this contributes to exhausting the world's food supply.
- In developed countries, high levels of meat consumption rates are strongly correlated with rates of diseases such as obesity, diabetes, some common cancers and heart disease. Moreover, reducing meat consumption and increasing the proportion of dietary protein obtained from high-protein plant foods — such as soy, pulses, cereals and tubers — is associated with significant human health benefits.
- The greenhouse gas footprint of consuming ruminant meat is, on average, 19–48 times higher than that of high-protein foods obtained from plants (Fig. 2), when full life cycle analysis including both direct and indirect environmental effects from 'farm to fork' for enteric fermentation, manure, feed, fertilizer, processing, transportation and land-use change are considered.

- In terms of short-term climate change mitigation during the next few decades, if all the land used for ruminant livestock production were instead converted to grow natural vegetation, increased CO_2 sequestration on the order of 30–470% of the greenhouse gas emissions associated with food production could be expected.
- (D)ecreasing ruminants should be considered alongside our grand challenge of significantly reducing the world's reliance on fossil fuel combustion. Only with the recognition of the urgency of this issue and the political will to commit resources to comprehensively mitigate both CO_2 and non- CO_2 greenhouse gas emissions will meaningful progress be made on climate change. For an effective and rapid response, we need to increase awareness among the public and policymakers that what we choose to eat has important consequences for climate change.

See more explanation:
https://www.facebook.com/DavidAvocadoWolfe/videos/10153860126441512/

Van der Werf, et al. 2009 discuss the effects of land-management practices and state:

> (T)he maximum reduction in CO_2 emissions from avoiding deforestation and forest degradation is probably about 12% of current total anthropogenic emissions (or 15% if peat degradation is included) - and that is assuming, unrealistically, that emissions from deforestation, forest degradation and peat degradation can be completely eliminated.
>
> ...reducing fossil fuel emissions remains the key element for stabilizing atmospheric CO_2 concentrations.
>
> (E)fforts to mitigate emissions from tropical forests and peatlands, and maintain existing terrestrial carbon stocks, remain critical for the negotiation of a post-Kyoto agreement. Even our revised estimates represent substantial emissions ...

Keith et al., 2009 state:

> Both net primary production and net ecosystem production in many old forest stands have been found to be positive; they were lower than the carbon fluxes in young and mature stands, but not significantly different from them. Northern Hemisphere forests up to 800 years old have been found to still function as a carbon sink. Carbon stocks can continue to accumulate in multi-aged and mixed species stands because stem respiration rates decrease with increasing tree size, and continual turnover of leaves, roots, and woody material contribute to stable components of soil organic matter. There is a growing body of evidence that forest ecosystems do not necessarily reach an equilibrium between assimilation and respiration, but can continue to accumulate carbon in living biomass, coarse woody debris, and soils, and therefore may act as net carbon sinks for long periods. Hence, process-based models of forest growth and carbon cycling based on an assumption that stands are even-aged and carbon exchange reaches an equilibrium may underestimate productivity and carbon accumulation in some forest types. Conserving forests with large stocks of biomass from deforestation and degradation avoids significant carbon emissions to the atmosphere. Our insights into forest types and forest conditions that result in high biomass carbon density can be used to help identify priority areas for conservation and restoration.

Hanson, 2010 addresses some of the false notions often misrepresented as "best science" by agencies, extractive industries and the politicians they've bought:

> Our forests are functioning as carbon sinks (net sequestration) where logging has been reduced or halted, and wildland fire helps maintain high productivity and carbon storage.
>
> Even large, intense fires consume less than 3% of the biomass in live trees, and carbon emissions from forest fires is only tiny fraction of the amount resulting from fossil fuel consumption (even these emissions are balanced by carbon uptake from forest growth and regeneration).
>
> "Thinning" operations for lumber or biofuels do not increase carbon storage but, rather, reduce it, and thinning designed to curb fires further threatens imperiled wildlife species that depend upon post-fire habitat.

Campbell et al., 2012 also refutes the notion that fuel-reduction treatments increase forest carbon storage in the western US:

> It has been suggested that thinning trees and other fuel-reduction practices aimed at reducing the probability of high-severity forest fire are consistent with efforts to keep carbon (C) sequestered in terrestrial pools, and that such practices should therefore be rewarded rather than penalized in C-accounting schemes. By evaluating how fuel treatments, wildfire, and their interactions affect forest C stocks across a wide range of spatial and temporal scales, we conclude that this is extremely unlikely. Our review reveals high C losses associated with fuel treatment, only modest differences in the combustive losses associated with high-severity fire and the low-severity fire that fuel treatment is meant to encourage, and a low likelihood that treated forests will be exposed to fire. Although fuel-reduction treatments may be necessary to restore historical functionality to fire-suppressed ecosystems, we found little credible evidence that such efforts have the added benefit of increasing terrestrial C stocks.

Mitchell et al. (2009) also refutes the assertion that logging to reduce fire hazard helps store carbon, and conclude that although thinning can affect fire, management activities are likely to remove more carbon by logging than will be stored by trying to prevent fire.

Heat, a long-established topic of physics, plays an equally important role at the level of plant and animal physiology—every organism only survives and thrives within thermal limits. For example, Pörtner et al. (2008) point out, "All organisms live within a limited range of body temperatures… Direct effects of climatic warming can be understood through fatal decrements in an organism's performance in growth, reproduction, foraging, immune competence, behaviors and competitiveness." The authors further explain, "Performance in animals is supported by aerobic scope, the increase in oxygen consumption rate from resting to maximal." In other words, rising heat has the same effect on animals as reducing the oxygen supply, and creates the same difficulties in breathing. But breathing difficulties brought on by heat can have important consequences even at sub-lethal levels. In the case of grizzly bears, increased demand for oxygen under increasing heat has implications for vigorous (aerobically demanding) activity including digging, running in pursuit of prey, mating, and the play of cubs.

Moomaw and Smith, 2017 conclude:

> With the serious adverse consequences of a changing climate already occurring, it is important to broaden our view of sustainable forestry to see forests …as complex ecosystems that provide valuable, multiple life-supporting services like clean water, air, flood control, and carbon storage. We have ample policy mechanisms, resources, and funding to support conservation and protection if we prioritize correctly.
>
> …We must commit to a profound transformation, rebuilding forested landscapes that sequester carbon in long-lived trees and permanent soils. Forests that protect the climate also allow a multitude of species to thrive, manage water quality and quantity and protect our most vulnerable communities from the harshest effects of a changing climate.
>
> Protecting and expanding forests is not an "offset" for fossil fuel emissions. To avoid serious climate disruption, it is essential that we simultaneously reduce emissions of carbon dioxide from burning fossil fuels and bioenergy along with other heat trapping gases and accelerate the removal of carbon dioxide from the atmosphere by protecting and expanding forests. It is not one or the other. It is both!
>
> Achieving the scale of forest protection and restoration needed over the coming decades may be a challenging concept to embrace politically; however, forests are the only option that can operate at the necessary scale and within the necessary time frame to keep the world from going over the climate precipice. Unlike the fossil fuel companies, whose industry must be replaced, the wood products industry will still have an important role to play in providing the wood products that we need while working together to keep more forests standing for their climate, water, storm protection, and biodiversity benefits.
>
> It may be asking a lot to "rethink the forest economy" and to "invest in forest stewardship," but tabulating the multiple benefits of doing so will demonstrate that often a forest is worth much more standing than logged. Instead of subsidizing the logging of forests for lumber, paper and fuel, society should pay for the multiple benefits of standing forests. It is time to value U.S. forests differently in the twenty-first century. We have a long way to go, but there is not a lot of time to get there.

Global warming and its consequences are effectively *irreversible* which implicates certain legal consequences under NEPA and NFMA and ESA (e.g., 40 CFR § 1502.16; 16 USC §1604(g); 36 CFR §219.12; ESA Section 7; 50 CFR §§402.9, 402.14). All net carbon emissions from logging represent "irretrievable and irreversible commitments of resources."

The Committee of Scientists, 1999 recognize the importance of forests for their contribution to global climate regulation. Also, the 2012 Planning Rule recognizes, in its definition of *Ecosystem services*, the "Benefits people obtain from ecosystems, including: (2) *Regulating services,* such as long term storage of carbon; climate regulation…"

Harmon, 2009 is the written record of "Testimony Before the Subcommittee on National Parks, Forests, and Public Lands of the Committee of Natural Resources for an oversight hearing on

The Role of Federal Lands in Combating Climate Change." The author "reviews, in terms as simple as possible, how the forest system stores carbon, the issues that need to be addressed when assessing any proposed action, and some common misconceptions that need to be avoided." His testimony begins, "I am here to …offer my expertise to the subcommittee. I am a professional scientist, having worked in the area of forest carbon for nearly three decades. During that time I have conducted numerous studies on many aspects of this problem, have published extensively, and provided instruction to numerous students, forest managers, and the general public."

Climate change science suggests that logging for sequestration of carbon, logging to reduce wild fire, and other manipulation of forest stands does not offer benefits to climate. Rather, increases in carbon emissions from soil disturbance and drying out of forest floors are the result. The FS can best address climate change through minimizing development of forest stands, especially stands that have not been previously logged, by allowing natural processes to function. Furthermore, any supposedly carbon sequestration from logging are usually more than offset by carbon release from ground disturbing activities and from the burning of fossil fuels to accomplish the timber sale, even when couched in the language of restoration. Reducing fossil fuel use is vital. Everything from travel planning to monitoring would have an important impact in that realm.

There is scientific certainty that climate change has reset the deck for future ecological conditions. For example, Sallabanks, et al., 2001:

> (L)ong-term evolutionary potentials can be met only by accounting for potential future changes in conditions. …Impending changes in regional climates …have the capacity for causing great shifts in composition of ecological communities.

For the above reasons, the EA does not consider the best available science required by the Healthy Forests Restoration Act, and it fails to take a hard look at the project's impacts, in violation of the National Environmental Policy Act.

Remedy: Choose the No Action Alternative. Revise the Forest Plan to take a hard look at the science of climate change. Alternatively, revise the EA for this project if the FS still wants to pursue it, which includes an analysis that examines climate change in the context of project activities and historic conditions. Better yet, it's time to prepare an EIS on the whole bag of U.S. Government climate policies.

CUMULATIVE EFFECTS AND MONITORING

NEPA requires that high-quality information is available to the public and that NEPA documents, like EAs, must concentrate on issues truly significant to the action in question. One such truly significant issue is cumulative effects. This issue was raised on pp. 1-3 of our comments on the Proposed Action.

It is vital that the results of past monitoring be incorporated into project analysis and planning. This means including in the analysis:

- A list of all past projects (completed or ongoing) implemented in the analysis area.
- A list of the monitoring commitments made in all previous NEPA documents covering the analysis area.
- The results of all that monitoring.
- A description of any monitoring, specified in those past project NEPA for the analysis area, which has yet to be gathered and/or reported.
- A summary of all monitoring of resources and conditions relevant to the proposal or analysis area as a part of the Forest Plan monitoring and evaluation effort.
- A cumulative effects analysis which includes the results from the monitoring required by the Forest Plan.
- The regional impacts of projects that border each other

We also commented that, if the Forest Service chose to proceed with one open comment period (discussed in an above objection), there would "be no opportunity for the public to comment on the genuine direct, indirect, and cumulative effects analysis," among other lost opportunities. FOC End of the World PA comments, p. 2. So, we never had a chance to see this cumulative-effects analysis until the objection period, which smacks of the impression that the Forest Service is attempting to prevent the public from raising issues that may very well be significant to this project. The insufficient cumulative effects analysis reaches into many aspects of the project, which we address in more detail below. We address the global objection in this part.

There can be no proper cumulative effects analysis in a NEPA document tiered to a Forest Plan EIS, if the FS has failed to properly conduct the monitoring as directed by the Forest Plan.

And the FS apparently has no idea how well past FS projects met the goals, objectives, desired conditions, etc. stated in the NEPA documents, and how well the projects conformed to forest plan standards and guidelines. The EOTW EA failed to include an analysis of how well the statements of Purpose and Need in those NEPA documents were served.

Those items are a critical part of the NEPA analysis. Without this critical link the validity of many FS assumptions are baseless. Without analyzing the accuracy and validity of the assumptions used in previous NEPA processes one has no way to judge the accuracy and validity of the current proposal. The predictions made in previous NEPA processes also need to be disclosed and analyzed because if these were inaccurate, and the agency is making similar decisions, then the process will lead to failure. For instance, if for previous projects the FS said they were going to do a certain monitoring plan or implement a certain type of management and these were never effectively implemented or monitored, it is important for the public and the decision maker to know. If there have been problems with FS implementation or monitoring in the past, it is not logical to assume that implementation will now all of a sudden be appropriate. If prior logging, prescribed fire and other "forest health" or "fuel" treatments have not been monitored appropriately, then there is no valid justification for this project.

The Forest Plan itself is in total accord with what we're arguing here. In Chapter V, it states:

> Project environmental analyses provide an essential source of information for Forest Plan monitoring. First, as project analyses are completed, new or emerging public issues or management concerns may be identified. Second, the management direction designed to

> facilitate achievement of the management area goals are validated by the project analyses. Third, the site-specific data collected for project environmental analyses serve as a check on the correctness of the land assignment. All of the information included in the project environmental analyses is used in the monitoring process to determine when changes should be made in the Forest Plan.

Further, Forest Plan Chapter V states, "If funds are inadequate to properly monitor the Forest Plan goals, objectives, standards, and resulting environmental effects, an analysis will be made to develop a further course of action. This may include Forest Plan amendment or revision, or revising implementation schedules."

Yet it's been 2003-2004 since the FS has published a Nez Perce National Forest Annual Monitoring and Evaluation Report, and 2012 since the Clearwater National Forest has published its monitoring and evaluation reports.[8]

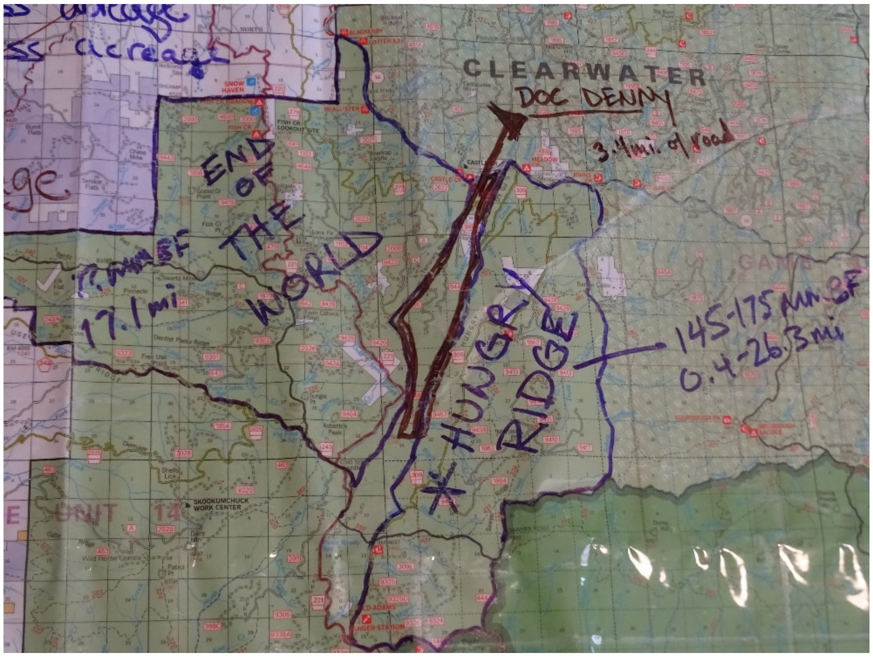
The deficiencies of required Forest Plan implementation monitoring, together with the failure to undertake the kind of hard look under NEPA at the project level that can only be accomplished with an EIS, makes it impossible for the public to gauge the cumulative impacts of this latest timber sale in the NPCNF. Clearly, the FS is operating in the dark, which is perhaps why it is so seductive for the agency to prepare and EA for this project to be able to proclaim "no significant impacts." The FS must prepare an EIS and stop pretending there's nothing to be discovered where it doesn't want to look.

Forest Plan Chapter V states, "The Forest Supervisor shall review the conditions on the land covered by the Plan at least every 5 years to determine whether conditions or demands of the public have changed significantly." Another mandate to be informed—ignored by the FS.

The EA fails to mention the other projects in the area by name, and certainly has not described the timing or the size of those projects. The document only vaguely mentions, "There are other reasonably foreseeable project planned outside the project area" and that specialist reports consider these projects. The only place some of these other projects are mentioned in the EA is in the range analysis cumulative effects, but that does not give the reader any idea where they are, how big they are, or whether they are finished. By not disclosing the high-quality of information upfront, the agency has violated NEPA. Specialist reports also did not deal with the cumulative effects from these projects adequately, and we raise these below, but the EA needs to disclose and truly focus on cumulative effects from the following projects.

Below is a map of the region with contiguous project boundaries. We have provided the NEPA documents.

[8] *See* our document titled "NPCNF Webpage Nez Perce monitoring reports available (11-8-19)."



Contiguous and to the east of the End of the World project boundary is the Doc Denny project boundary. Doc Denny is a 4,280-acre project area, analyzed in 2012-13, and that authorized 1,026 acres of "forest management activities" (Doc Denny DN-FONSI p. 1). This project included regeneration harvest of 763 acres, 3.4 miles of temporary roads, commercial thinning of 197 acres, and 40 acres of pre-commercial thinning, and all of the impacts that these activities have on the land. Some of this project has been implemented, but it does not seem to be done.[9] The EA did not name or discuss this project even though it borders the End of the World project boundary. The EA also did not discuss the amount of work that has been completed nor the amount of work that remains. We just don't know, which adversely impacts the comments we can provide and certainly does not give the Forest Service the level of information it needs to take a hard look at what happens when this project's impacts are considered with those from the End of the World project.

Contiguous and to the east of the Doc Denny project is the Hungry Ridge project boundary. The Hungry Ridge project is an approximately 30,000-acre project area with proposals to log up to 8,750 acres, with 2,517 acres of intermediate harvest and 6,233 acres of regeneration harvest, with 180 acres of old growth harvested and 804 acres of old growth slated for prescribed burning.[10] None of this had been disclosed to the public in the EA. Even though Hungry Ridge is 75 percent of the project area and proposes less than half the amount of logging that End of the World does, the Forest Service is analyzing Hungry Ridge with an environmental impact statement? Is that because of Region 1's directive to do no more environmental impact statements absent Region 1's permission?[11]

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[9] *See* Idaho County Free Press, *Doc Denny timber sale work continues, weekday road closure in effect despite shutdown* (Jan. 2, 2019).
[10] Hungry Ridge draft EIS p. i, iv.
[11] USDA, Forest Service (2019). *Region 1 Decisions and Agreements to implement our Environmental Analysis and Decision Making Effort* memo (April 26, 2019).

Given that Hungry Ridge borders Doc Denny, and Doc Denny borders End of the World, there are probably some regional impacts, especially since there will be far more acreage directly impacted by the End of the World project. Has the agency done any monitoring from the Doc Denny project, or is the agency relying on the same forecast without assessing the impacts of what has already been done?

Overall, the agency has ignored these cumulative effects in the EA. (There are also issues with how the specialist reports address these two projects, but we have broken those down below). "Significantly" requires consideration of context—given there are contiguous projects in this area, the significance of this action must be analyzed within the long-term and short-term contexts of the region impacted. Significance also addresses intensity, which includes whether the action might, in combination with other actions, might have cumulatively significant effects. This means that there is logging planned or ongoing on about 30,000 continuous acres, 12 miles at its widest point, and about 13 miles at its longest point, assuming a square area (and the projects comprise less than that square area). Because of the potential for cumulative effects, the agency must conduct an environmental impact statement. To not do so would violate NEPA because the action is potentially significant and the agency would have failed to take a hard look at the project.

Remedy:
1) Select the No Action alternative;
2) Drop the project;
3) Prepare an EIS that addresses these issues.

FIRE POLICY AND FIRE ECOLOGY

Our comments on the Proposed Action discuss wildfire suppression on page 3, also page 10, the bottom of page 16, and in much detail on pages 17-23. We incorporate those comments, and add the following.

The EA claims "there is a need to …Reduce wildfire risk to the local communities and surrounding federal lands."

The Fire and Fuels Specialist Report states: "The purpose and need for the End of the World project as it relates to fire and fuels resource identifies a need to reduce existing and potential forest fuel, reduce the risk of large-scale crown fire spread by creating vegetative patterns through silvicultural treatments and prescribed burning."

The EA states of the No Action alternative, "There is no consistency with the National Fire Plan and Healthy Forest Initiative because the no action alternative does not reduce hazardous fuel accumulation within the wildland urban interface." Yet the FS has conducted no NEPA process to adopt the National Fire Plan or other stated policies.

DellaSala, et al. (1995) state:

> Scientific evidence does not support the hypothesis that intensive salvage, thinning, and other logging activities reduce the risk of catastrophic fires if applied at landscape scales ... At very

> local scales, the removal of fuels through salvage and thinning may hinder some fires. However, applying such measures at landscape scales removes natural fire breaks such as moist pockets of late-seral and riparian forests that dampen the spread and intensity of fire and has little effect on controlling fire spread, particularly during regional droughts. ... Bessie and Johnson (1995) found that surface fire intensity and crown fire initiation were strongly related to weather conditions and only weakly related to fuel loads in subalpine forest in the southern Canadian Rockies. . . . Observations of large forest fires during regional droughts such as the Yellowstone fires in 1988 (Turner, et al. 1994) and the inland northwest fires of 1994 . . . raise serious doubts about the effectiveness of intensive fuel reductions as "fire-proofing" measures.

Veblen (2003) states:

> The premise behind many projects aimed at wildfire hazard reduction and ecological restoration in forests of the western United States is the idea that unnatural fuel buildup has resulted from suppression of formerly frequent fires. This premise and its implications need to be critically evaluated by conducting area-specific research in the forest ecosystems targeted for fuels or ecological restoration projects. Fire regime researchers need to acknowledge the limitations of fire history methodology and avoid over-reliance on summary fire statistics such as mean fire interval and rotation period. While fire regime research is vitally important for informing decisions in the areas of wildfire hazard mitigation and ecological restoration, there is much need for improving the way researchers communicate their results to managers and the way managers use this information.

Riggers, et al. 2001 state:

> (T)he real risk to fisheries is not the direct effects of fire itself, but rather the existing condition of our watersheds, fish communities, and stream networks, and the impacts we impart as a result of fighting fires. Therefore, attempting to reduce fire risk as a way to reduce risks to native fish populations is really subverting the issue. If we are sincere about wanting to reduce risks to fisheries associated with future fires, we ought to be removing barriers, reducing road densities, reducing exotic fish populations, and re-assessing how we fight fires. At the same time, we should recognize the vital role that fires play in stream systems, and attempt to get to a point where we can let fire play a more natural role in these ecosystems.

Those FS biologists emphasize, "the importance of wildfire, including large-scale, intense wildfire, in creating and maintaining stream systems and stream habitat. ...(I)n most cases, proposed projects that involve large-scale thinning, construction of large fuel breaks, or salvage logging as tools to reduce fuel loading with the intent of reducing negative effects to watersheds and the aquatic system are largely unsubstantiated."

A lack of forest-plan monitoring and HFRA monitoring highlights just how unsubstantiated the Forest Service's claims are. As pointed out earlier in our objection, there has been no published comprehensive forest-wide monitoring in approximately the past decade. As to HFRA, each administrative region of the Forest Service is required to "monitor the results of a representative sample of projects authorized under [HFRA] for each management unit" and issue a report that evaluates the treatments. 16 U.S.C. §6512(g). Friends of the Clearwater submitted a FOIA to Region 1 for this monitoring, and Region 1 could find no records that any monitoring has been done.[12]

Kauffman (2004) suggests that current FS fire suppression policies are what is catastrophic, and that fires are beneficial:

> Large wild fires occurring in forests, grasslands and chaparral in the last few years have aroused much public concern. Many have described these events as "catastrophes" that must be prevented through aggressive increases in forest thinning. **Yet the real catastrophes are not the fires themselves but those land uses, in concert with fire suppression policies that have resulted in dramatic alterations to ecosystem structure and composition**. The first step in the restoration of biological diversity (forest health) of western landscapes must be to implement changes in those factors that have resulted in the current state of wildland ecosystems. Restoration entails much more than simple structural modifications achieved through mechanical means. **Restoration should be undertaken at landscape scales and must allow for the occurrence of dominant ecosystem processes, such as the natural fire regimes achieved through natural and/or prescribed fires at appropriate temporal and spatial scales.** (Emphases added.)

Noss et al. (2006) state:

> Forest landscapes that have been affected by a major natural disturbance, such as a severe wildfire or wind storm, are commonly viewed as devastated. Such perspectives are usually far from ecological reality. Overall species diversity, measured as number of species–at least of higher plants and vertebrates – is often highest following a natural stand replacement disturbance and before redevelopment of closed-canopy forest (Lindenmayer and Franklin 2002). Important reasons for this include an abundance of biological legacies, such as living organisms and dead tree structures, the migration and establishment of additional organisms adapted to the disturbed, early-successional environment, availability of nutrients, and temporary release of other plants from dominance by trees. Currently, early-successional forests (naturally disturbed areas with a full array of legacies, i.e. not subject to post-fire logging) and forests experiencing natural regeneration (i.e. not seeded or planted), are among the most scarce habitat conditions in many regions.

Even if there is scientific legitimacy to the claims that fuel reductions reduce ecological damage from subsequent fire—a claim that is scientifically controversial and unproven for the long term, and unquantified for any defined short term—the area affected by such projects in recent years is miniscule compared to the entire, allegedly fire-suppressed Forest.

It may be that fire suppression in the project area has not, in reality, caused a significantly elevated risk of abnormal fire in the project area. We believe the agency is playing this fire-scare card largely to justify logging as "restoration." However, playing the fire scare card is not just a

[12] FOC's Freedom of Information Act request to Region 1 re: HFRA monitoring (April 4, 2019); Forest Service's April 30, 2019 response, at *2019-03254 FS response HFRA monit_4-30-19*.

project area issue—it's forestwide. The agency puts the joker in the deck, changing the whole game—not just for one hand as the FS pretends.

Scientific information concerning fire suppression was a major theme of the Interior Columbia Basin Ecosystem Management Project (ICBEMP) in the 1990s: "Aggressive fire suppression policies of Federal land-managing agencies have been increasingly criticized as more has been learned about natural fire cycles." (USDA FS & USDI BLM 1996, p. 22.)

Also, "Substantial changes in disturbance regimes—especially changes resulting from fire suppression, timber management practices, and livestock grazing over the past 100 years—have resulted in moderate to high departure of vegetation composition and structure and landscape mosaic patterns from historical ranges." (USDA FS & USDI BLM 2000, Ch. 4. P. 18.)
The effects of fire suppression are not unique to this project area—similar language has been included in NEPA documents for all logging projects on this Forest for at least a decade.[13] If fire suppression effects as described in the EA are occurring, it means that, as forestwide fire suppression continues, the results of this management include continuing **increases in these adverse effects across the entire forest.** So multiply the above list of effects times the extent of the entire forest, and what the agency tacitly admits is, forestwide fire suppression is leading to stand-replacing fires outside what is natural, and that alternation of fire regimes results in wide-scale disruption of habitats for wildlife, rare plants, tree insect and disease patterns and increases the occurrence of noxious weeds. Such analyses and disclosures are not found in the Forest Plan FEIS.

The no-action alternative contemplated under the ICBEMP EIS <u>is the management direction found in the Forest Plan</u>: "Alternative S1 (no action) continues management specified under each existing Forest Service and BLM land use plan, as amended or modified by interim direction—known as Eastside Screens (national forests in eastern Oregon and Washington only), PACFISH, and INFISH—as the long-term strategy for lands managed by the Forest Service or BLM." (USDA FS & USDI BLM 2000. Ch. 5, pp 5-6.)

The philosophy driving the FS strategy to replicate historic vegetative conditions (i.e. desired conditions) is that emulation of the <u>results</u> of disturbance processes would conserve biological diversity. McRae et al. 2001 provide a scientific review summarizing empirical evidence that illustrates several significant differences between logging and wildfire—differences which the EA fails to address. Also, Naficy et al. 2010 found a significant distinction between fire-excluded ponderosa pine forests of the northern Rocky Mountains logged prior to 1960 and paired fire-excluded, unlogged counterparts:

> We document that fire-excluded ponderosa pine forests of the northern Rocky Mountains logged prior to 1960 have much higher average stand density, greater homogeneity of stand structure, more standing dead trees and increased abundance of fire-intolerant trees than paired fire-excluded, unlogged counterparts. Notably, the magnitude of the interactive effect of fire exclusion and historical logging substantially exceeds the effects of fire exclusion alone. These differences suggest that historically logged sites are more prone to

[13] *See, e.g.*, USDA Forest Service, Nez Perce National Forest: Center-Johnson EA (2018) p. 10; Doc Denny EA (2012) pp. 81-82; Dutch Oven Vegetation Management Project Final EA (2017) p. 41; Iron Mountain Vegetation Management Project Updated EA (2013) a p. 1-1.

> severe wildfires and insect outbreaks than unlogged, fire-excluded forests and should be considered a high priority for fuels reduction treatments. Furthermore, we propose that ponderosa pine forests with these distinct management histories likely require distinct restoration approaches. We also highlight potential long-term risks of mechanical stand manipulation in unlogged forests and emphasize the need for a long-term view of fuels management.

Bradley et al. 2016 found the same—they studied the fundamental premise that mechanical fuel reduction will reduce fire risk. This study "found forests with higher levels of protection had lower severity values even though they are generally identified as having the highest overall levels of biomass and fuel loading."[14] In fact, this study found the opposite to be true: "burn severity tended to be higher in areas with lower levels of protection status (more intense management), after accounting for topographic and climatic conditions in all three model runs. Thus, we rejected the prevailing forest management view that areas with higher protection levels burn most severely during wildfires."[15] The study goes on to discuss other findings of the same ilk:

> An extension of the prevailing forest/fire management hypothesis is that biomass and fuels increase with increasing time after fire (due to suppression), leading to such intense fires that the most long-unburned forests will experience predominantly severe fire behavior (e.g., see USDA Forest Service 2004, Agee and Skinner 2005, Spies et al. 2006, Miller et al. 2009b, Miller and Safford 2012, Stephens et al. 2013, Lydersen et al. 2014, Dennison et al. 2014, Hessburg 2016). However, this was not the case for the most long-unburned forests in two ecoregions in which this question has been previously investigated—the Sierra Nevada of California and the Klamath-Siskiyou of northern California and southwest Oregon. In these ecoregions, the most long-unburned forests experienced mostly low/moderate-severity fire (Odion et al. 2004, Odion and Hanson 2006, Miller et al. 2012, van Wagtendonk et al. 2012). Some of these researchers have hypothesized that as forests mature, the overstory canopy results in cooling shade that allows surface fuels to stay moister longer into fire season (Odion and Hanson 2006, 2008). This effect may also lead to a reduction in pyrogenic native shrubs and other understory vegetation that can carry fire, due to insufficient sunlight reaching the understory (Odion et al. 2004, 2010).[16]

Zald and Dunne, 2018 state, "intensive plantation forestry characterized by young forests and spatially homogenized fuels, rather than pre-fire biomass, were significant drivers of wildfire severity."

In his testimony before Congress, DellaSala, 2017 discusses "…how proposals that call for increased logging and decreased environmental review in response to wildfires and insect

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[14] Bradley et al., *Does increased forest protection correspond to higher fire severity in frequent-fire forests of the western United States?*, Ecosphere Vol 7, Issue 10, Article e01492, p. 1 (2016).
[15] Bradley et al., Does increased forest protection correspond to higher fire severity in frequent-fire forests of the western United States?, Ecosphere Vol 7, Issue 10, Article e01492, p. 7 (2016).
[16] Bradley et al., Does increased forest protection correspond to higher fire severity in frequent-fire forests of the western United States?, Ecosphere Vol 7, Issue 10, Article e01492, p. 8 (2016).

outbreaks are not science driven, in many cases may make problems worse, and will not stem rising wildfire suppression costs" and "what we know about forest fires and beetle outbreaks in relation to climate change, limitations of thinning and other forms of logging in relation to wildfire and insect management" and makes "recommendations for moving forward based on best available science."

Typically, attempts to control or resist the natural process of fire have been a contributor to deviations from historic conditions. The EA analyses skew toward considering fire as well as native insects and other natural pathogens as threats to the ecosystem rather than rejuvenating natural processes. It seems to need the obsolete viewpoint in order to justify and prioritize the proposed vegetation manipulations, tacitly for replacing natural processes with "treatments" and "prescriptions." However, the scientific support for assuming that ecosystems can be restored or continuously maintained by such manipulative actions is entirely lacking.

Karr (1991) cites a definition of ecological integrity as "the ability to support and maintain "a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitat of the region." Karr (1991) also cites a definition of ecological health: "a biological system ... can be considered healthy when its inherent potential is realized, its condition is stable, its capacity for self-repair when perturbed is preserved, and **minimal external support for management is needed**." (Emphasis added.) The FS misses that last aspect of ecological health—specifically that it doesn't need management meddling.

Likewise Angermeier and Karr (1994) describe biological integrity as referring to "conditions under little or no influence from human actions; a biota with high integrity reflects natural evolutionary and biogeographic processes."

In their conclusion, Hessburg and Agee, 2003 state "Desired future conditions will only be realized by planning for and creating the desired ecosystem dynamics represented by ranges of conditions, set initially in strategic locations with minimal risks to species and processes."

The FS's foreseeable budget for the NPCNF would not allow enough vegetation management under the agency's paradigm to "fix" the problems the FS says would be perpetuated by fire suppression. The FS did not conduct any analysis that faces up to any **likely** budget scenario, in regards to the overall management emphases. The implication is clear: logging and fire suppression is intended to continually dominate, except in those weather situations when and where suppression actions are ineffective, in which case fires of high severity will occur across relatively wide areas. No cumulative effects analysis at any landscape scale exists to disclose the environmental impacts.

Also in claiming landscape departures from historic conditions, the EA does not provide a spatial analysis, either for the true reference conditions or of current project area conditions. The EA has no scientifically defensible analysis of the project area **landscape pattern** departure from HRV.

Churchill, 2011 points out:

> Over time, stand development processes and biophysical variation, along with low and mixed-severity disturbances, **break up these large patches into a finer quilt of patch types**. **These new patterns then constrain future fires**. Landscape pattern is thus generated from a blend of finer scale, feedback loops of vegetation and disturbance and broad scale events that are driven by extreme climatic events.

(Emphases added.) Churchill describes above the ongoing natural processes that will alleviate problems alleged in the EA—without expensive and ecologically risky logging and road building. Since no proper spatial analysis of the landscape pattern's departure has been completed, the EA has no scientifically defensible logging solution.

The FS assumes that natural fire regimes would maintain practically all the low and mid-elevation forests in open conditions with widely spaced mature and old trees. The FS fails to acknowledge that mixed-severity and even low-severity fire regimes result in much more variable stand conditions across the landscape through time. Assumptions that drier forests did not experience stand-replacing fires, that fire regimes were frequent and nonlethal, that these stands were open and dominated by large well-spaced trees, and that fuel amounts determine fire severity (the false thinning hypothesis that fails to recognize climate as the overwhelming main driver of fire intensity) are not supported by science (see for example Baker and Williams 2015, Williams and Baker 2014, Baker et al. 2006, Pierce et al. 2004, Baker and Ehle 2001, Sherriff et al. 2014). Even research that has uncritically accepted the questionable ponderosa pine model that may only apply to the Mogollon Rim of Arizona and New Mexico (and perhaps in similar dry-forest types in California), notes the inappropriateness of applying that model to elsewhere (see Schoennagel et al. 2004). The EA's assertion that the proposed treatments will result in likely or predictable later wildland fire effects is of considerable scientific doubt (Rhodes and Baker, 2008).

Despite the fact that the EA makes many statements to the effect that without the proposed treatments there is a high likelihood of highly adverse effects on various resources due to wildfire, the EA discloses nothing about such effects from recent fires in the general area. The FS's fear-invoking statements about the impacts of fire are speculative and not based upon data or any empirical evidence, in violation of NEPA.

Large fires are weather-driven events, not fuels-driven. When the conditions exist for a major fire—which includes drought, high temperatures, low humidity and high winds—nothing, including past logging, halts blazes. Such fires typically self-extinguish or are stopped only when less favorable conditions occur for fire spread. As noted in Graham, 2003:

> The prescriptions and techniques appropriate for accomplishing a treatment require understanding the fuel changes that result from different techniques and the fire behavior responses to fuel structure**. Fuel treatments, like all vegetation changes, have temporary effects and require repeated measures, such as prescribed burning, to maintain desired fuel structure.**

If the predictions of uncharacteristically severe fire were accurate, one might think that the results of scientific validation of such assumptions would have been conducted in the NPCNF by now, and cited in the EA. We find no data or scientific analysis of those fires' effects validating the EA's predictions of uncharacteristically severe fire effects if the logging is not conducted.

The EA fails to explain the fire implications of no treatment applied to most of the project area under the action alternatives.

The EA did not provide a genuine analysis and disclosure of the varying amounts and levels of effectiveness of fuel changes attributable to: the varying ages of the past cuts, the varying forest types, the varying slash treatments, etc.

The Fire and Fuels Specialist Report relies upon the Wildland Fire Assessment Tool (WFAT). It states, "The primary objectives behind WFAT is to assist managers in 1) prioritizing fuel treatments on the basis of predicted fire behavior, fire effects, and post-fire fuels, and 2) assessing the effectiveness of fuel treatment proposals in a geospatial context." It also states the WFAT model "does not estimate fire spread from firebrands or embers." We explain below that such firebrands or embers are sources of ignition the agency cannot control or affect in any meaningful way, during conditions when the vast majority of acres are burned which is when the vast majority of homes are lost—and so the focus on forest "fuels" is vastly misplaced.

Brown, 1995 which the FS cites, states: "Stand structure diversity in mixed and variable fire regime types. – These fire regime types are the most complicated and least understood. **A wide range of stand structures and landscape patterns are probably within the range of natural variability.**" (Emphasis added.) Also:

> (Fire) severity …classified as a mixed regime, …consists of individual fires that alternate between nonlethal understory burning and stand-replacement creating a fine-grained pattern of young and older trees. This type of fire, which causes intermediate levels of plant mortality, has not been described in previous fire regime classifications but **probably occurs commonly**. If severity differs between fires on the same landscape it is **classified as a variable regime which typically consists of frequent, low-intensity surface fires and long-interval, stand-replacement fires** (Kilgore 1987). (Emphases added.)

There has been extensive research in forests about the ecological benefits of mixed-severity (which includes high-severity) fire over the past two decades, so much so that in 2015 science and academic publishers Elsevier published a 400-page book, *The Ecological Importance of Mixed-Severity Fires: Nature's Phoenix* which synthesizes published, peer-reviewed science investigating the value of mixed- and high-severity fires for biodiversity (DellaSala and Hanson, 2015). The book includes research documenting the benefits of high-intensity wildfire patches for wildlife species, as well as a discussion of mechanical "thinning" and its inability to reduce the chances of a fire burning in a given area, or alter the intensity of a fire, should one begin under high fire weather conditions, because overwhelmingly weather, not vegetation, drives fire behavior (DellaSala and Hanson, 2015, Ch. 13, pp. 382-384).

The Wildlife Specialist Report states, "Fire suppression has played a role in shaping existing habitat conditions …within the project area. Forest succession in the absence of fire or vegetation management has altered the composition and structure of stands in the End of the

World project area." However, the FS fails to quantify these effects in any meaningful way, and <u>no data source for the above statement is cited.</u>

We incorporate "A New Direction for California Wildfire Policy—Working from the Home Outward" dated February 11, 2019 from the Leonard DiCaprio Foundation. It criticizes policies from the state of California, which are essentially the same Forest Service fire policies on display in the NPCNF. From the Executive Summary: "These policies try to alter vast areas of forest in problematic ways through logging, when instead they should be focusing on helping communities safely co-exist with California's naturally fire-dependent ecosystems by prioritizing effective fire-safety actions for homes and the zone right around them. This new direction—working from the home outward—can save lives and homes, save money, and produce jobs in a strategy that is better for natural ecosystems and the climate." It also presents an eye-opening analysis of the Camp Fire, which destroyed the town of Paradise.

We also incorporate the John Muir Project document "Forest Thinning to Prevent Wildland Fire …vigorously contradicted by current Science" (Attachment 2).

We likewise incorporate "Open Letter to Decision Makers Concerning Wildfires in the West" signed by over 200 scientists (Attachment 3).

And also see "Land Use Planning More Effective Than Logging to Reduce Wildfire Risk" (Attachment 4).

Baker, 2015, states: "Programs to generally reduce fire severity in dry forests are not supported and have significant adverse ecological impacts, including reducing habitat for native species dependent on early-successional burned patches and decreasing landscape heterogeneity that confers resilience to climatic change."

Baker, 2015 concluded: "Dry forests were historically renewed, and will continue to be renewed, by sudden, dramatic, high-intensity fires after centuries of stability and lower-intensity fires."

Baker, 2015 writes: "**Management issues…** The evidence presented here shows that efforts to generally lower fire severity in dry forests for ecological restoration are not supported."

In his book, "Fire Ecology in Rocky Mountain Landscapes" William Baker writes on page 435, "…a prescribed fire regime that is too frequent can reduce species diversity (Laughlin and Grace 2006) and favor invasive species (M.A. Moritz and Odion 2004). Fire that is entirely low severity in ecosystems that historically experience some high-severity fire may not favor germination of fire-dependent species (M.A. Moritz and Odion 2004) or provide habitat key animals (Smucker, Hutto, and Steele 2005)." And on page 436: "Fire rotations equal the average mean fire interval across a landscape and are appropriate intervals at which individual points or the whole landscape is burned. Composite fire intervals underestimate mean fire interval and fire rotation (chap 5) and should not be used as prescribed burning intervals as this would lead to too much fire and would likely lead to adversely affect biological diversity (Laughlin and Grace 2006)."

Baker estimates the high severity fire rotation to be 135 - 280 years for lodgepole pine forests. (See page 162.). And on pp. 457-458: "Fire rotation has been estimated as about 275 years in the Rockies as a whole since 1980 and about 247 years in the northern Rockies over the last century, and both figures are near the middle between the low (140 years) and high (328 years) estimates for fire rotation for the Rockies under the HRV (chap. 10). These estimates suggest that since EuroAmerican settlement, fire control and other activities may have reduced fire somewhat in particular places, but a general syndrome of fire exclusion is lacking. Fire exclusion also does not accurately characterize the effects of land users on fire or match the pattern of change in area burned at the state level over the last century (fig. 10.9). In contrast, fluctuation in drought linked to atmospheric conditions appear to match many state-level patterns in burned area over the last century. Land uses that also match fluctuations include logging, livestock grazing, roads and development, which have generally increased flammability and ignition at a time when the climate is warming and more fire is coming."

Schoennagel et al., 2004 state: "High-elevation subalpine forests in the Rocky Mountains typify ecosystems that experience infrequent, high-severity crown fires []. . . The most extensive subalpine forest types are composed of Engelmann spruce (Picea engelmannii), subalpine fir (Abies lasiocarpa), and lodgepole pine (Pinus contorta), all thin-barked trees easily killed by fire. Extensive stand-replacing fires occurred historically at long intervals (i.e., one to many centuries) in subalpine forests, typically in association with infrequent high-pressure blocking systems that promote extremely dry regional climate patterns."

Schoennagel et al., 2004 state:

> (I)t is unlikely that the short period of fire exclusion has significantly altered the long fire intervals in subalpine forests. Furthermore, large, intense fires burning under dry conditions are very difficult, if not impossible, to suppress, and such fires account for the majority of area burned in subalpine forests.
>
> Moreover, there is no consistent relationship between time elapsed since the last fire and fuel abundance in subalpine forests, further undermining the idea that years of fire suppression have caused unnatural fuel buildup in this forest zone.
>
> No evidence suggests that spruce–fir or lodgepole pine forests have experienced substantial shifts in stand structure over recent decades as a result of fire suppression. Overall, variation in cli-mate rather than in fuels appears to exert the largest influence on the size, timing, and se-verity of fires in subalpine forests []. We conclude that large, infrequent stand replacing fires are 'business as usual' in this forest type, not an artifact of fire suppression.
>
> Contrary to popular opinion, previous fire suppression, which was consistently effective from about 1950 through 1972, had only a minimal effect on the large fire event in 1988 []. Reconstruction of historical fires indicates that similar large, high-severity fires also occurred in the early 1700s []. Given the historical range of variability of fire regimes in high- elevation subalpine forests, fire behavior in Yellowstone during 1988, although severe, was neither unusual nor surprising.

> Mechanical fuel reduction in subalpine forests would not represent a restoration treatment but rather a departure from the natural range of variability in stand structure.
>
> Given the behavior of fire in Yellowstone in 1988, fuel reduction projects probably will not substantially reduce the frequency, size, or severity of wildfires under extreme weather conditions.
>
> The Yellowstone fires in 1988 revealed that variation in fuel conditions, as measured by stand age and density, had only minimal influence on fire behavior. Therefore, we expect fuel- reduction treatments in high-elevation forests to be generally unsuccessful in reducing fire frequency, severity, and size, given the overriding importance of extreme climate in controlling fire regimes in this zone. Thinning also will not re-store subalpine forests, because they were dense historically and have not changed significantly in response to fire suppression. Thus, fuel-reduction efforts in most Rocky Mountain subalpine forests probably would not effectively mitigate the fire hazard, and these efforts may create new ecological problems by moving the forest structure out-side the historic range of variability.

Whereas the EA claims to be reducing risk of wildfire by reducing forest canopy density, the proposed action will result in increased fire severity and more rapid fire spread. This common sense is recognized in a news media discussion[17] of the 2017 Eagle Creek fire in Oregon:

> **Old growth not so easy to burn:**
>
> Officials said the fire spread so rapidly on the third and fourth days because it was traveling across lower elevations.
>
> The forests there aren't as thick and as dense as the older growth the fire's edge is encountering now - much of it in the Mark O. Hatfield Wilderness, Whittington said.
>
> Whittington said because **there's more cover from the tree canopy, the ground is moister -- and that's caused the fire to slow. Also, bigger trees don't catch fire as easily**, he said.

(Emphasis added.) The FS also likes to trot out the premise that tree mortality from native insect activity and other agents of tree mortality increase risk of wildfire. Again, this is not supported by science. Meigs, et al., 2016 found "that insects generally reduce the severity of subsequent wildfires. … By dampening subsequent burn severity, native insects could buffer rather than exacerbate fire regime changes expected due to land use and climate change. In light of these findings, we recommend a precautionary approach when designing and implementing forest management policies intended to reduce wildfire hazard and increase resilience to global change."

Also *see* Black, S.H. 2005 (Logging to Control Insects: The Science and Myths Behind Managing Forest Insect "Pests." A Synthesis of Independently Reviewed Research) and Black, et al., 2010 (Insects and Roadless Forests: A Scientific Review of Causes, Consequences and

[17] Green, A. "Eagle Creek fire: Evacuation orders won't be lifted for at least a few more days," available at https://www.oregonlive.com/wildfires/2017/09/eagle_creek_fire_evacuation_or.html.

Management Alternatives) as well as DellaSala (undated), Kulakowski (2013), Hanson et al., 2010, and Hart et al., 2015. And for an ecological perspective from the FS itself, see Rhoades et al., 2012, who state: "While much remains to be learned about the current outbreak of mountain pine beetles, researchers are already finding that **beetles may impart a characteristic critically lacking in many pine forests today: structural complexity and species diversity**." (Emphasis added.)

McClelland (undated) criticizes the aim to achieve desired conditions by the use of mitigation measures calling for retention of specific numbers of certain habitat structures:

> The snags per acre approach is not a long-term answer because it **concentrates on the <u>products</u> of ecosystem processes rather than the processes themselves**. It does not address the most critical issue—long-term perpetuation of diverse forest habitats, a mosaic pattern which includes stands of old-growth larch. **The processes that produce suitable habitat must be retained or reinstated by managers. Snags are the result of these processes** (fire, insects, disease, flooding, lightning, etc.).

Collins and Stephens (2007) suggest direction to implement <u>restoring the process</u> of wildland fire by educating the public, which means explaining the inevitability of wildland fire, teaching about fire ecology, and identifying landowners' primary responsibility for protecting their properties.

We incorporate into this objection the John Muir Project's document, "Do beetle outbreaks in western forests increase fire severity?" (Attachment 5).

Hutto, 1995 states: "Fires are clearly beneficial to numerous bird species, and **are apparently necessary for some**."

See Attachment 6, which is a collection of news media articles, quoting experts including those in the FS, who do understand the high value of severely burned forest for wildlife and other resources.

The EA fails to disclose or acknowledge the scientific information that indicates severe fires burning over large acreages are normal for these forests, and that fire intensity and severity are dependent much more upon weather than fuels. It's common knowledge by now. If the purpose for a project is built upon false information about ecological functioning, then the predicted effects of the project are not credible. This EA does not comply with NEPA's requirements for scientific integrity.

Huff, et al, 1995 state:

> In general, rate of spread and flame length were positively correlated with the proportion of area logged (hereafter, area logged) for the sample watersheds. …The potential rate of spread and intensity of fires associated with recently cut logging residues is high, especially the first year or two as the material decays. High fire-behavior hazards associated with the residues can extend, however, for many years depending on the tree.
>
> Logged areas generally showed a strong association with increased rate of spread and flame length, thereby suggesting that tree harvesting could affect the potential fire behavior

> within landscapes. In general, rate of spread and flame length were positively correlated with the proportion of area logged in the sample watersheds.
>
> As a by-product of clearcutting, thinning, and other tree-removal activities, activity fuels create both short- and long-term fire hazards to ecosystems. The potential rate of spread and intensity of fires associated with recently cut logging residues is high, especially the first year or two as the material decays. High fire-behavior hazards associated with the residues can extend, however, for many years depending on the tree. Even though these hazards diminish, their influence on fire behavior can linger for up to 30 years in the dry forest ecosystems of eastern Washington and Oregon.

We incorporate DellaSala, et al., 2018 which is a synopsis of current literature summarizing some of the latest science around top-line wildfire issues, including areas of scientific agreement, disagreement, and ways to coexist with wildfire.

As far as the "restoration" being alleged to address the impacts of long-term fire suppression, there is no coherent plan for integrating wildland fire back into this ecosystem. In fact in several places the EA indicates nothing is being changed to learn from the admitted suppression ecological damage. For example:

> …post treatment conditions will allow for the use of safe efficient fire suppression management actions due to low flame lengths (less than 4 feet high), and surface fire type"
>
> Fire suppression ability would be increased, because flame lengths would be reduced. Flame lengths would generally be less than 4 feet and fireline intensities would be low which would allow for more direct firefighting tactics when compared with the no action alternatives.
> Firefighter safety would be improved because of the reduction in flame length and fire type would be surface, decreasing potential fire behavior when compared to the no action alternative.

The war against wildland fire, i.e., nature, continues.

The proposed and ongoing management are all about continuing a repressive and suppressive regime, however the FS has never conducted an adequate cumulative effects analysis of forestwide fire suppression despite the vast body of science that has arisen since the Forest Plan was adopted. The "plan" is clearly to log now, suppress fires continuously, and log again in the future based on the very same "need" to address the ongoing results of fire suppression. Furthermore, the FS fails to cite any assessment of nearby/ recent fires which might support its assumptions about "uncharacteristic" fire effects.

The risks of fire are best dealt with in the immediate vicinity of homes, and by focusing on routes for egress during fire events—not by logging national forest lands well away from human occupied neighborhoods. The EA fails to disclose that the only effective way to prevent structure damage is to manage the fuels in the immediate vicinity of those structures.

The nine-part Wildfire Research Fact Sheet Series was produced by the National Fire Protection Association (NFPA)'s Firewise USA® program, as part of the NFPA/USDA Forest Service cooperative agreement and with research provided by the Insurance Institute for Business and Home Safety (IBHS). They are a product of the research done by the IBHS lab in South Carolina, covering a wide range of issues. This contrasts with the fire scare misrepresentation of science and outright fiction to justify logging, which appears in the EOTW EA. This Firewise approach also begs the question—why isn't the NPCNF implementing an aggressive outreach and education program to assist homeowners living in and near the project area—and elsewhere in the "WUI"?

Odion and DellaSala, 2011 describe this situation: "…fire suppression continues unabated, creating a self-reinforcing relationship with fuel treatments which are done in the name of fire suppression. Self-reinforcing relationships create runaway processes and federal funding to stop wildfires now amounts to billions of tax dollars each year."

Tingley et al., 2016 note the diversity of habitats following a fire is related to the diversity of burn severities: "(W)ithin the decade following fire, different burn severities represent unique habitats whose bird communities show differentiation over time… Snags are also critical resources for many bird species after fire. Increasing densities of many bird species after fire—primarily wood excavators, aerial insectivores, and secondary cavity nesters—can be directly tied to snag densities…"

Similarly, Hutto and Patterson, 2016 state, "the variety of burned-forest conditions required by fire-dependent bird species cannot be created through the application of relatively uniform low-severity prescribed fires, through land management practices that serve to reduce fire severity or through post-fire salvage logging, which removes the dead trees required by most disturbance-dependent bird species."

Hutto et al., 2016 urge "a more ecologically informed view of severe forest fires":

> Public land managers face significant challenges balancing the threats posed by severe fire with legal mandates to conserve wildlife habitat for plant and animal species that are positively associated with recently burned forests. Nevertheless, land managers who wish to maintain biodiversity must find a way to embrace a fire-use plan that allows for the presence of all fire severities in places where a historical mixed-severity fire regime creates conditions needed by native species while protecting homes and lives at the same time. This balancing act can be best performed by managing fire along a continuum that spans from aggressive prevention and suppression near designated human settlement areas to active "ecological fire management" (Ingalsbee 2015) in places farther removed from such areas. This could not only save considerable dollars in fire-fighting by restricting such activity to near settlements (Ingalsbee and Raja 2015), but it would serve to retain (in the absence of salvage logging, of course) the ecologically important disturbance process over most of our public land while at the same time reducing the potential for firefighter fatalities (Moritz et al. 2014). Severe fire is not ecologically appropriate everywhere, of course, but the potential ecological costs associated with prefire fuels reduction, fire suppression, and postfire harvest activity in forests born of mixed-severity fire need to considered much more seriously if we want to maintain those species and processes that

> occur only where dense, mature forests are periodically allowed to burn severely, as they have for millennia.

Ultimately the EA reflects an overriding bias favoring vegetation manipulation and resource extraction via "management" needed to "move toward" some selected desired conditions, along the way neglecting the ecological processes driving these ecosystems. Essentially the FS rigs the game, as its desired conditions would only be achievable by resource extractive activities. But since desired conditions must be maintained through repeated management/manipulation the management paradigm conflicts with natural processes—the real drivers of the ecosystem.

Fire, insects & disease are endemic to western forests and are natural processes resulting in the forest self-thinning. This provides for greater diversity of plant and animal habitat than logging can achieve. In areas that have been historically and logged there are less diversity of native plants, more invasive species, and less animal diversity. Six et al., 2014 documented that logging to prevent or contain insect and disease has not been empirically proven to work, and because of lack of monitoring the FS can't content this method is viable for containing insect outbreaks.

In any case, these processes also provide benefits. For example, cavity-nesting birds rely on insects in forests. Just as cavities excavated by woodpeckers provide benefits for other birds and wildlife, there are benefits from Douglas fir mistletoe or other pathogens. The EA provides too little information about benefits of insects and disease.

The EA primarily discusses fuel conditions only in the areas proposed for treatment, yet wildland fire operates beyond artificial ownership or other boundaries. In regards to the proper cumulative effects analysis area for fire risk, Finney and Cohen (2003) discuss the concept of a "fireshed involving a wide area around the community (for many miles that include areas that fires can come from)." In other words, for any given entity that would apparently have its risk of fire reduced by the proposed project (or affected cumulatively from past, ongoing, or foreseeable actions on land of all ownerships within this "fireshed")—just how effective would fuel reduction be? The EA fails to include a thorough discussion and detailed disclosure of the current fuel situation within the fireshed within and outside the proposed treatment units, making it impossible to make scientifically supportable and reasonable conclusions about the manner and degree to which fire behavior would be changed by the project.

The EA also fails to deal with the fuels issue on the appropriate temporal scale. How landscape-level fire behavior at any period except for very shortly after treatment would be changed or improved is ignored.

Rhodes (2007) states: "The transient effects of treatments on forest, coupled with the relatively low probability of higher-severity fire, makes it unlikely that fire will affect treated areas while fuel levels are reduced." (Internal citations omitted.) And Rhodes also points out that using mechanical fuel treatments (MFT) to restore natural fire regimes must take into consideration the root causes of the alleged problem:

> In order to be ultimately effective at helping to restore natural fire regimes, fuel treatments must be part of wider efforts to address the root causes of the alteration in fire behavior. At best, MFT can only address symptoms of fire regime alteration. Evidence indicates that

> primary causes of altered fire regimes in some forests include changes in fuel character caused by the ongoing effects and legacy of land management activities. These activities include logging, post-disturbance tree planting, livestock grazing, and fire suppression. Many of these activities remain in operation over large areas. Therefore, unless treatments are accompanied by the elimination of or sharp reduction in these activities and their impacts in forests where the fire regime has been altered, MFT alone will not restore fire regimes. (Internal citations omitted.)

Cohen, 1999a recognizes "the imperative to separate the problem of the wildland fire threat to homes from the problem of ecosystem sustainability due to changes in wildland fuels" (Id.). In regards to the latter—ecosystem sustainability—Cohen and Butler (2005) state:

> Realizing that wildland fires are inevitable should urge us to recognize that excluding wildfire does not eliminate fire, it unintentionally selects for only those occurrences that defy our suppression capability—the extreme wildfires that are continuous over extensive areas. If we wish to avoid these extensive wildfires and restore fire to a more normal ecological condition, **our only choice is to allow fire occurrence under conditions other than extremes. Our choices become ones of compatibility with the inevitable fire occurrences rather than ones of attempted exclusion.** (Emphasis added.)

In support of focusing on manipulating limited areas near homes, Finney and Cohen, 2003, state:

> Research findings indicate that a home's characteristics and the characteristics of a home's immediate surroundings within 30 meters principally determine the potential for wildland-urban fire destruction. This area, which includes the home and its immediate surroundings, is termed the home ignition zone. The home ignition zone implies that activities to reduce the potential for wildland-urban fire destruction can address the necessary factors that determine ignitions and can be done sufficiently to reduce the likelihood of ignition. Wildland fuel reduction outside and adjacent to a home ignition zone might reduce the potential flame and firebrand exposure to the home ignition zone (i.e., within 30 m of the home). However, the factors contributing to home ignition within this zone have not been mitigated. Given a wildfire, wildland fuel management alone (i.e., outside the home ignition zone) is not sufficient nor does it substitute for mitigations within the home ignition zone. ...(I)t is questionable whether wildland fuel reduction activities are necessary and sufficient for mitigating structure loss in wildland urban fires.
>
> …(W)ildland fuel management changes the … probability of a fire reaching a given location. It also changes the distribution of fire behaviors and ecological effects experienced at each location because of the way fuel treatments alter local and spatial fire behaviors (Finney 2001). **The probability that a structure burns, however, has been shown to depend exclusively on the properties of the structure and its immediate surroundings (Cohen 2000a).** (Emphasis added.)

Our take from Finney and Cohen (2003) is that there is much uncertainty over effects of fuel reduction. The authors point out:

> Although the conceptual basis of fuel management is well supported by ecological and fire behavior research in some vegetation types, the promise of fuel management has lately become loaded with the expectation of a diffuse array of benefits. Presumed benefits range

from restoring forest structure and function, bringing fire behavior closer to ecological precedents, reducing suppression costs and acres burned, and preventing losses of ecological and urban values. For any of these benefits to be realized from fuel management, a supporting analysis must be developed to physically relate cause and effect, essentially evaluating how the benefit is physically derived from the management action (i.e. fuel management). Without such an analysis, the results of fuel management can fail to yield the expected return, potentially leading to recriminations and abandonment of a legitimate and generally useful approach to wildland fire management.

In their conclusion, Graham, et al., 1999a state:

> Depending on intensity, thinning from below and possibly free thinning can most effectively alter fire behavior by reducing crown bulk density, increasing crown base height, and changing species composition to lighter crowned and fire-adapted species. Such intermediate treatments can reduce the severity and intensity of wildfires for a given set of physical and weather variables. **But crown and selection thinnings would not reduce crown fire potential.** (Emphasis added.)

The EA does not disclose the project logging impacts on the rate of fire spread. Graham, et al., 1999a point out that fire modeling indicates:

> For example, the 20-foot wind speed[18] must exceed 50 miles per hour for midflame wind speeds to reach 5 miles per hour within a dense Stand (0.1 adjustment factor). In contrast, in an open stand (0.3 adjustment factor), the same midflame wind speeds would occur at only a 16-mile-per-hour wind at 20 feet.

The EA also fails to recognize the implications of how the fire regime is changing due to climate change.

And many direct and indirect effects of fire suppression are also ignored in the EA as well as in the programmatic context. For example, Ingalsbee, 2004 describes the direct, indirect, and cumulative environmental impacts of firefighting:

> Constructing firelines by handcrews or heavy equipment results in a number of direct environmental impacts: it kills and removes vegetation; displaces, compacts, and erodes soil; and degrades water quality. When dozerlines are cut into roadless areas they also create long-term visual scars that can ruin the wilderness experience of roadless area recreationists. Site-specific impacts of firelines may be highly significant, especially for interior-dwelling wildlife species sensitive to fragmentation and edge effects.
>
> ...Another component of fire suppression involves tree cutting and vegetation removal. Both small-diameter understory and large-diameter overstory trees are felled to construct firelines, helispots, and safety zones.
>
> ...A host of different toxic chemical fire retardants are used during fire suppression operations. Concentrated doses of retardant in aquatic habitats can immediately kill fish, or lead to algae blooms that kill fish over time. Some retardants degrade into cyanide at levels deadly to amphibians. When dumped on the ground, the fertilizer in retardant can stimulate

[18] Velocity of the wind 20 feet above the vegetation, in this case tree tops.

> the growth of invasive weeds that can enter remote sites from seeds transported inadvertently by suppression crews and their equipment.
>
> ...One of the many paradoxes of fire suppression is that it involves a considerable amount of human-caused fire reintroduction under the philosophy of "fighting fire with fire." The most routine form of suppression firing, "burnout," occurs along nearly every linear foot of perimeter fireline. Another form of suppression firing, "backfiring," occurs when firefighters ignite a high-intensity fire near a wildfire's flaming edge, with or without a secured containment line. In the "kill zone" between a burnout/backfire and the wildfire edge, radiant heat intensity can reach peak levels, causing extreme severity effects and high mortality of wildlife by entrapping them between two high-intensity flame fronts.
>
> ...Firelines, especially dozerlines, can become new "ghost" roads that enable unauthorized or illegal OHV users to drive into roadless areas. These OHVs create further soil and noise disturbance, can spread garbage and invasive weeds, and increase the risk of accidental human-caused fires.
>
> ...Roads that have been blockaded, decommissioned, or obliterated in order to protect wildlife or other natural resource values are often reopened for firefighter vehicle access or use as firelines.
>
> ...Both vegetation removal and soil disturbance by wildfire and suppression activities can create ideal conditions for the spread of invasive weeds, which can significantly alter the native species composition of ecosystems, and in some cases can change the natural fire regime to a more fire-prone condition. Firefighters and their vehicles can be vectors for transporting invasive weed seeds deep into previously uninfested wildlands.
>
> ...Natural meadows are attractive sites for locating firelines, helispots, safety zones, and fire camps, but these suppression activities can cause significant, long-term damage to meadow habitats.

The EOTW EA emphasizes actions that attempt to adapt a fire-prone ecosystem to the presence of human development, however we firmly believe the emphasis must be the opposite—assisting human communities to adapt to the fire-prone ecosystems into which they been built.

We strongly support government actions which facilitate cultural change towards private landowners taking the primary responsibility for mitigating the safety and property risks from fire, by implementing firewise activities on their property. Indeed, the best available science supports such a prioritization. (Kulakowski, 2013; Cohen, 1999a) Also, see Firewise Landscaping[19] as recommended by Utah State University, and the Firewise USA website by the National Fire Protection Association[20] for examples of educational materials.

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[19] https://extension.usu.edu/ueden/ou-files/Firewise-Landscaping-for-Utah.pdf

[20] http://www.nfpa.org/Public-Education/By-topic/Wildfire/Firewise-USA/The-ember-threat-and-the-home-ignition-zone

The EOTW EA fails to disclose the actions being taken to reduce fuels on private lands adjacent to the Project area, and how those activities (or lack of) will impact the efficacy of the activities proposed for this Project.

For the above reasons the EA fails to comply with the National Environmental Policy Act or the Healthy Forest Restoration Act.

Remedy: Select the No Action alternative. Alternatively, prepare an EIS that remedies the above noted analytic and scientific deficiencies.

FAILURE TO MEET REQUIREMENTS OF THE HFRA

The HFRA sets limitations on projects authorized under the HFRA, as EOTW is proposed. The EA fails to demonstrate consistency of the EOTW Project with the HFRA in multiple ways.

One limitation of HFRA includes application of best available science to specific actions and locations. Elsewhere this objection in SCIENTIFIC INTEGRITY we explain how the FS has ignored best available science, uses data of questionable reliability, uses analytic methods of questionable validity, or otherwise conducts itself in violation of scientific process and principles.

Further, the HFRA requires the FS to demonstrate its actions increase resilience of some aspect(s) of the ecosystem. The EA doesn't even include a definition of resilience, so any claim that the EOTW Project increases resilience of something doesn't have any ecological basis.

Resilience is a term that might be used to characterize aspects of forest ecosystems. However, mostly what is suggested about resilience in the EA is, it only happens when the forest is "treated" (i.e., mostly logged or prescribe burned), and the more the forest is logged and burned, the more resilient it becomes. Also we "learn" that nothing that happens naturally, without management, will increase resilience. In other words, from the FS's perspective, resilience can only be manufactured, engineered, or imposed by management.

As it stands, the EA provides absolutely no operational definition of resilience that would allow anybody to actually **measure** the resilience of anything as they now stand, or measure their change in resilience following project activities. An essential component of an operational definition is **measurement**. A simple and accurate definition of measurement is the **assignment of numbers to a variable** in which we are interested. In this case, the variable in which we are interested is resilience, and how the FS measures it in these ecosystems.

Resilience is not the absence of natural disturbances such as wildland fire, insects, and diseases etc. rather, it is the opposite (DellaSala and Hanson, 2015, Chapter 1, pp. 12-13). What the FS is promoting is control of the forest ecosystem through mechanical means to maintain unnatural stasis and in the process, eliminating, suppressing or altering natural disturbances such as insect or disease effects or wildland fire. In other words, tree farming, its purpose being to maximize commercial exploitation. This is the antithesis of ecological resilience and conservation of native biodiversity. Ecological resilience is the ability to ultimately return to predisturbance vegetation types after a natural disturbance, including higher-severity fire. This sort of dynamic equilibrium, where a varied spectrum of succession stages is present across the larger landscape, tends to maintain the full complement of native biodiversity on the landscape. (Thompson et al., 2009).

This FS management is hubris on a grand scale. Frissell and Bayles (1996) note:

> Most philosophies and approaches for ecosystem management put forward to date are limited (perhaps doomed) by **a failure to acknowledge and rationally address the overriding problems of uncertainty and ignorance about the mechanisms by which complex ecosystems respond to human actions.** They lack humility and historical perspective about science and about our past failures in management. They still implicitly subscribe **to the scientifically discredited illusion that humans are fully in control of an ecosystemic machine and can foresee and manipulate all the possible consequences of particular actions while deliberately altering the ecosystem to produce only predictable, optimized and socially desirable outputs.** Moreover, despite our well-demonstrated inability to prescribe and forge institutional arrangements capable of successfully implementing the principles and practice of integrated ecosystem management over a sustained time frame an at sufficiently large spatial scales, would-be ecosystem managers have neglected to acknowledge and critically analyze past institutional and policy failures. They say we need ecosystem management because public opinion has changed, neglecting the obvious point that **public opinion has been shaped by the glowing promises of past managers and by their clear and spectacular failure to deliver on such promises**. (Emphases added.)

The EA states or implies that achieving "resilience" involves logging and/or burning to make the project area resemble "historical" conditions. Together the Proposed Action (PA) and EA together use this term at least a dozen times. Yet the FS fails to identify a reliable data source and scientifically defensible process for determining these "historical" conditions.

Historical conditions have often been defined as falling within the "range of natural variability" or "historical range of variability." Frissell and Bayles (1996) ask:

> From the point of view of many aquatic species, the range of natural variability at any one site would doubtless include local extirpation. At the scale of a large river basin, management could remain well within such natural extremes and we would still face severe degradation of natural resource and possible extinction of species (Rhodes et al., 1994). The missing element in this concept is the landscape-scale *pattern* of occurrence of extreme conditions, and patterns over space and time of recovery from such stressed states. How long did ecosystems spend in extreme states vs. intermediate or mean states? Were extremes chronologically correlated among adjacent basins, or did asynchrony of landscape disturbances provide for large-scale refugia for persistence and recolonization of native species? These are critical questions that are not well addressed under the concept of range of natural variability as it has been framed to date by managers.
>
> …The concept of range of natural variability also suffers from its failure to provide defensible criteria about **which factors ranges should be measured**. Proponents of the concept assume that a finite set of variables can be used to define the range of ecosystem behaviors, when ecological science strongly indicates many diverse factors can control and

> limit biota and natural resource productivity, often in complex, interacting, surprising, and species-specific and time-variant ways. **Any simple index for measuring the range of variation will likely exclude some physical and biotic dimensions important for the maintenance of ecological integrity and native species diversity.** (Emphasis added.)

The FS's strategy to strive towards historical conditions focuses on achieving static conditions, instead of fostering the natural dynamic characteristics of ecosystems. An abundance of scientific evidence indicates the FS's static desired conditions must be rejected in favor of desired future dynamics to align with best available science. Hessburg and Agee, 2003 emphasize the primacy of natural processes for management purposes:

> Ecosystem management planning must acknowledge **the central importance of natural processes and pattern–process interactions, the dynamic nature of ecological systems** (Attiwill, 1994), the inevitability of uncertainty and variability (Lertzman and Fall, 1998) and cumulative effects (Committee of Scientists, 1999; Dunne et al., 2001). (Emphasis added.)

The EA provides no explicit plan disclosing the details on how a restored landscape would be sustained. In other words, how often treatments will occur, how extensive they need to be, which kinds of treatments will be necessary, how many miles of roads will be needed (both permanent and temporary), etc. This means we cannot know how many acres at any given time will be suffering reduced productivity because of soil damage or infested by noxious weeds, or how many acres of wildlife habitat will be subject to diversity impacts due to snag losses from dealing with to logger safety or from public firewood cutting. Also missing is an economic analysis, which would disclose how much managing for this regime will cost on a continuing basis—and therefore how likely such a regime could actually be implemented in order to achieve or maintain the "restored" (under the FS definition) vegetation conditions.

Sallabanks et al., 2001 state:

> Given the dynamic nature of ecological communities in Eastside (interior) forests and woodlands, particularly regarding potential effects of fire, **perhaps the very concept of defining "desired future conditions" for planning could be replaced with a concept of describing "desired future dynamics."** (Emphasis added.)

The EA fails to consider scientific information that provides a better alternative to the FS's management paradigm.

Factors that create significant adverse impacts on native species diversity include those not historically not found in nature, including road densities, edge effects due to logged openings, noxious weeds and other invasive species, livestock, compacted and otherwise productivity-reduced soil conditions, and many human-caused fires.

A major FS public relations strategy/justification for pushing destructive and risky logging is raising the specter of some sort of "catastrophe" such as fire or more tree mortality from insects or tree diseases. From a tree farming perspective, this might have some merit, but since this is a national forest where other features such as old growth and birds and predators and clean water are important to the public, the FS ought to widen its management perspective in able to hear the public and fairly weigh scientific information.

Castello et al. (1995) state:

> Pathogens help decompose and release elements sequestered within trees, facilitate succession, and maintain genetic, species and age diversity. Intensive control measures, such as thinning, salvage, selective logging, and buffer clearcuts around affected trees remove crucial structural features. Such activities also remove commercially valuable, disease-resistant trees, thereby contributing to reduced genetic vigor of populations.

Hayward, 1994 states:

> Despite increased interest in historical ecology, scientific understanding of the historic abundance and distribution of montane conifer forests in the western United States is not sufficient to indicate how current patterns compare to the past. In particular, knowledge of patterns in distribution and abundance of older age classes of these forests in not available. …Current efforts to put management impacts into a historic context seem to focus almost exclusively on what amounts to a snapshot of vegetation history—a documentation of forest conditions near the time when European settlers first began to impact forest structure. …The value of the historic information lies in the perspective it can provide on the potential variation… I do not believe that historical ecology, emphasizing static conditions in recent times, say 100 years ago, will provide the complete picture needed to place present conditions in a proper historic context. Conditions immediately prior to industrial development may have been extraordinary compared to the past 1,000 years or more. Using forest conditions in the 1800s as a baseline, then, could provide a false impression if the baseline is considered a goal to strove toward.

Fire, insects and diseases are endemic to western forests and are natural processes resulting in the forest self-thinning. This provides for greater diversity of plant and animal habitat than logging can achieve. In areas that have been historically and logged there are less diversity of native plants, more invasive species, and less animal diversity. Six et al., 2014 documented that logging to prevent or contain insect and disease has not been empirically proven to work, and because of lack of monitoring, both forest-wide[21] and specifically on HFRA projects,[22] the FS has no basis for this HFRA-related claim.

Wales, et al. 2007 modeled various potential outcomes of fire and fuel management scenarios on the structure of forested habitats in northeast Oregon. They projected that the **natural disturbance scenario resulted in the highest amounts of all types of medium and large tree forests combined** and best emulated the Natural Range of Variability for medium and large tree forests by potential vegetation type after several decades. Restoring the natural disturbances regimes and processes is the key to restoring forest structure and functionality similar to historical conditions.

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[21] *See* Section "Cumulative Effects and Monitoring."

[22] FOC's Freedom of Information Act request to Region 1 re: HFRA monitoring (April 4, 2019); Forest Service's April 30, 2019 response, at *2019-03254 FS response HFRA monit_4-30-19*.

Other scientific information contradicts some of the premises upon which the EA is based. Bradley, et al. 2016 "found forests with higher levels of protection had lower severity values even though they are generally identified as having the highest overall levels of biomass and fuel loading." Among the major findings were that areas undisturbed by logging experienced significantly less intensive fire compared with areas that have been logged. From a news release announcing the results of the study (http://www.biologicaldiversity.org/publications/papers/):

> "We were surprised to see how significant the differences were between protected areas managed for biodiversity and unprotected areas, which our data show burned more severely," said lead author Curtis Bradley, with the Center for Biological Diversity.
>
> The study focused on forests with relatively frequent fire regimes, ponderosa pine and mixed-conifer forest types; used multiple statistical models; and accounted for effects of climate, topography and regional differences to ensure the findings were robust.

"The belief that restrictions on logging have increased fire severity did not bear out in the study," said Dr. Chad Hanson, an ecologist with the John Muir Project. "In fact, the findings suggest the opposite. The most intense fires are occurring on private forest lands, while lands with little to no logging experience fires with relatively lower intensity."

"Our findings demonstrate that increased logging may actually increase fire severity," said Dr. Dominick A. DellaSala, chief scientist of Geos Institute. "Instead, decision-makers concerned about fire should target proven fire-risk reduction measures nearest homes and keep firefighters out of harm's way by focusing fire suppression actions near towns, not in the back country."

The FS does not view ecological damage through the same lens as it does for vegetative "historical conditions." Other factors that have been heavily influenced by management along with their historical range of variability (HRV) include:

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

Noss 2001, believes "If the thoughtfully identified critical components and **processes of an ecosystem are sustained**, there is a high probability that the ecosystem as a whole is sustained." (Emphasis added.) Noss 2001 describes basic ecosystem components:

> Ecosystems have **three basic components: composition, structure, and function**. Together, they define biodiversity and ecological integrity and provide the foundation on which standards for a sustainable human relationship with the earth might be crafted.

(Emphasis added.) Noss 2001 goes on to define those basic components:

> **Composition** includes the kinds of species present in an ecosystem and their relative abundances, as well as the composition of plant associations, floras and faunas, and habitats at broader scales. We might describe the composition of a forest, from individual stands to watersheds and regions.
>
> **Structure** is the architecture of the forest, which includes the vertical layering and shape of vegetation and its horizontal patchiness at several scales, from within stands (e.g., treefall gaps) to landscape patterns at coarser scales. Structure also includes the presence and abundance of such distinct structural elements as snags (standing dead trees) and downed logs in various size and decay classes.
>
> **Function** refers to the **ecological processes** that characterize the ecosystem. These processes are both biotic and abiotic, and include decomposition, nutrient cycling, disturbance, succession, seed dispersal, herbivory, predation, parasitism, pollination, and many others. Evolutionary processes, including mutation, gene flow, and natural selection, are also in the functional category.

(Emphasis added.) Hutto, 1995 also addresses natural processes, referring specifically to fire:

> Fire is such an important creator of the ecological variety in Rocky Mountain landscapes that the conservation of biological diversity [required by NFMA] is likely to be accomplished only through **the conservation of fire as a process**…Efforts to meet legal mandates to maintain biodiversity should, therefore, be directed toward **maintaining processes like fire**, which create the variety of vegetative cover types upon which the great variety of wildlife species depend.

(Emphasis added.) Noss and Cooperrider (1994) state:

> **Considering process is fundamental to biodiversity conservation because process determines pattern**. Six interrelated categories of ecological processes that biologists and managers must understand in order to effectively conserve biodiversity are (1) energy flows, (2) nutrient cycles, (3) hydrologic cycles, (4) disturbance regimes, (5) equilibrium processes, and (6) feedback effects.

(Emphasis added.) The Environmental Protection Agency (1999) recognizes the primacy of natural processes: (E)cological processes such as natural disturbance, hydrology, nutrient cycling, biotic interactions, population dynamics, and evolution determine the species composition, habitat structure, and ecological health of every site and landscape. **Only through the conservation of ecological processes will it be possible to (1) represent all native ecosystems within the landscape and (2) maintain complete, unfragmented environmental gradients among ecosystems.**

(Emphasis added.) Forest Service researcher Everett (1994) states:

> To prevent loss of future options we need to simultaneously **reestablish ecosystem processes and disturbance effects that create and maintain desired sustainable**

> **ecosystems**, while conserving genetic, species, community, and landscape diversity and long-term site productivity.
>
> …We must address **restoration of ecosystem processes and disturbance effects** that create sustainable forests before we can speak to the restoration of stressed sites; otherwise, we will forever treat the symptom and not the problem. … **One of the most significant management impacts on the sustainability of forest ecosystems has been the disruption of ecosystem processes** through actions such as fire suppression (Mutch and others 1993), dewatering of streams for irrigation (Wissmar and others 1993), truncation of stand succession by timber harvest (Walstad 1988), and maintaining numbers of desired wildlife species such as elk in excess of historical levels (Irwin and others 1993). Several ecosystem processes are in an altered state because we have interrupted the cycling of biomass through fire suppression or have created different cycling processes through resource extraction (timber harvest, grazing, fish harvest). (Emphasis added.)

Further, Collins and Stephens (2007) suggest direction to implement restoring the process of fire by educating the public:

> (W)hat may be more important than restoring structure is restoring the process of fire (Stephenson 1999). By allowing fire to resume its natural role in limiting density and reducing surface fuels, competition for growing space would be reduced, along with potential severity in subsequent fires (Fule and Laughlin 2007). As a result, we contend that the forests in Illilouette and Sugarloaf are becoming more resistant to ecosystem perturbations (e.g. insects, disease, drought). This resistance could be important in allowing these forests to cope with projected changes in climate. … Although it is not ubiquitously applicable, (wildland fire use) could potentially be a cost-effective and ecologically sound tool for "treating" large areas of forested land. Decisions to continue fire suppression are politically safe in the short term, but ecologically detrimental over the long term. Each time the decision to suppress is made, the risk of a fire escaping and causing damage (social and economic) is essentially deferred to the future. Allowing more natural fires to burn under certain conditions will probably mitigate these risks. If the public is encouraged to recognize this and to become more tolerant of the direct, near-term consequences (i.e. smoke production, limited access) managers will be able to more effectively use fire as a tool for restoring forests over the long term.

Typically, attempts to control or resist the natural process of fire have been a contributor to deviations from historic conditions. The FS's analyses skew toward considering fire as well as native insects and other natural pathogens as threats to the ecosystem rather than rejuvenating natural processes. It seems to need the obsolete viewpoint in order to justify and prioritize the proposed vegetation manipulations, tacitly for replacing natural processes with "treatments" and "prescriptions." However the scientific support for assuming that ecosystems can be restored or continuously maintained by such manipulative actions is entirely lacking.

Biologist Payne, 1995 includes a commentary on the kind of hubris represented by the FS's view that it can manipulate and control its way to a restored forest by more intensive management:

> One often hears that because humanity's impact has become so great, the rest of life on this planet now relies on us for its succession and that we are going to have to get used to

> managing natural systems in the future—the idea being that since we now threaten everything on earth we must take responsibility for holding the fate of everything in our hands. This bespeaks a form of unreality that takes my breath away… The cost of just finding out enough about the environment to become proper stewards of it—to say nothing of the costs of acting in such a way as to ameliorate serious problems we already understand, as well as problems about which we haven't a clue—is utterly prohibitive. And the fact that monitoring must proceed indefinitely means that on economic grounds alone the only possible way to proceed is to face the fact that by far the cheapest means of continuing life on earth as we know it is to **curb ourselves instead of trying to take on the proper management of the ecosystems we have so entirely disrupted.** (Emphasis added.)

In other places, the FS has recognized natural processes are vital for ecological integrity. USDA Forest Service, 2009a incorporates "ecological integrity" into its concept of "forest health" thus:

> "(E)cological integrity": Angermeier and Karr (1994), and Karr (1991) define this as: The capacity to support and maintain a balanced, integrated, and adaptive biological system having the full range of elements and processes expected in a region's natural habitat. "…the ability to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region." That is, an ecosystem is said to have high integrity if its full complement of native species is present in normal distributions and abundances, and if normal dynamic functions are in place and working properly. In systems with integrity, the "…capacity for self-repair when perturbed is preserved, and minimal external support for management is needed."

That last sentence provides a measure of resilience that the EOTW Project doesn't acknowledge. In their conclusion, Hessburg and Agee, 2003 state "Desired future conditions will only be realized by planning for and creating the desired ecosystem dynamics represented by ranges of conditions, set initially in strategic locations with minimal risks to species and processes." NEPA regulations at 40 CFR § 1502.24 state, under **Methodology and scientific accuracy**: "Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." The EA violates NEPA in terms of methodology, scientific accuracy, and scientific integrity.

In addition, in the context of ongoing climate change the notion of chasing "historical conditions" is even more irrational. The effects of climate change have already been significant, particularly in the region. Westerling, et al. 2006 state:

> Robust statistical associations between wildfire and hydro-climate in western forests indicate that increased wildfire activity over recent decades reflects sub-regional responses to changes in climate. Historical wildfire observations exhibit an abrupt transition in the mid-1980s from a regime of infrequent large wildfires of short (average of one week) duration to one with much more frequent and longer-burning (five weeks) fires. This transition was marked by a shift toward unusually warm springs, longer summer dry seasons, drier vegetation (which provoked more and longer-burning large wildfires), and longer fire seasons. Reduced winter precipitation and an early spring snowmelt played a role in this shift. Increases in wildfire were particularly strong in mid-elevation forests.

> …The greatest increases occurred in mid-elevation, Northern Rockies forests, where land-use histories have relatively little effect on fire risks, and are strongly associated with increased spring and summer temperatures and an earlier spring snowmelt.

Running, 2006 cites model runs of future climate scenarios from the 4th Assessment of the Intergovernmental Panel on Climate Change, stating:

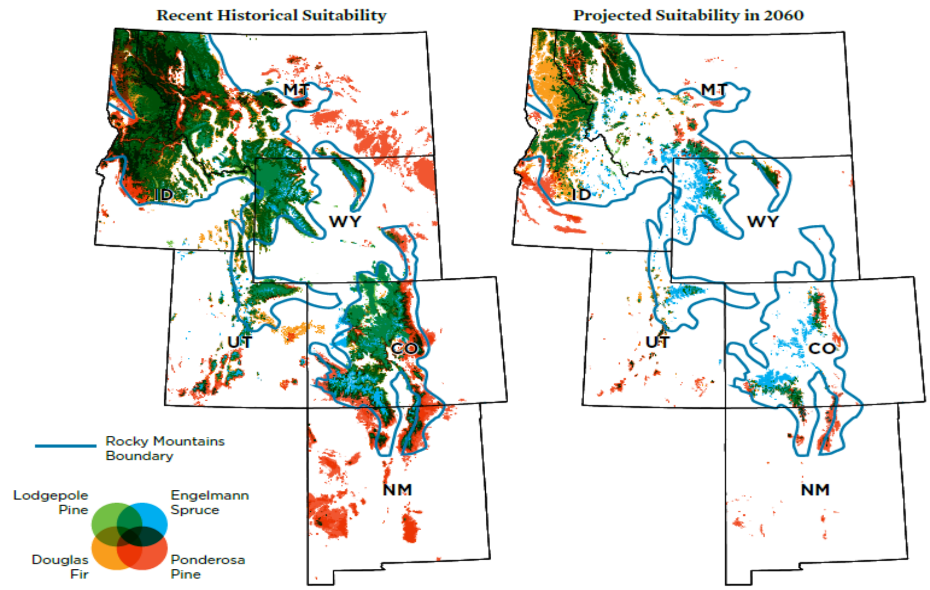
> (S)even general circulation models have run future climate simulations for several different carbon emissions scenarios. These simulations unanimously project June to August temperature increases of 2° to 5°C by 2040 to 2069 for western North America. The simulations also project precipitation decreases of up to 15% for that time period (*11*). Even assuming the most optimistic result of no change in precipitation, a June to August temperature increase of 3°C would be roughly three times the spring-summer temperature increase that Westerling *et al.* have linked to the current trends. Wildfire burn areas in Canada are expected to increase by 74 to 118% in the next century (*12*), and similar increases seem likely for the western United States.

Pederson et al. (2009) note that western Montana has already passed through 3 important, temperature-driven ecosystem thresholds.

The Pacific Northwest Research Station, 2004 recognizes "(a) way that climate change may show up in forests is through changes in disturbance regimes—the long-term patterns of fire, drought, insects, and diseases that are basic to forest development."

From a report by the Union of Concerned Scientists & Rocky Mountain Climate Organization (Funk et al., 2014):

FIGURE 5 AND TABLE 1. **Projected Changes in Suitable Ranges for Key Rocky Mountain Tree Species**



Species	Current	2060		
	Recent Historical Suitability (acres)	Projected Suitability (acres)	Net Change in Suitability (acres)	Percent Net Change
Lodgepole Pine	60,474,000	6,065,000	-54,409,000	-90%
Ponderosa Pine	39,842,000	7,771,000	-32,071,000	-80%
Engelmann Spruce	64,651,000	21,999,000	-42,652,000	-66%
Douglas Fir	53,620,000	22,606,000	-31,014,000	-58%

The caption under Funk et al.'s Figure 5 and Table 1 states:

> Much of the current range of these four widespread Rocky Mountain conifer species is projected to become climatically unsuitable for them by 2060 if emissions of heat-trapping gases continue to rise. The map on the left shows areas projected to be climatically suitable for these tree species under the recent historical (1961–1990) climate; the map on the right depicts conditions projected for 2060 given medium-high levels of heat-trapping emissions. Areas in color have at least a 50 percent likelihood of being climatically suitable according to the models, which did not address other factors that affect where species occur (e.g., soil types). Emissions levels reflect the A2 scenario of the Intergovernmental Panel on Climate Change. For more about this methodology, see www.ucsusa.org/forestannex.

Forests affect the climate, climate affects the forests, and there's been increasing evidence of climate triggering forest cover loss at significant scales (Breshears et al. 2005), forcing tree species into new distributions "unfamiliar to modern civilization" (Williams et al. 2012), and raising a question of forest decline across the 48 United States (Cohen et al. 2016).

In 2012 Forest Service scientists reported, "Climate change will alter ecosystem services, perceptions of value, and decisions regarding land uses." (Vose et al. 2012.)

The 2014 National Climate Assessment chapter for the Northwest is prefaced by four "key messages" including this one: "The combined impacts of increasing wildfire, insect outbreaks, and tree diseases are already causing widespread tree die-off and are virtually certain to cause additional forest mortality by the 2040s and long-term transformation of forest landscapes. Under higher emissions scenarios, extensive conversion of subalpine forests to other forest types is projected by the 2080s." (Mote et al. 2014.)

None of this means that longstanding values such as conservation of old-growth forests are no longer important. Under increasing heat and its consequences, we're likely to get unfamiliar understory and canopy comprised of a different mix of species. This new assortment of plant species will plausibly entail a new mix of trees, because some familiar tree species may not be viable—or as viable—under emerging climate conditions.

That said, the plausible new mix will include trees for whom the best policy will be in allowing them to achieve their longest possible lifespan, for varied reasons including that big trees will still serve as important carbon capture and storage (Stephenson et al. 2014).

Managing forest lands with concerns for water will be increasingly difficult under new conditions expected for the 21st century. (Sun and Vose, 2016.) Already, concerns have focused on new extremes of low flow in streams. (Kormos et al. 2016.) The 2014 National Climate Assessment Chapter for the Northwest also recognizes hydrologic challenges ahead: "Changes in the timing of streamflow related to changing snowmelt are already observed and will continue, reducing the supply of water for many competing demands and causing far-reaching ecological and socioeconomic consequences." (Mote et al. 2014.)

Malmsheimer et al. 2008 state, "Forests are shaped by climate. Along with soils, aspect, inclination, and elevation, climate determines what will grow where and how well. Changes in temperature and precipitation regimes therefore have the potential to dramatically affect forests nationwide."

Kirilenko and Sedjo, 2007 state "The response of forestry to global warming is likely to be multifaceted. On some sites, species more appropriate to the climate will replace the earlier species that is no longer suited to the climate."

Some FS scientists recognize this changing situation, for instance Johnson, 2016:

> Forests are changing in ways they've never experienced before because today's growing conditions are different from anything in the past. The climate is changing at an unprecedented rate, exotic diseases and pests are present, and landscapes are fragmented by human activity often occurring at the same time and place.
>
> The current drought in California serves as a reminder and example that forests of the 21st century may not resemble those from the 20th century. "When replanting a forest after disturbances, does it make sense to try to reestablish what was there before? Or, should we find re-plant material that might be more appropriate to current and future conditions of a changing environment?
>
> "Restoration efforts on U.S. Forest Service managed lands call for the use of locally adapted and appropriate native seed sources. The science-based process for selecting these

seeds varies, but in the past, managers based decisions on the assumption that present site conditions are similar to those of the past.

"This may no longer be the case."

The issue of forest response to climate change is also of course an issue of broad importance to community vitality and economic sustainability. Raising a question about persistence of forest stands also raises questions about hopes—and community economic planning—for the sustainability of forest-dependent jobs. Allen et al., 2015 state:

> Patterns, mechanisms, projections, and consequences of tree mortality and associated broad-scale forest die-off due to drought accompanied by warmer temperatures—hotter drought", an emerging characteristic of the Anthropocene—are the focus of rapidly expanding literature.
>
> …(R)ecent studies document more rapid mortality under hotter drought due to negative tree physiological responses and accelerated biotic attacks. Additional evidence suggesting greater vulnerability includes rising background mortality rates; projected increases in drought frequency, intensity, and duration; limitations of vegetation models such as inadequately represented mortality processes; warming feedbacks from die-off; and wildfire synergies.
>
> …We also present a set of global vulnerability drivers that are known with high confidence: (1) droughts eventually occur everywhere; (2) warming produces hotter droughts; (3) atmospheric moisture demand increases nonlinearly with temperature during drought; (4) mortality can occur faster in hotter drought, consistent with fundamental physiology; (5) shorter droughts occur more frequently than longer droughts and can become lethal under warming, increasing the frequency of lethal drought nonlinearly; and (6) mortality happens rapidly relative to growth intervals needed for forest recovery.
>
> These high-confidence drivers, in concert with research supporting greater vulnerability perspectives, support an overall viewpoint of greater forest vulnerability globally. We surmise that mortality vulnerability is being discounted in part due to difficulties in predicting threshold responses to extreme climate events. Given the profound ecological and societal implications of underestimating global vulnerability to hotter drought, we highlight urgent challenges for research, management, and policy-making communities.

There is scientific certainty that climate change has reset the deck for future ecological conditions. For example, Sallabanks, et al., 2001:

> (L)ong-term evolutionary potentials can be met only by accounting for potential future changes in conditions. …Impending changes in regional climates …have the capacity for causing great shifts in composition of ecological communities.

Next, as this objection explains elsewhere the FS has not correctly applied its own defining criteria of old growth for the purposes of examining areas proposed for logging and/or burning to see if they qualify as old growth, or replacement old growth. Furthermore, to the degree that actions are proposed in old growth, the FS has not demonstrated any scientifically defensible benefits to the habitat would result.

The EA also does not show how this project meets HFRA priorities for projects in at-risk communities. It doesn't state how the project area is covered by a specific Community Wildfire Protection Plan.

The "Proposed Action Wildland Urban Interface Map" seems to indicate that almost nothing in the project area falls within any category of Wildland Urban Interface (WUI).

Kramer, et al, 2019 states, "The 2001 Federal Register definition of the WUI defines two separate types of WUI: interface WUI (Fig. 1a), i.e. developed areas that have sparse or no wildland vegetation, but are within close proximity of a large patch of wildland, and intermix WUI (Fig. 1b), i.e. the area where houses and wildland vegetation directly intermingle (USDA and USDI 2001)."

But the Fire and Fuels Specialist Report indicates the FS has somehow delegated the project WUI definition to an outside entity:

> The Healthy Forests Restoration Act gives a clear designation that the location of the wildland urban interface is at the determination of the county when a community wildfire protection plan is in place. Idaho County does have a community wildfire protection plan, therefore this plan will be used for Wildland Urban Interface (WUI) designation within the project area.

The EA also doesn't justify choice of the areas to be treated based upon Condition Class. The Fire and Fuels Specialist Report states, "The project area fuels condition can be best summarized by using the Fire Regime Condition Class assessment that is used for determining the degree of departure from reference condition vegetation, fuels and disturbance regimes." But scientific information calls into question the condition class categorization scheme. Fire regime condition class is derived by comparing current conditions to an estimate of the historical conditions that existed before significant Euro-American settlement. Science recognizes the limitations of this methodology. It has very limited accuracy and tends to overestimate the risk of higher-severity fire posed by fuel loads, as documented by studies of recent fires (Odion and Hanson, 2006). Those researchers state:

> Condition Class, was not effective in identifying locations of high-severity fire. … In short, Condition Class identified nearly all forests as being at high risk of burning with a dramatic increase in fire severity compared to past fires. Instead, we found that the forests under investigation were at low risk for burning at high-severity, especially when both spatial and temporal patterns of fire are considered.

Another critique is from Rhodes (2007):

> Several of the biases …are embodied in the Fire Regime Condition Class (FRCC) approach (Hann and Bunell, 2001), which is widely used to provide an index of the potential for uncharacteristically severe fire and fire regime alteration. The FRCC relies on of estimates of mean fire intervals, but does not require that they be estimated on the basis of site-specific historical data. It emphasizes fire scar data, but does not require its collection and

> analysis on a site-specific basis. The FRCC's analysis of departure from natural fire regimes also relies on estimates of how many estimated mean fire intervals may have been skipped. The method does not require identification and consideration of fire-free intervals in site-specific historic record. Notably, a recent study that examined the correlation of FRCC estimates of likely fire behavior with actual fire behavior in several large fires recently burning the Sierra Nevada in California concluded: "[Fire Regime] Condition Class was not able to predict patterns of high-severity fire. . . . Condition Class identified nearly all forests as being at high risk of burning with a dramatic increase in fire severity compared to past fires. Instead, we found that the forests under investigation were at low risk for burning at high-severity, especially when both spatial and temporal patterns of fire are considered." (Odion and Hanson, 2006.) These results corroborate that FRCC is biased toward overestimating the alteration of fire regimes and the likelihood of areas burning at uncharacteristically high severity if affected by fire. Therefore, in aggregate there is medium degree of certainty that the FRCC is biased toward overestimating departures from natural fire regimes and the propensity of forests to burn at higher severity when affected by fire.

Brown, 1995 which the FS cites, states:

> Limitations to use of historical fire regime knowledge in ecosystem management need to be recognized. They include the following:
>
> 1. Difficulty interpreting past variability due to insufficient data.
> 2. Degree to which past and future environmental conditions may fall outside the established range in historical conditions.[23]
> 3. Extent to which the range of ecosystem conditions desired by society differs from natural variability.

The EA also does not assure the FS has not exceeded the system-wide limitation of 20 million acres of land treated under HFRA.

The EA fails to demonstrate it is meeting the requirements for focusing largely upon small trees, and retaining large trees as much as possible. As we stated in comments on the PA, "The proposal to log more heavily along project area roads contradicts large tree retention requirements." And the criteria for tree retention as described in the EA's various categories of silviculture "treatment" are far too vague for anyone to go out on the ground and understand how and if the HFRA requirements are or will be applied (e.g., "The largest, best-quality, healthiest trees in the dominant and codominant crown classes would be left" and "The largest, healthiest trees with the best form would be left". <u>We fail to see how logging most all the large trees in the treatment areas would be prohibited by such language.</u> If that is the FS's intent, the EA should state it so the public may review. Approval of these "treatments" would be arbitrary and capricious.

This project far exceeds what projects done under the Farm Bill authority allow. In our scoping comments, we were concerned about the project's size, noting that the WUI is only a fraction of the size of this project:

[23] We would supplement that with the discussion on climate change in this Objection.

> For example, the PA identifies the WUI as being an important issue. Yet the PA map shows that the WUI only occupies a very tiny fraction of the project area (see also comments about the WUI later in this letter). Assuming that logging, thinning or treating the WUI is a legitimate concern, why not analyze an alternative that only does so in the WUI? Even that may be well beyond what Forest Service research suggests is needed (see Cohen 1999a). Even if one were to consider all inheld private land, regardless of whether it contains structures or not, logging within 100 meters would produce a far smaller timber sale and still meet what is supposedly a main purpose and need for this timber sale

FOC proposed action comments, p. 6. Additionally, we have new information released with the EA, the document titled "Requirements for Using the Farm Bill EA/EIS," which described the Forest Service's interpretation of what limits Farm Bill projects have. We object to this interpretation, and the size of this project, because the plain meaning of the Farm Bill amendment to HFRA places parameters on projects proposed under the Farm Bill (codified under 16 U.S.C. § 6591b and §6591c), and this project does not follow these parameters. Although the Forest Service relied on the landscape-scale designation to justify the need for this project under section 6591a (see Draft Finding of No Significant Impact p. 1, pdf 59 of the EA/draft FONSI), the project ignores parts of section 6591b, which apply to 6591a.

The Forest Service has violated the size of projects allowed by the Farm Bill. When you develop a project under the authority of the Farm Bill (HFRA Section 602(d)), the agency can avail itself of the permissions in the Farm Bill, but the agency must also confine itself to the limitations. are also confining yourself to the limitations from Under the 16 U.S.C. §6591b.

Remedy:
1) Chose the no-action alternative
2) Reduce this project to 3,000 acres of treatment to comply with the Farm Bill limitations on projects

ILLEGITIMATE COLLABORATION PROCESS

As is the unfortunate trend with Forest Service proposals, this project is yet another one that is a result of a collaborative and has excluded the broader public until a point where the project appeared to have been pretty developed, to the public's prejudice in participating. Collaboration had already been ongoing by the time this project was released for public comment under NEPA, so collaborative stakeholders were involved in this project well before the rest of the general public who don't live close to these meetings but, as Americans, still own our national forests.

Our comments on the Proposed Action include:

> Based upon the contents of the PA, the FS has largely committed itself to a course of action well before engaging the public. The lack of a full and meaningful involvement of the general public in the process of project development prior to the release of this PA greatly concerns us. The PA reveals many actions the Forest Service (FS) took prior to even scoping the proposal to the full ownership of this national forest—the American public. Part of the earlier narrowly focused public involvement process included meetings with

> self-selected members of the public who were able, because of their location near the project area, to engage in "collaboration." Many of these same people have financial interests in a decision that would approve commercial logging and/or were paid to attend.
>
> The Opportunity to Comment letter states, "the Responsible Official does not anticipate providing an additional request for written comments other than this scoping period." So now we are to believe our input on the project will have the same weight as that of the local collaborators?

With "collaboration" as facilitated and embraced by the FS, local special interests are prioritized over the interests of the U.S. public—regardless of where those Americans live or whether or not they can attend collaborative meetings to make sure their interests are being heard. Science, which should inform the development of these projects, is what is lost in collaboratives that gather self-interested stakeholders with little or no scientific expertise. For example, Idaho County is represented through an elected official in the Clearwater Basin Collaborative, yet there is nothing scientific about the county's position to log.[24] The participant in the Clearwater Basin Collaborative that should have the scientific expertise is the Forest Service—this science should both inform projects and examine the impacts of the proposed project under the National Environmental Policy Act. But, scientific independence is the key to scientific credibility.[25] Because of the Forest Service's commonly established motivations for participating in collaboratives, the agency undermines its credibility as an independent scientific voice in both the development and analyzation of proposed projects.

Research has found that the Forest Service's participation in collaboratives are rooted more in a motivation to win trust from stakeholders than for any scientific reason. Forest Service researchers studied stakeholder and Forest Service motivations for participating in collaborative federal forest governance.[26] The researchers performed a statewide survey of Oregon collaboratives, using this western state because over fifty percent of the land in Oregon is federally owned and at least twenty-five collaboratives exist,[27] which gave the researchers a broad basis to measure motivations for participating in collaboratives. The researchers found that the single primary motive for Forest Service survey respondents to collaborate was to improve trust: "This suggests that [agency respondents] identify the social process of collaboration as important, and value collaborations most of all as a venue for social outcomes."[28] Because science shows that many Forest Service participants use the collaborative process to improve trust, this motivation undermines scientific independence in both choosing when to develop projects and assessing what kind of impacts those projects will have. When we raise objections where scientific or rational analysis is lacking, and we can't help but wonder if the driving motivation to be seen as trustworthy by collaborative participants, who are not disclosed to the public, might have something to do with that.

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[24] Hedberg, "Idaho County to seek voters' 'thoughts and prayers' on wilderness," Lewiston Tribune, Sept. 5, 2018.
[25] *See generally* L.F. Ruggerio, Eco Report, *Scientific Independence: A Key to Credibility* pp. 1,2 4 (2007).
[26] Davis et al. 2017. *Comparison of USDA Forest Service and Stakeholder Motivations and Experiences in Collaborative Federal Forest Governance in the Western United States*, Environmental Management 60: 908-921.
[27] Davis et al. 2017. *Comparison of USDA Forest Service and Stakeholder Motivations and Experiences in Collaborative Federal Forest Governance in the Western United States*, Environmental Management 60: 908-921.
[28] Davis et al. 2017. *Comparison of USDA Forest Service and Stakeholder Motivations and Experiences in Collaborative Federal Forest Governance in the Western United States*, Environmental Management 60: 908-921.

Dukes and Firehock, 2001 wrote a guide for environmental advocates which includes a set of principles. None of the collaborative entities involved with this project would subscribe to those collaborative, democratic principles.

This "collaboration" is actually collusion among special interest groups and set the stage for the FS's skewed proposed action. And this process has become even less transparent. Included with our objection materials is the Clearwater Basin Collaborative's (CBC) website, which has a member page that, as of 11/4/19, does not disclose ts members to the public—it is a password protected page.[29] And, according to the Forest Service in the EA, the agency has involved the CBC, who won't disclose its members, more frequently than the public for input on this project.[30]

Nie and Metcalf, 2015 provide a social science analysis of the problems posed by collaboration. Among the many problems, it's clear that most environmental groups don't have the resources to participate meaningfully in long processes created by the collaborators. The authors cite an earlier inquiry in stating, "Organizational resources and capacity were found to be significant factors shaping the decision about whether to collaborate or sue. If trends in collaboration continue, says the author, '[W]e will see a marginalization of smaller, ideologically pure environmental groups [and] their values will not be included in decision making because they are unable or unwilling to collaborate…'."

Nie and Metcalf, 2015 document perceptions of several negative outcomes of collaboration, from the perspective of those skeptical of the process.

- The under-representation of conservation interests in many collaborative efforts, a perception that there is a heavy skew of the membership of the group against conservation and in favor of the folks who are impacting the environment.
- An inappropriate and often dominant role played by the Forest Service in some collaborative processes.
- Those making a profit from federal lands will dominate these processes because they have the organizational and financial capacity and resources to participate over the long haul.

- Collaboration sets up two classes of citizens, those who are part of the process and those who aren't, even if the latter participate fully in the NEPA process.
- Collaboration weeds out dissent and opposition and is most conducive to defending the status quo.
- Collaboration is undermining, subverting, and disempowering the more democratic NEPA process.
- There is a contrast between an exclusive and self-selected set of (often) paid interest groups participating in a collaborative versus a more broad-based and inclusive public participation process governed by NEPA.

[29] Clearwater Basin Collaborative Members page_Nov 4 2019 pdf, *also available at* https://clearwaterbasincollaborative.org/members/; *see also* Clearwater Basin Collaborative – Finding Solutions (about us page)_11-4-19, *also available at* https://clearwaterbasincollaborative.org/landscape-health/.
[30] *See* EA p. 2 (Public Involvement and Tribal Consultation).

- Collaborative groups having a disproportionate amount of influence with the Forest Service.
- Collaborative group recommendations precede NEPA analysis, and there is an implicit understanding the collaborative group's recommendation will be implemented, rendering the NEPA process a pro forma exercise.
- Laws such as the ESA are designed to be used and enforced by citizens, who forgo such rights by being included in collaborative groups.
- Collaborative groups do not consider the best available science on resource management.
- Collaborative groups promote logging which is a pretense or price to be paid for genuine forest restoration.

For the reasons above, EOTW violates HFRA and NEPA.

Remedy: Drop the project, choose the no-action alternative, or start the entire process again, this time letting the Clearwater Basin Collaborative participate as anybody is entitled to do—through the National Environmental Policy Act process, which is transparent and nonexclusive.

SCIENTIFIC INTEGRITY

Our comments on the PA included:

> Please disclose the statistical reliability of all data the FS relies upon for the End of the World analysis. However, even if FS data input to modeling is reliable, the question remains of the models' validity. Please disclose how the analysis models have been scientifically validated as appropriate for the ways the FS is utilizing them in the End of the World analyses. The peer review process is a widely accepted method of validation in the scientific community.

The FS has not disclosed the statistical reliability of the data the FS relies upon for the EOTW project analysis. Since "an instrument's data must be reliable if they are valid" (Huck, 2000) this means data input to a model must accurately measure that aspect of the world it is claimed to measure, or else the data is invalid for use by that model. Also, Beck and Suring, 2011 "remind practitioners that if available data are poor quality or fail to adequately describe variables critical to the habitat requirements of a species, then only poor quality outputs will result. Thus, obtaining quality input data is paramount in modeling activities." And Larson et al. 2011 state: "Although the presence of sampling error in habitat attribute data gathered in the field is well known, the measurement error associated with remotely sensed data and other GIS databases may not be as widely appreciated."

Huck, 2000 states:

> The basic idea of reliability is summed up by the word consistency. Researchers can and do evaluate the reliability of their instruments from different perspectives, but the basic question that cuts across these various perspectives (and techniques) is always the same: "To what extent can we say the data are consistent?" …(T)he notion of consistency is at the heart of the matter in each case.

> …(R)eliability is conceptually and computationally connected to the data produced by the use of a measuring instrument, not to the measuring instrument as it sits on the shelf.

During litigation of a timber sale on the Kootenai NF (CV-02-200-M-LBE, Federal Defendants Response to Motion for Preliminary Injunction), the FS criticized a report provided by plaintiffs, stating "(Its) purported 'statistical analysis' reports no confidence intervals, standard deviations or standard errors in association with its conclusions."

As Huck (2000) states, the issue of "standard deviations or standard errors" that the FS raised in the context of that litigation relates to the reliability of the data, which in turn depends upon how well-trained the data-gatherers are with their measuring tools and measuring methodology. In other words, different measurements of the same phenomenon must result in numbers that are very similar to result in small "standard deviations or standard errors" and thus high reliability coefficients, which in turn provide the public and decisionmakers with an idea of how confident they can be in the conclusions drawn from the data.

The analysis methodology rely heavily upon the assumption that the FS knows the "historic forest conditions" as is stated in the PA. This is also often referred to as the "Historic Range of Variability." Yet the reliability of the data sources used to construct the EA's "historic forest conditions" or Historic Range of Variability (HRV) is not disclosed. The data sources themselves are not identified or obscure.

The U.S. Department of Agriculture document, "USDA-Objectivity of Statistical and Financial Information" is instructional on this topic.

The next level of scientific integrity is the notion of "validity." So even if FS data input to its models are reliable, a question remains of the analysis and modeling methodology validity. In other words, are the models scientifically appropriate for the uses for which the FS is utilizing them? As Huck, (2000) explains, the degree of "content validity," or accuracy of the model or methodology is established by utilizing other experts. This, in turn, demonstrates the necessity for utilizing the peer review process. The FS has not disclosed the limitations of all models the FS relies upon for the EOTW project analyses, which begins to address model validity.

In fact, the Forest Plan requires the FS to validate the models it uses. In Chapter V, the Forest Plan monitoring plan notes a "NFMA Requirement 36 CFR 219.12(K)(2)" and the "Action() …" is "Validation of resource prediction models; wildlife, water quality, fisheries, timber." Again, the FS has not validated such models.

Model results can be no better than as the data fed into them, which is why data reliability is discussed above. The Ninth Circuit Court of Appeals has declared that the FS must disclose the limitations of its models in order to comply with NEPA. The EA has failed to disclose these limitations. Unfortunately, the FS uses models without any real indication as to how much they truly reflect reality.

In the Clear Creek Integrated Restoration Project FEIS, the NPCNF defines “model” as “a theoretical projection in detail of a possible system of natural resource relationships. A simulation based on an empirical calculation to set potential or outputs of a proposed action or actions.” (FEIS at 5-14.) From www.thefreedictionary.com:

> Empirical – 1. a. Relying on or derived from observation **or** experiment: empirical results that supported the hypothesis. b. Verifiable or provable by means of observation or experiment: empirical laws. 2. Guided by practical experience and not theory, especially in medicine.

(Emphasis added.) So models are “theoretical” in nature and the agency implies that they are somehow based in observation or experiment that support the hypotheses of the models. That would be required, because as Verbyla and Litaitis (1989) assert, “Any approach to ecological modelling has little merit if the predictions cannot be, or are not, assessed for their accuracy using independent data.” This corresponds directly to the concept of “**validity**” as discussed by Huck, 2000: “(A) measuring instrument is valid to the extent that it measures what it purports to measure.”

However, there is no evidence that the FS has performed validation of any the models for the way they were used to support the EA’s analyses. There is no documentation of someone using observation or experiment to support the model hypotheses.

As Huck, (2000) explains, the degree of “content validity,” or accuracy of the model or methodology is established by utilizing other experts. This, in turn, demonstrates the necessity for utilizing the peer review process. The validity of the various models utilized in the EA’s analyses have, by and large, not been established for how agency utilizes them. No studies are cited which establishes their content validity, and no independent expert peer review process of the models has occurred.

Larson et al. 2011 state:

> Habitat models are developed to satisfy a variety of objectives. ...A basic objective of most habitat models is to predict some aspect of a wildlife population (e.g., presence, density, survival), so assessing predictive ability is a critical component of model validation. **This requires wildlife-use data that are independent of those from which the model was developed.** ...It is informative not only to evaluate model predictions with new observations from the original study site but also to evaluate predictions in new geographic areas.

(Internal citations omitted, emphasis added). A FS forest plan monitoring and evaluation report provides an example of the agency itself acknowledging the problems of data that is old and incomplete, leading to the limitation of models the FS typically uses for wildlife analyses for old-growth wildlife habitats:

> Habitat modeling based on the timber stand database has its limitations: the data are, on average, 15 years old; canopy closure estimates are inaccurate; and data do not exist for the abundance or distribution of snags or down woody material… .

(USDA Forest Service, 2000c.) In that case, the FS expert believed the data were unreliable, so the usefulness or applicability of the model—its validity—is limited.

USDA Forest Service 1994b states "It is important to realize that all models greatly simplify complex processes and that the numbers generated by these models should be interpreted in light of field observations and professional judgement." (III-77.)

Beck and Suring, 2011 state:

> Developers of frameworks have consistently attained scientific credibility through published manuscripts describing the development or applications of models developed within their frameworks, but a major weakness for many frameworks continues to be a lack of validation. Model validation is critical so that models developed within any framework can be used with confidence. Therefore, we recommend that models be validated through independent field study or by reserving some data used in model development.

Larson et al. 2011 state:

> (T)he scale at which land management objectives are most relevant, often the landscape, is also the most relevant scale at which to evaluate model performance. Model validity, however, is currently limited by a lack of information about the spatial components of wildlife habitat (e.g., minimum patch size) and relationships between habitat quality and landscape indices (Li et al. 2000).

Beck and Suring, 2011 developed several criteria for rating modeling frameworks—that is,

Habitat–population linkage	Does the modeling framework incorporate vital rates (e.g., production, survival), other demographic parameters (e.g., density, population size); surrogates (e.g., quality of home ranges, habitat conditions in critical reproductive habitats, presence/absence) of population demographic parameters; or does the modeling framework model habitat conditions without specific consideration of wildlife population parameters?	0 = does not rely on population demographics or surrogates of modeled species 1 = relies on surrogates for population demographic parameters or framework; can utilize population demographics if desired, but is not dependent on them 2 = specifically relies on population demographics of modeled species

evaluating their validity. Three of their criteria are especially relevant to this discussion:

Output definition	Is the output well defined and will it translate to something that can be measured?	1 = difficult 2 = moderate 3 = easy
	acceptance by an array of professionals?	application of the modeling framework

The documents, "USDA-Objectivity of Regulatory Information" and "USDA-Objectivity of Scientific Research Information" are instructional on this topic.

Ruggiero, 2007 (a scientist from the research branch of the FS) recognizes a fundamental need to demonstrate the proper use of scientific information, in order to overcome issues of decisionmaking integrity that arise from bureaucratic inertia and political influence. Ruggiero, 2007 and Sullivan et al., 2006 provide a commentary on the scientific integrity and agency use and misuse of science. And the Committee of Scientists (1999) recommend "independent scientific review of proposed conservation strategies…" The interpretation of scientific information the analyses do cite is problematic as we discuss throughout this objection. A big problem is that scientific information we cited in our comments on the PA was ignored or dismissed without discussion.

The EA violates NEPA because the FS has not insured the reliability of data relied upon by the EA's models, the FS has not validated the models for the way the EA utilizes them, and the FS has overly narrowed the information it considers to be best available science.

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:

> (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.

A Science Consistency Review is long overdue for the revised Forest Plan (See Guldin et al., 2003, 2003b). The FS prepared Guldin et al. (2003) which:

> ...outlines a process called the science consistency review, which can be used to evaluate the use of scientific information in land management decisions. Developed with specific reference to land management decisions in the U.S. Department of Agriculture Forest Service, the process involves assembling a team of reviewers under a review administrator to constructively criticize draft analysis and decision documents. Reviews are then forwarded to the responsible official, whose team of technical experts may revise the draft documents in response to reviewer concerns. The process is designed to proceed iteratively until reviewers are satisfied that key elements are **consistent with available scientific information.**

Darimont, et al., 2018 advocate for more transparency in the context of government conclusions about wildlife populations, stating:

> Increased scrutiny could pressure governments to present wildlife data and policies crafted by incorporating key components of science: transparent methods, reliable estimates (and their associated uncertainties), and intelligible decisions emerging from both of them. Minimally, **if it is accepted that governments may always draw on politics, new oversight by scientists would allow clearer demarcation between where the population data begin and end in policy formation** (Creel et al. 2016*b*; Mitchell et al. 2016). Undeniably, social dimensions of management (i.e., impacts on livelihoods and human–wildlife conflict) will remain important. (Emphasis added.)

In a news release accompanying the release of that paper, the lead author states:

> In a post-truth world, **qualified scientists are arm's length now have the opportunity and responsibility to scrutinize government wildlife policies and the data underlying them.** Such scrutiny could support transparent, adaptive, and ultimately trustworthy policy that could be generated and defended by governments. (Emphasis added.)

The Committee of Scientists (1999) state:

> To ensure the development of scientifically credible conservation strategies, the Committee recommends a process that includes (1) scientific involvement in the selection of focal species, in the development of measures of species viability and ecological integrity, and in the definition of key elements of conservation strategies; (2) independent scientific review of proposed conservation strategies before plans are published; (3) scientific involvement in designing monitoring protocols and adaptive management; and (4) a national scientific committee to advise the Chief of the Forest Service on scientific issues in assessment and planning.

Remedy: Select the No Action alternative. Alternatively, prepare an EIS that addresses the analytical and scientific issues identified above.

TRAVEL MANAGEMENT

At page 15 our comments on the Proposed Action state:

> The EIS must demonstrate the FS is managing the project area and forest consistent with the Travel Management Regulations (36 CFR 212) Subpart A which requires the FS to involve the public while conducting a science-based analysis to identify the minimum road system needed to manage the Forest ecologically sustainably and within expected budgets.
>
> The EIS must disclose 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.
>
> The EIS must disclose the impacts of project area system roads not maintained in conformance to BMPs or in compliance with standards, because of funding shortfalls or

> other management inadequacies. Please disclose the impacts of roads that go without maintenance because they are unauthorized or non-system. This is needed in the EIS, because “Recent reviews on project roads by the Nez Perce Tribe and Forest Service personnel have noted a number of potential impacts to watershed and streams as a result of deferred maintenance.”
>
> “There are about 78 crossings that have not been reviewed.” The EIS must account for the potential impacts of these 78 crossings of uncertain condition.

The EA does not incorporate the science-based transportation analysis required under 36 CFR § 212 Subpart A, and so there was no assessment that identified the unneeded roads. The EA also fails to disclose the Access Management Plan required by the forest plan.

The FS regulations at 36 CFR § 212 Subpart A require the FS to identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of national forest lands. The NEPA process the FS used for EOTW project design is not consistent with the Travel Management Regulations at 36 CFR § 212 Subpart A.

On March 3, 2000, the FS set a course to revise 36 CFR Part 212 to shift emphasis from transportation development to managing administrative and public access within the capability of the lands. The proposal was to shift the focus of National Forest System road management from development and construction of new roads to maintaining and restoring needed roads and decommissioning unneeded roads within the context of restoring healthy ecosystems.

On January 12, 2001, the FS issued the final National Forest System Road Management Rule. The rule revised regulations concerning the management, use, and maintenance of the National Forest Transportation System. Consistent with changes in public demands and use of National Forest System resources and the need to better manage funds available for road construction, reconstruction, maintenance, and decommissioning, the final rule removed the emphasis on transportation development and **added a requirement for science-based transportation analysis**. The final rule is to help ensure that additions to the National Forest System road network are those deemed essential for resource management and use; that construction, reconstruction, and maintenance of roads minimize adverse environmental impacts; and that **unneeded roads are decommissioned** and restoration of ecological processes are initiated. (Emphases added.)

The EOTW EA does not incorporate the required science-based transportation analysis, and so there was no assessment that identified all of the unneeded roads.

Nonsystem roads are not on any Forest inventory, and are not addressed by the annual road maintenance budget.

Forestwide, roads are not being maintained as needed: “Congressionally appropriated road maintenance funding is approximately 9% of what is needed for the current classified road system.” (Nez Perce National Forest Roads Analysis Report, 2006.) That report also admits:

> Some arterial, collector and local roads are not being maintained to specified standards. In some areas the road system will continue to degrade and this will affect future access to areas served by these roads.

In failing to analyze the implications of insufficient funding for the project area, the EA violates NEPA.

The 2006 Roads Analysis Report also acknowledges:

> Some roads are causing adverse impacts, such as sedimentation in streams, wildlife impacts, and reduced access due to landslides, and should be evaluated for mitigation projects at the sub-forest level.
>
> Roads in streamside or valley bottom locations disrupt the riparian areas through constriction, removal of woody debris and shade, introduction of sediment, reduction in leafy primary production, and through increased hazard of introduction of toxic pollutants to the stream.
>
> Roads can alter physical channel dynamics, including isolating floodplains, constraining channel migration, and movement of large wood, fine organic matter, and sediment. This happens most at road-stream intersections and where roads are within close proximity to streams. Of the 3873 miles of National Forest system roads, approximately 23 percent exist within 300 feet of stream channels.
>
> Wolverines are the most sensitive MIS species to motorized access. They typically inhabit remote mountainous areas where human disturbance is lower. Wolverines typically avoid human disturbance and roaded landscapes.
>
> Standing and down dead wood is important to pileated woodpecker and marten habitat. Roads facilitate the removal of these habitat components for firewood. A major implication is that some MIS habitats are likely underused.

The Nez Perce National Forest has not yet completed its Travel Analysis Process (TAP) as mandated by the Travel Management Regulations. Since the TAP is to be a science-based process, Friends of the Clearwater's August 27, 2014 Travel Analysis letter to the Forest Supervisor cited scientific information including Wisdom, et al. (2000):

> Our analysis also indicated **that >70 percent of the 91 species are affected negatively by one or more factors associated with roads.** Moreover, maps of the abundance of source habitats in relation to classes of road density suggested that road-associated factors hypothetically may reduce the potential to support persistent populations of terrestrial carnivores in many subbasins. Management implications of our summarized road effects include the potential to mitigate a diverse set of negative factors associated with roads. **Comprehensive mitigation of road-associated factors would require a substantial reduction in the density of existing roads as well as effective control of road access in relation to management of livestock, timber, recreation, hunting, trapping, mineral development, and other human activities.**

> **...Efforts to restore habitats without simultaneous efforts to reduce road density and control human disturbances will curtail the effectiveness of habitat restoration, or even contribute to its failure; this is because of the large number of species that are simultaneously affected by decline in habitat as well as by road-associated factors.**

(Emphases added.) Friends of the Clearwater's August 27, 2014 Travel Analysis letter is incorporated within this Objection, and is included as Attachment 7.

36 CFR § 212 Subpart A directs each national forest to conduct "a science-based roads analysis," generally referred to as the "travel analysis process." The FS Washington Office, through a series of directive memoranda, instructed forests to use the Subpart A process to "maintain an appropriately sized and environmentally sustainable road system that is responsive to ecological, economic, and social concerns." These memoranda also outline core elements that must be included in each Travel Analysis Report.

The Washington Office memorandum dated March 29, 2012 (USDA Forest Service, 2012d) directed the following:

- A TAP must analyze all roads (maintenance levels 1 through 5);
- The Travel Analysis Report must include a map displaying roads that will inform the Minimum Road System pursuant to 36 C.F.R. § 212.5(b), and an explanation of the underlying analysis;
- The TAP and Watershed Condition Framework process should inform one another so that they can be integrated and updated with new information or where conditions change.

The December 17, 2013 Washington Office memorandum (USDA Forest Service, 2013b) clarifies that by the September 30, 2015 deadline each forest must:

- Produce a Travel Analysis Report summarizing the travel analysis;
- Produce a list of roads *likely not needed for future use*; and
- Synthesize the results in a map displaying roads that are *likely needed* and *likely not needed in the future* that conforms to the provided template.

The Subpart A analysis is intended to account for benefits and risks of each road, and especially to account for affordability. The TAP must account for the cost of maintaining roads to standard, including costs required to comply with Best Management Practices related to road maintenance.

The Travel Management Regulations at 36 CFR **§** 212.5 state:

> (b) Road system—(1) *Identification of road system.* For each national forest, national grassland, experimental forest, and any other units of the National Forest System (§ 212.1), the responsible official must identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands. In determining the minimum road system, the responsible official must incorporate a science-based roads analysis at the appropriate scale and, to the degree practicable, involve a broad spectrum of interested and affected citizens, other state and federal agencies, and tribal governments. The minimum system is the road system determined to be needed to meet resource and other management objectives adopted in the relevant land and resource management plan (36 CFR part 219), to meet applicable statutory and regulatory

> requirements, to reflect long-term funding expectations, to ensure that the identified system minimizes adverse environmental impacts associated with road construction, reconstruction, decommissioning, and maintenance.

The huge estimated annual maintenance costs for roads on the NPCN far exceed all published estimates of road maintenance funding the Forest has received annually for decades. And although the FS never likes to conduct an analysis of or disclose the forest-wide ecological impacts of its road maintenance funding shortfalls, projecting from discussion in Gucinski et al. 2001 helps to start imagining the scale of the impacts.

It is also important to recognize the ongoing ecological damage of roads—regardless of the adequacy of maintenance funding. Undesirable consequences include adverse effects on hydrology and geomorphic features (such as debris slides and sedimentation), habitat fragmentation, predation, road kill, invasion by exotic species, dispersal of pathogens, degraded water quality and chemical contamination, degraded aquatic habitat, use conflicts, destructive human actions (for example, trash dumping, illegal hunting, fires), lost solitude, depressed local economies, loss of soil productivity, and decline in biodiversity. (Gucinski et al., 2001)

Huge bibliographies of scientific information indicate the highly significant nature of departures from historic conditions that are the impacts on forest ecosystems caused by motorized travel routes and infrastructure. From the Wisdom et al. (2000) Abstract:

> Our assessment was designed to provide technical support for the ICBEMP and was done in five steps. … Third, we summarized the effects of roads and road-associated factors on populations and habitats for each of the 91 species and described the results in relation to **broad-scale patterns of road density.** Fourth, we mapped classes of the current abundance of source habitats for four species of terrestrial carnivores in relation to **classes of road density** across the 164 subbasins and used the maps to identify areas having high potential to support persistent populations. And fifth, we used our results, along with results from other studies, to describe broad-scale implications for managing habitats deemed to have undergone long-term decline and for managing species negatively affected by **roads or road-associated factors**. (Emphases added.)

Carnefix and Frissell, 2009 make a very strong scientific rationale for including ecologically-based road density standards:

> Roads have well-documented, significant and widespread ecological impacts across multiple scales, often far beyond the area of the road "footprint". Such impacts often create large and extensive departures from the natural conditions to which organisms are adapted, which increase with the extent and/or density of the road network. Road density is a useful metric or indicator of human impact at all scales broader than a single local site because it integrates impacts of human disturbance from activities that are associated with roads and their use (e.g., timber harvest, mining, human wildfire ignitions, invasive species introduction and spread, etc.) with direct road impacts. Multiple, convergent lines of empirical evidence summarized herein support two robust conclusions: 1) no truly "safe" threshold road density exists, but rather negative impacts begin to accrue and be expressed with incursion of the very first road segment; and 2) **highly significant impacts (e.g., threat of extirpation of sensitive species) are already apparent at road densities on the**

> **order of 0.6 km per square km (1 mile per square mile) or less.** Therefore, restoration strategies prioritized to reduce road densities in areas of high aquatic resource value from low-to-moderately-low levels to zero-to-low densities (e.g., <1 mile per square mile, lower if attainable) are likely to be most efficient and effective in terms of both economic cost and ecological benefit. By strong inference from these empirical studies of systems and species sensitive to humans' environmental impact, with limited exceptions**, investments that only reduce high road density to moderate road density are unlikely to produce any but small incremental improvements in abundance, and will not result in robust populations of sensitive species.**

(Emphases added.) Wisdom et al., 2000, also state in their Abstract:

> Our analysis also indicated **that >70 percent of the 91 species are affected negatively by one or more factors associated with roads.** Moreover, maps of the abundance of source habitats in relation to classes of road density suggested that road-associated factors hypothetically may reduce the potential to support persistent populations of terrestrial carnivores in many subbasins. Management implications of our summarized road effects include the potential to mitigate a diverse set of negative factors associated with roads. **Comprehensive mitigation of road-associated factors would require a substantial reduction in the density of existing roads as well as effective control of road access in relation to management of livestock, timber, recreation, hunting, trapping, mineral development, and other human activities.** (Emphases added.)

Frissell, 2014 states:

> Roads are ecologically problematic in any environment because they affect biota, water quality, and a suite of biophysical processes through many physical, chemical, and biological pathways (Trombulak and Frissell 2000, Jones et al. 2000). The inherent contribution of forest roads to nonpoint source pollution (in particular sediment but also nutrients) to streams, coupled with the extensive occurrence of forest roads directly adjacent to streams through large portions of the range of bull trout in the coterminous US, adversely affects water quality in streams to a degree that is directly harmful to bull trout and their prey. This impairment occurs on a widespread and sustained basis; runoff from roads may be episodic and associated with annual high rainfall or snowmelt events, but once delivered to streams, sediment and associated pollutant deposited on the streambed causes sustained impairment of habitat for salmon and other sensitive aquatic and amphibian species. Current road design, management of road use and conditions, the locations of roads relative to slopes and water bodies, and the overall density of roads throughout most of the Pacific Northwest all contribute materially to this impairment. This effect is apart from, but contributes additively in effect to the point source pollution associated with road runoff that is entrained by culverts or ditches before being discharged to natural waters.

Ongoing and proposed activities will deliver sediment into stream networks. Sediment in streams degrades native fish habitat by filling in interstitial spaces and pools, and decreasing inter-gravel dissolved oxygen concentrations. Deposited sediments harm native fish directly by smothering eggs in redds, altering spawning habitat, and reducing overwintering habitat for fry, and indirectly by altering invertebrate species composition, thereby decreasing abundance of preferred prey.

The EA fails to disclose the impacts of project area system roads not maintained in conformance to BMP or in compliance with standards because of funding shortfalls, and fails to disclose the impacts of roads that go without maintenance because they are unauthorized or non-system.

The FS must establish road management objectives for all project area roads.

The FS must not assume the project will adequately mitigate the problems chronically posed by the road network by project road work and BMP implementation. The FS admits such problems in a non-NEPA context (USDA Forest Service, 2010t):

> Constructing and improving drainage structures on Forest roads is an ongoing effort to reduce road-related stream sediment delivery. Although BMPs are proven practices that reduce the effects of roads to the watershed, it is not a static condition. Maintaining BMP standards for roads requires ongoing maintenance. Ecological processes, traffic and other factors can degrade features such as ditches, culverts, and surface water deflectors. Continual monitoring and maintenance on open roads reduces risks of sediment delivery to important water resources.

Also in a non-NEPA context, a forest supervisor (Lolo National Forest, 1999) frankly admits that projects are a “chance to at least correct some (BMP) departures rather than wait until the funding stars align that would allow us to correct all the departures at once.”

The FS relies heavily upon BMPs to address the issues associated with logging roads, but only implemented within the context of a project such as EOTW. However, comprehensive monitoring of the effectiveness of logging road BMPs in achieving water quality standards does not demonstrate the BMPs are protecting water quality, nor does it undermine the abundant evidence that stormwater infrastructure along logging roads continues to deposit large quantities of sediment into rivers and streams (Endicott, 2008). Even as new information becomes available about BMP effectiveness, many states do not update their logging road BMPs, and some states have retained BMPs that have been discredited for some time, such as using fords when they are known to have greater water quality impacts than other types of stream crossings. (Id.) If the measure of success is whether a nonpoint source control program has achieved compliance with state water quality standards, the state forest practices programs have failed.

Again, these programs are only triggered when active logging operations occur. The lack of a requirement in most states to bring existing, inactive logging roads and other forest roads up to some consistent standard results in many forest roads that are not currently being used for logging falling through the regulatory cracks and continuing to have a negative impact on our water quality. Currently, only the State of Washington requires that old roads be upgraded to comply with today’s standard BMPs. Across most of the country, the oldest, most harmful logging roads have been grandfathered and continue to deliver sediment into streams and rivers. (Id.)

BMPs are "largely procedural, describing the steps to be taken in determining how a site will be managed," but they lack "practical in-stream criteria for regulation of sedimentation from forestry activities." (Id.) The selection and implementation of BMPs are often "defined as what is practicable in view of 'technological, economic, and institutional consideration." (Id.) The ultimate effectiveness of the BMPs are therefore impacted by the individual land manager's "value system" and the perceived benefit of protecting the resource values as opposed to the costs of operations. (Id.)

Ziemer and Lisle (1993) note a lack of reliable data showing that BMPs are cumulatively effective in protecting aquatic resources from damage. Espinosa et al., 1997 noted that the mere reliance on BMPs in lieu of limiting or avoiding activities that cause aquatic damages serves to increase aquatic damage. Even activities implemented with somewhat effective BMPs still often contribute negative cumulative effects (Ziemer et al. 1991b, Rhodes et al. 1994, Espinosa et al. 1997, Beschta et al. 2004).

In analyses of case histories of resource degradation by typical land management (logging, grazing, mining, roads) several researchers have concluded that BMPs actually increase watershed and stream damage because they encourage heavy levels of resource extraction under the false premise that resources can be protected by BMPs (Stanford and Ward, 1993; Rhodes et al., 1994; Espinosa et al., 1997).

The extreme contrast between streams in roaded areas vs. unroaded areas found on the Lolo NF (Riggers, et al. 1998) is a testament to the failures of the agency's BMP approach.

We cannot discern the intensity or thoroughness of surveys for inventorying sediment sources in the project area. Fly et al., 2011 describes a thorough survey in the Boise National Forest.

Log hauling itself adds sediment to streams. From an investigation of the Bitterroot Burned Area Recovery Project, hydrologist Rhodes (2002) notes, "On all haul roads evaluated, haul traffic has created a copious amounts of mobile, non-cohesive sediment on the road surfaces that will elevate erosion and consequent sedimentation, during rain and snowmelt events." USDA Forest Service, 2001a also presents an analysis of increased sedimentation because of log hauling, reporting "Increased traffic over these roads would be expected to increase sediment delivery from a predicted 6.30 tons per year to 7.96 tons per year."

USDA Forest Service, 2016b (your Johnson Bar Draft EIS) states, "Increased heavy-truck traffic related to log hauling can increase rutting and displacement of road-bed material, creating conditions conducive to higher sediment delivery rates (Reid and Dunne, 1984)." The abstract from Reid and Dunne, 1984 states:

> Erosion on roads is an important source of fine-grained sediment in streams draining logged basins of the Pacific Northwest. Runoff rates and sediment concentrations from 10 road segments subject to a variety of traffic levels were monitored to produce sediment rating curves and unit hydrographs for different use levels and types of surfaces. These relationships are combined with a continuous rainfall record to calculate mean annual sediment yields from road segments of each use level. A heavily used road segment in the field area contributes 130 times as much sediment as an abandoned road. A paved road

segment, along which cut slopes and ditches are the only sources of sediment, yields less than 1% as much sediment as a heavily used road with a gravel surface.

The 1998 Bull Trout Biological Opinion (BO) indicates that bull trout are absent when road densities exceed 1.71 mi./mi^2., depressed when the road density = 1.36 mi/mi^2 and strong when road density equals or is less than .45 mi/mi^2. (P. 67.)

U.S. Fish and Wildlife Service, 2015 states:

> Culverts that remain in the road behind gates and berms that are not properly sized, positioned, and inspected …have an increased risk for failure by reducing awareness of potential maintenance needs. The accumulation of debris has the potential to obstruct culverts and other road drainage structures. Without maintenance and periodic cleaning, these structures can fail, resulting in sediment production from the road surface, ditch, and fill slopes. The design criteria to address drainage structures left behind gates and berms require annual monitoring of these structures.

Members of the ID Team for the Clear Creek Project fully expressed concerns in project files for that project. From 110606TransportationNFMAQuestions.docx:[31]

> 2. What is broke or at risk?
>
> The existing size of the transportation system is in excess of what is needed for current uses of the National Forest land. Newer technologies require a less invasive road system structure. A history of skid road or jammer road use, and not properly stabilizing roads has lead to a higher risk of failure by landslides and culvert washouts. These risks are even higher in landslide prone landscapes.
>
> Another concern with the large transportation system is that it is cost prohibitive to maintain. The Forest cannot currently maintain all of the transportation system. Currently higher priority roads are being maintained to minimal standards, while other roads are not being maintained and have deferred maintenance. Roads with reduced maintenance or no maintenance are at a higher risk of failures and road closures.
>
> More than 50 percent of the Nez Perce National Forest roads were built between 1960 and 1979. Road standards used during construction of these roads employed current BMPs. The life span of BMPs range anywhere from 10 to 50 years with repeated maintenance, so it is likely that many BMPs installed during original construction are at the end of their life span. BMPs productivity and life spans are reduced if maintenance has not occurred. Roads with BMPs near or at the end of their life span have a higher risk of failure.
>
> 4. How do you fix it?
>
> Analyze all the system and non-system roads in the area and determine a minimum road system required based on needs and risks. Maintain roads needed for public and administrative use. Prioritize the repair of the needed roads based on risk and needs. Update all needed roads to ensure existing standards are met. Updates may include

[31] This document, from the Clear Creek project record, is included in our electronic documents, document title unchanged.

reconstruction, relocation or maintenance of roadways so they are in a stable condition. During the updates, use BMPs for minimal impact on the watershed.

Decommissioning roads no longer needed for access, that are temporary in nature, that are causing environmental damage or that are redundant.

9. What are the social / resource implications of no actions?
With only limited road maintenance and no decommissioning, roads will fail causing irreparable resource damage. Road fill and culvert failures will have an impact on stream quality. Public safety is also a concern with no action. To protect individuals from failing roads, road closures would be a common occurrence. Limited to no maintenance leads to structure failures of culverts, bridges and road fills. As road densities in the assessment area are considered high, by no action, there will be a continued adverse affects on the wildlife.

10. What are some of the foundational elements used in shaping your responses?
Nez Perce National Forest Plan
Selway Middle Fork Subbasin Assessment
CFR 36, Part 212, Travel Management Rule - Subpart A
Interior Columbia Basin Assessment

(Emphasis added.) From 111017WildlifeClearCreekNFMAComments.docx:[32]

What's broke / at risk (threats) (this is all based on roads which are likely the largest cumulative effects out there. I believe we need to manage motorized uses in identified "sacrifice areas" and restrict motorized use in high quality habitats. I believe there is demand for a restricted roaded setting for hunters to use roads in a non-motorized setting.

From 110606NFMAQuestionsKaren.docx:[33]

What's broke / at risk
Roads are the major contributor of sediment to streams, especially at stream crossings. Ditchlines can direct flow and road surface sediment into perennial streams at crossings. These can be a chronic (ongoing) source of sediment to streams. Culverts at crossings are mostly undersized which greatly increases the risk of plugging and failure. Crossing failures can contribute large amounts of sediment to streams. They can be costly to fix and the sediment delivered to streams can take decades to flush out of the system. Road failures also disturb existing vegetation and expose bare soil to potential erosion until the site heals.

Forest Plan Roads and Trails Standards state:

1. Develop an "Area Transportation Analysis" prior to entering drainages with land-disturbing activities.
2. Analyze the economics of proposed access developments using proven tools, and incorporate them into the project design.

[32] Included, as titled, with our objection documents.
[33] Included, as titled, with our objection documents.

3. Evaluate all facilities using the Access Management Analysis Worksheet to determine use restrictions and access needs. This worksheet will be an integral part of the Decision Document.
4. An Access Management Plan will be implemented to monitor and evaluate the effects of access on forest resources and the ability of the transportation system to accomplish the designed use. As measuring or monitoring tools, Forest access management will use two indices to monitor change over time. These indices will allow us to compare between points in time, between areas, and between alternate access management schemes or proposals.

The EA fails to demonstrate compliance with all these Standards, in violation of the Forest Plan and NFMA. The EA violates the Travel Management Regulations at 36 CFR § 212. It also violates NEPA by failing to use the best available science, and by failing to disclose project inconsistency with the Travel Management Regulations.

The EA also fails to demonstrate the FS is managing the project area and forest consistent with 36 CFR 212 Subparts B and C. The FS used a hypothetical baseline by combining the real baseline with two travel plan alternatives, neither of which have been adopted (there is no final decision on the travel plan). The FS cannot comply with 36 CFR 212 Subpart A, if it cannot accurately disclose the extent of its motorized travel network.

Further, the EA and supporting materials do not reveal when the last formal inspections of the entire road system occurred in the project area. This would include culverts. The record includes a spreadsheet entitled, *End of the World Road Needs for Aquatic Improvement*, but it is not an engineering report on the structural integrity of culverts or roads, but is directed at watershed concerns.

Remedy:
1. Disclose the following information concerning the project area:
- 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 post-project road network, and disclose how deferred maintenance costs might increase or decrease post-project.

2. Prepare an EIS that incorporates the completed forest-wide TAP and includes alternatives that implement the minimum road system, and that complies with Forest Plan Roads and Trails Standards.

VIABILITY AND DIVERSITY

Our comments on the Proposed Action (PA) state on page 9, "Please disclose in the EIS the FS's method of assuring viability for each Sensitive and Management Indicator Species." And on page 10 we clearly raised viability. On pages 13-14, we raised old-growth issues, which relate to the viability of the species that depend upon old growth.

A. Population Viability

The Forest Plan defines "viable population" as "A population which has adequate numbers and dispersion of reproductive individuals to ensure the continued existence of the species population in the planning area."

Forest Plan Wildlife and Fish Standard #1 requires the FS to "Maintain viable populations of existing native and desirable non-native vertebrate wildlife species." Forest Plan Wildlife and Fish Standard #7 requires the FS to "Provide management for minimum viable populations of old-growth and snag- dependent species by adhering to the standards stated in Appendix N."

Forest Plan Wildlife and Fish Standard #3 requires the FS to:

> Monitor population levels of all Management Indicator Species on the Forest. These include bald eagle, grizzly bear, gray wolf, peregrine falcon, elk, moose, bighorn sheep, pileated woodpecker, goshawk, pine marten, fisher, westslope cutthroat trout, summer steelhead, and spring chinook. These species have been selected because (a) they are threatened and endangered; (b) they have special habitat needs that may be influenced significantly by planned management programs; (c) they are commonly hunted, fished, or trapped; (d) they are non-game species of special interest; or (e) their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality.
>
> Population levels will be monitored and evaluated as described in the Forest Plan Monitoring Requirements (Chapter V of the Forest Plan).

The goals for the Nez Perce National Forest include:

> 3. Provide and maintain a diversity and quality of habitat to support viable populations of native and desirable non-native wildlife species.

Forest Plan Objectives include:

> Viable populations of old-growth-dependent species will be maintained. At least 10 percent of the forested acres across the Forest that are suitable old-growth habitat will be managed as old-growth habitat. This acreage will be distributed across the Forest in a way which assures that at least 5 percent of the forested acres within major prescription watersheds of 6,000 to 10,000 acres will be managed as old-growth habitat.
>
> Habitats will be maintained to provide for population viability of all sensitive species including the wolverine, big-eared bat, Harlequin duck, boreal owl, and common loon. Important habitat components include riparian zones, caves, mine shafts, snags, and large

open waters. Management actions will acknowledge and protect other key habitat components important to these species as they are discovered and accepted.

The EA fails to demonstrate compliance with the above Forest Plan viability direction. The Wildlife Specialist Report includes the following Table:

Table . Existing Conditions – Old Growth by Old Growth Analysis Area

OGAA	OGAA Forested Acres	Existing MA20 Acres	% OG	Existing FP OG Acres	% OG	Existing NIOG Acres	% OG	Replacement OG (Acres)	% OG**	Total %OG
OGAA02090101	11,530	1,138	9.9	129	1.3	148	1.3	119	1.0	13.5
OGAA02090107	17,942	1,536	8.6	174	1.0	34	0.2	103	0.6	10.4
OGAA03050116	9,966	1,730	17.4	0	0	0	0.0	0	0.0	17.4
OGAA03050123	8,125	1,051	12.9	13	0.5	0	0.0	29	0.4	13.8
OGAA03050716	6,513	1,384	21.2	11	0.2	0	0.0	0	0.0	21.4

This reveals that for each Old Growth Analysis Area, the amount of forest meeting either criteria falls far short of 5%. Contrast that fact with the following statement in the EA: "Existing data shows that the Old Growth Analysis Areas associated with the End of the World project currently meet the Forest Plan standard of five percent existing old growth…" MA20 is not necessarily old growth, which is why it needs to be validated. We discuss this further below.

Yet instead of restraint on this issue, the EA indicates the FS is proposing to clearcut ("regeneration") 754 acres of old growth with either action alternative! And confusion reigns, since the Wildlife Specialist Report states, "There would be no treatments in MA20 or other old growth stands."

Additionally, management of Forest Plan Management Area 20 lands prioritizes "critical habitat for wildlife species dependent on old-growth forest conditions."

Forest Plan Appendix N identifies the Forest Plan old-growth management indicator species (MIS):

> For the Nez Perce National Forest the primary indicator species are pileated woodpecker, goshawk, and fisher. Pine martin (sic) is considered a secondary indicator species because it inhabits both mature and old-growth stands.

Forest Plan Appendix N also explains the basis for the use of old-growth MIS as a proxy for viability of other species associated with old growth:

> Old-growth indicator species are those species of wildlife that are dependent on or that find optimum habitat in old-growth stands for at least part of their life cycle. It is assumed that if the requirements of these species are met, the requirements of other old-growth associated species will be satisfied.

In other words, if viability is not being assured for the old-growth MIS, it is also not being assured for the Sensitive, Threatened, and Endangered species that fulfill important life history needs by utilizing key old-growth forest attributes.

Schultz (2010) provides a critique of FS wildlife analyses the most prominent being they are based on habitat availability, which alone is insufficient for understanding the status of populations (Noon et al. 2003, Mills 2007). Schultz (2010) recommendations generally call for more peer review of large-scale assessments and project level management guidelines, and to adopt more robust scientifically sound monitoring and measurable objectives and thresholds if maintaining viable populations of all native and desirable non-native wildlife species is to be accomplished.

Traill et al., 2010 and Reed et al., 2003 are published, peer-reviewed scientific articles addressing what a true "minimum viable population" would be, and how that number is typically drastically underestimated. The FS has not identified the best available science that provides scientifically sound, minimum viable populations of any Sensitive species or MIS on the NPCNF.

Considering potential difficulties of using population viability analysis at the project analysis area level (Ruggiero, et. al., 1994a), the cumulative effects of carrying out multiple projects simultaneously across the Forest makes it imperative that population viability be assessed at least at the forestwide scale (Marcot and Murphy, 1992). Also, temporal considerations of the impacts on wildlife population viability from implementing something with such long duration as a Forest Plan must be considered (id.) but this has never been done by the FS. It is also of paramount importance to monitor population during the implementation of the Forest Plan in order to validate assumptions used about long-term species persistence i.e., population viability (Marcot and Murphy, 1992; Lacy and Clark, 1993). While the forest plan requires this, it has not been done.

In the absence of meaningful thresholds of habitat loss and no monitoring of wildlife populations at the Forest level, projects will continue to degrade wildlife habitat across the Forest over time. (See also Schultz 2012.). The FS would never be able to detect the likelihood of complete extirpation of any wildlife species, using such methodology.

The FS relies upon Region-wide database analyses such as FIA or by Samson to conclude that species viability is assured for various wildlife species of concern on the NPCNF. However, those reports have not been subject to scientific peer review and thus fail to meet the best available science standard. The Samson reports rely upon the databases of outdated, unreliable information as its quantitative source. The FS does not address the age and reliability of the data.

In any case, the EA doesn't disclose Samson's conclusions for the longer term, for any wildlife species, which are very certain.

Sampson did not evaluate long-term viability for the fisher and marten, but did for the goshawk, pileated woodpecker, flammulated owl and black-backed woodpecker. Sampson concluded that "In regard to long-term viability, this conservation assessment has found that long-term habitat conditions in terms of Representativeness, Redundancy, and Resiliency are "low" for all species." The FS must disclose Sampson's long-term viability conclusions. Sampson merely uses home range size for each species and makes assumptions of overlap in ranges of males and females. Home range size is then multiplied by the effective population size (n_e - a number that includes young and non-breeding individuals - Allendorf and Ryman 2002) and this is projected as the amount of habitat required to maintain a minimal viable population in the short-term. This simplistic approach ignores a multitude of factors and makes no assumptions about habitat loss or change over time. For the fisher and marten, Samson uses a "critical habitat threshold" as calculated in another publication (Smallwood 2002).

There are several problems with such an approach and the risk to the species would be extremely high if any of the species ever reached these levels in the Northern Region. Surely, all six species would be listed as endangered if this was to occur and the probabilities for their continued existence would be very low. There is also no way that National Forest Management Act (NFMA) and Endangered Species Act (ESA) requirements could be met of maintaining species across their range and within individual National Forests with such an approach. Mills (2007) captured the futility of such approach in his book on Conservation of Wildlife Populations: "MVP is problematic for both philosophical and scientific reasons. Philosophically, it seems questionable to presume to manage for the minimum number of individuals that could persist on this planet. Scientifically, the problem is that we simply cannot correctly determine a single minimum number of individuals that will be viable for the long term, because of inherent uncertainty in nature and management…"

Samson also admits that "Methods to estimate canopy closure, forest structure, and dominant forest type may differ among the studies referred to in this assessment and from those used by the Forest Service to estimate these habitat characteristics" and that "FIA sample points affected within the prior 10 years by either timber harvest or fire are excluded in the estimates of habitat for the four species" and finally that "FIA does not adequately sample rare habitats". This especially concerning given the reliance on the FIA queries to identify suitable habitat and the fact that the data used in the analysis is now over 20 years old. There have been more wildfires in this time frame, and more large timber sales.

B. Habitat fragmentation and connectivity.

Assuring viability also means addressing the issue of fragmentation, road effects, and past logging on wildlife species' habitat. Viability is only assured if individuals of a species can survive migration and dispersal for genetic diversity. The Forest Plan lacks meaningful direction maintaining landscape connectivity for wildlife. Lehmkuhl, et al. (1991) state:

> Competition between interior and edge species may occur when edge species that colonize the early successional habitats and forest edges created by logging (Anderson 1979; Askins and others 1987; Lehmkuhl and others, this volume; Rosenberg and Raphael 1986) also use the interior of remaining forest (Kendeigh 1944, Reese and Ratti 1988, Wilcove and others 1986, Yahner 1989). Competition may ultimately reduce the viability of interior species' populations.
>
> Microclimatic changes along patch edges alter the conditions for interior plant and animal species and usually result in drier conditions with more available light (Bond 1957, Harris 1984, Ranney and others 1981).
>
> Fragmentation also breaks the population into small subunits, each with dynamics different from the original contiguous population and each with a greater chance than the whole of local extinction from stochastic factors. Such fragmented populations are metapopulations,

> in which the subunits are interconnected through patterns of gene flow, extinction, and recolonization (Gill 1978, Lande and Barrowclough 1987, Levins 1970).

In terms of "quality of habitat" the continued fragmentation of the NPCNF is a major ongoing concern. It is documented that edge effects occur 10-30 meters into a forest tract (Wilcove et al., 1986). The size of blocks of interior forest that existed historically before management (including fire suppression) was initiated must be compared to the present condition. USDA Forest Service, 2004a states:

> Forested connections between old growth patches …(widths) are important because effective corridors should be wide enough to "contain a band of habitat unscathed by edge effects" relevant to species that rarely venture out of their preferred habitats (Lidicker and Koenig 1996 and Exhibit Q-17).
>
> Timber harvest patterns across the Interior Columbia River basin of eastern Washington and Oregon, Idaho, and western Montana have caused an increase in fragmentation of forested lands and a loss of connectivity within and between blocks of habitat. This has isolated some wildlife habitats and reduced the ability of some wildlife populations to move across the landscape, resulting in long-term loss of genetic interchange (Lesica 1996, U.S. Forest Service and Bureau of Land Management 1996 and 1997).
>
> Harvest or burning in stands immediately adjacent to old growth mostly has negative effects on old growth, but may have some positive effects. Harvesting or burning adjacent to old growth can remove the edge buffer, reducing the effective size of old growth stands by altering interior habitats (Russell and Jones 2001). Weather-related effects have been found to penetrate over 165 feet into a stand; the invasion of exotic plants and penetration by predators and nest parasites may extend 1500 feet or more (Lidicker and Koenig 1996). On the other hand, adjacent management can accelerate regeneration and sometimes increase the diversity of future buffering canopy.
>
> The occurrence of roads can cause substantial edge effects on forested stands, sometimes more than the harvest areas they access (Reed, et al. 1996; Bate and Wisdom, in prep.). Open roads expose many important wildlife habitat features in old growth and other forested stands to losses through firewood gathering and increased fire risk.
>
> Effects of disturbance also vary at the landscape level. Conversion from one stand condition to another can be detrimental to some old growth associated species if amounts of their preferred habitat are at or near threshold levels or dominated by linear patch shapes and limited interconnectedness (Keller and Anderson 1992). Reducing the block sizes of many later-seral/structural stage patches can further fragment existing and future old growth habitat (Richards et al. 2002). Depending on landscape position and extent, harvest or fire can remove forested cover that provides habitat linkages that appear to be "key components in metapopulation functioning" for numerous species (Lidicker and Koenig 1996, Witmer et al. 1998). Harvest or underburning of some late and mid seral/structural stage stands could accelerate the eventual creation of old growth in some areas (Camp, et al. 1996). The benefit of this approach depends on the degree of risk from natural disturbances if left untreated.

> Effects on old growth habitat and old growth associated species relate directly to … "Landscape dynamics—Connectivity"; and … "Landscape dynamics—Seral/structural stage patch size and shapes."

Harrison and Voller, 1998 assert "connectivity should be maintained at the landscape level." They adopt a definition of landscape connectivity as "the degree to which the landscape facilitates or impedes movement among resource patches." Also:

> Connectivity objectives should be set for each landscape unit. …Connectivity objectives need to account for all habitat disturbances within the landscape unit. The objectives must consider the duration and extent to which different disturbances will alienate habitats. … In all cases, the objectives must acknowledge that the mechanisms used to maintain connectivity will be required for decades or centuries.

(Id., internal citations omitted.) Harrison and Voller, 1998 further discuss these mechanisms:

> Linkages are mechanisms by which the principles of connectivity can be achieved. Although the definitions of linkages vary, all imply that there are connections or movement among habitat patches. Corridor is another term commonly used to refer to a tool for maintaining connectivity. …the successful functioning of a corridor or linkage should be judged in terms of the connectivity among subpopulations and the maintenance of potential metapopulation processes. (Internal citations omitted.)

Harris, 1984 discusses connectivity and effective interior habitat of old-growth patches:

> Three factors that determine the effective size of an old-growth habitat island are (1) actual size; (2) distance from a similar old-growth island; and (3) degree of habitat difference of the intervening matrix. …(I)n order to achieve the same effective island size a stand of old-growth habitat that is surrounded by clearcut and regeneration stands should be perhaps ten times as large as an old-growth habitat island surrounded by a buffer zone of mature timber.

Harris, 1984 discusses habitat effectiveness of fragmented old growth:

> (A) 200-acre (80 ha) circular old-growth stand would consist of nearly 75% buffer area and only 25% equilibrium area. …A circular stand would need to be about 7,000 acres (2,850 ha) in order to reduce the 600-foot buffer strip to 10% of the total area. It is important to note, however, that the surrounding buffer stand does not have to be old growth, but only tall enough and dense enough to prevent wind and light from entering below the canopy of the old-growth stand.

Harris, 1984 believes that "biotic diversity will be maintained on public forest lands only if conservation planning is integrated with development planning; and site-specific protection areas must be designed so they function as an integrated landscape system." Harris, 1984 also states:

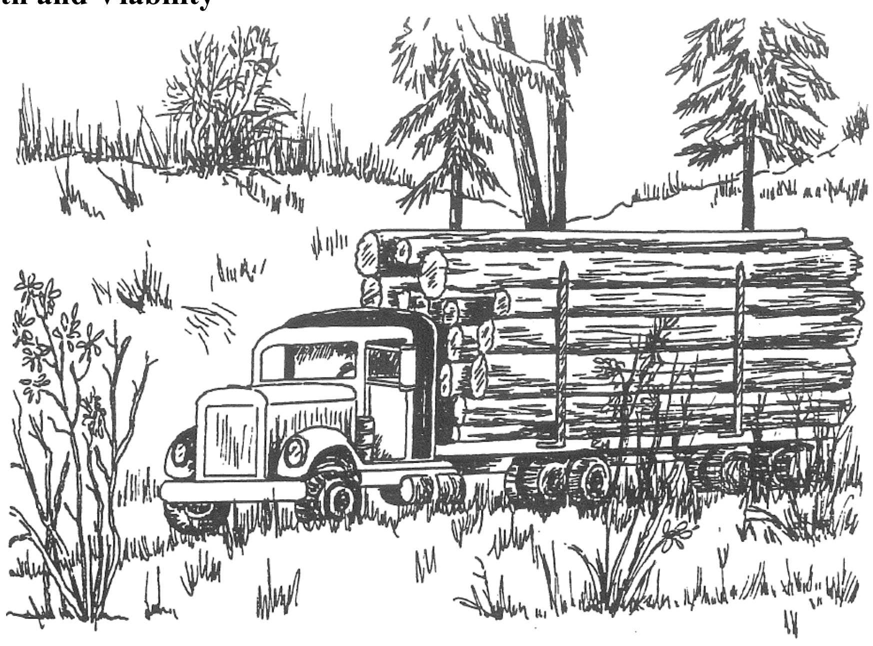
> Because of our lack of knowledge about intricate old-growth ecosystem relations (see Franklin et al. 1981), and the notion that oceanic island never achieve the same level of richness as continental shelf islands, a major commitment must be made to set aside representative old-growth ecosystems. This is further justified because of the lack of sufficient acreage in the 100- to 200-year age class to serve as replacement islands in the

immediate future. …(A) way to moderate both the demands for and the stresses placed upon the old-growth ecosystem, and to enhance each island's effective area is to surround each with a long-rotation management area.

The EA fails to provide any analysis of this issue whatsoever. The Overview for Wildlife Specialist Report, however, states:

> …clearcut harvests have contributed to forest conditions and landscape patterns that differ from those that would have occurred in the absence of such actions. …Early- and late-successional forest stages have been reduced in extent and diversity of patch size. **Movement corridors and diversity of wildlife cover are less available.** (Emphasis added.)

C. Old Growth and Viability



Logging is the chief systematic pressure affecting old-growth communities.

(From: USDA Forest Service, 1987d)

The Forest Plan methodology for assuring viability for many Sensitive, ESA-listed, and Management Indicator Species (MIS) on the Nez Perce NF is conserving sufficient amounts and distribution of old-growth habitat. We discuss elsewhere in this objection the many deficiencies of the analyses of the topic of old growth for this project.

The Forest Plan Management Area 20 "Description" includes:

> Management Area 20 is equally distributed across the nonclassified portion of the Forest. It is made up of forested lands in timber productivity classes 3, 4, 5, 6, and 7 and occurs on a variety of landtypes. Approximately half of the area has a timber condition class of overmature sawtimber (150 years or older).The remainder of the area is comprised of immature stands (40-80 years) that will provide for replacement old-growth habitat. These

lands provide critical habitat for wildlife species dependent on old-growth forest conditions such as the pileated woodpecker, the pine marten, and the fisher.

Management Area 20 Goals include:

Provide "suitable" habitat (existing and replacement) for old-growth-dependent wildlife species.

Management Area 20 Standards include:

Schedule no timber harvest in existing old-growth stands until decade 10. Schedule no timber harvest in replacement stands until decade 16.

Select, locate, and administer old-growth areas to protect them from firewood cutting.

Restrict or close all secondary collector and local roads after management activities cease in adjacent areas.

The Forest Plan Management Area 21 “Description” includes:

Management Area 21 consists of timber stands in timber productivity classes 3 and 4 that are old-growth, grand fir-Pacific yew vegetative communities that have been identified as moose winter range. These stands are generally located between the elevations of 4,000 to 6,000 feet on a variety of landtypes. These areas occur across the entire nonclassified portion of the Forest. These areas are key winter habitat for moose.

Management Area 21 Goals include:

Manage the grand fir-Pacific yew plant communities to provide for a continuing presence of Pacific yew “suitable" for moose winter habitat.

The goal for summer elk habitat in this management area is to manage 12,785 acres to achieve at least 75 percent of habitat potential; 31,425 acres to achieve at least 50 percent of habitat potential; and 518 acres to achieve at least 25 percent of habitat potential. Specific methods of how to achieve this will be determined on a site-specific basis during project planning (see Appendix B).

Management Area 21 Standards include:

Close all but specifically-identified roads during the fall and winter.

Restrict range improvements to areas where conifer and Pacific yew regeneration has been established.

The steep lands, greater than 35 percent slope, are "unsuitable" for timber management.

Schedule timber harvest only on the "suitable" lands, less than 35 percent slope, that do not require broadcast slash burning.

For those lands that are scheduled for harvest, harvest a maximum of 5 percent of Pacific yew stand per decade on a 210-year rotation.

> Maintain at least 50 percent of the live Pacific yew components scattered throughout the unit in patches 1/4 to 1/2 acre in size.
>
> The preferred harvest type includes patch clearcuts, individual tree selection, group selection, or shelterwood. Patch clearcuts should be no larger than 20 acres in size (5-10 acres preferred).
>
> Maintain leave-strips between yew stands sufficient to provide travel corridors for moose.
>
> Reforest to desired stocking levels either through planting or through natural regeneration to achieve 30 percent crown closure over 20 years for conifers, and 30 percent crown closure over 20-30 years for Pacific yew.
>
> Meet established fishery/water quality objectives for all prescription watersheds as shown in Appendix A.
>
> Planned ignitions, when within prescription, will be allowed to burn to enhance resource values. Generally, broadcast burning will not be prescribed. Do not slash Pacific yew except to provide room to machine pile. Slash piles should not be placed within patches of yew.

The EA fails to demonstrate consistency with the above Forest Plan MA 20 and MA 21 direction. The EA and PA do not even show the extent of acreages treated in the various Management Areas, which violates NEPA in that it does not disclose enough information to the public.

D. Population trend monitoring is mandatory NPNF Forest Plan viability methodology.
Forest Plan Wildlife and Fish Standard #3 **requires** the FS to:

> Monitor population levels of all Management Indicator Species on the Forest. These include bald eagle, grizzly bear, gray wolf, peregrine falcon, elk, moose, bighorn sheep, pileated woodpecker, goshawk, pine marten, fisher, westslope cutthroat trout, summer steelhead, and spring chinook. These species have been selected because (a) they are threatened and endangered; (b) they have special habitat needs that may be influenced significantly by planned management programs; (c) they are commonly hunted, fished, or trapped; (d) they are non-game species of special interest; or (e) their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality.
>
> Population levels will be monitored and evaluated as described in the Forest Plan Monitoring Requirements (Chapter V of the Forest Plan).

Forest Plan Chapter V includes Table V-1 – "Forest Plan Monitoring Requirements." It cites a "NFMA Requirement 36 CFR 219.19(6)" in regards to "Actions, Effects, or Resources to be Measured: Population trends of indicator species—wildlife and fish." As pointed out in various other places, no forest-wide monitoring has been done, and certainly not specific to management areas.

The Wildlife Specialists Report acknowledges:

> The National Forest Management Act (NFMA), requires the Forest Service to manage fish and wildlife habitat "to maintain viable populations of existing native and desired non-native vertebrate species in the planning area" (36 CFR 219.19). Management indicator species (MIS) are designated as surrogates for other species with similar life histories or habitat requirements in order to assess the effects of management activities.

36 CFR 219.19, as cited in the Forest Plan, states:

> Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.

Paragraph 6 as cited in the Monitoring Requirements states, "Population trends of the management indicator species will be monitored and relationships to habitat changes determined."

And specifically for MA 20 and MA 21, the Forest Plan states:

> The monitoring **requirements** from Chapter V that are applicable to Management Area 20 are: 1d, 1e, 1f, 1h, 1i, 1j, 2a, 2d, 2g, 2h, 2i, 2j, 2k, 4, 5, 6, 7, 10, 11. The procedures outlined in Chapter V will be followed to evaluate the data gathered during monitoring.
>
> The monitoring **requirements** from Chapter V that are applicable to Management Area 21 are: 1d, 1e, 1f, 1h, 1i, 1j, 2a, 2d, 2g, 2h, 2i, 2j, 2k, 4, 5, 6, 7, 10, 11. The procedures outlined in Chapter V will be followed to evaluate the data gathered during monitoring.

(Emphases added.) The FS has failed to monitor populations of old-growth MIS and other old-growth associated wildlife. The Committee of Scientists (1999) state:

> Habitat alone cannot be used to predict wildlife populations…The presence of suitable habitat does not ensure that any particular species will be present or will reproduce. Therefore, **populations of species must also be assessed and continually monitored.** (Emphasis added.)

The Committee of Scientists (1999) report stresses the importance of monitoring as a necessary step for the FS's overarching mission of sustainability: "Monitoring is the means to continue to update the baseline information and **to determine the degree of success in achieving ecological sustainability.**" (Emphasis added.) The Committee of Scientists (1999) provide still more emphases on the importance of monitoring:

> The proposal is that the Forest Service monitor those species whose status allows inference to the status of other species, are indicative of the soundness of key ecological processes, or

provide insights to the integrity of the overall ecosystem. This procedure is a necessary shortcut because monitoring and managing for all aspects of biodiversity is impossible.

No single species is adequate to assess compliance to biological sustainability at the scale of the national forests. Thus, several species will need to be monitored. The goal is to select a small number of focal species whose individual status and trends will collectively allow an assessment of ecological integrity. That is, the individual species are chosen to provide complementary information and to be responsive to specific conservation issues. Thus, the Committee proposed for consideration a broad list of species categories reflecting the diversity of ecosystems and management issues within the NFS.

E. Forest Plan and EOTW old-growth direction and analysis are not based upon best available science.

Lesica (1996) believes that the Forest Plan's reliance upon a 10% old-growth Standard could result in extirpation (i.e., loss of viability) of some species. This is based on an estimate of 20-50% of low and many mid-elevation forests being in old-growth condition prior to European settlement.

Gautreaux, 1999 states:

> …research in Idaho (Lesica 1995) of stands in Fire Group 4, estimated that over 37% of the dry Douglas-fir type was in an old growth structural stage (>200 years) prior to European settlement, approximately the mid 1800's.
>
> Based on research of Fire Group 6 in northwest Montana (Lesica 1995) it was estimated that 34% of the moist Douglas-fir type was in an old growth structural stage (>200 yrs.) prior to European settlement, approximately the mid 1800's.
>
> Based on fire history research in Fire Group 11 for northern Idaho and western Montana (Lesica, 1995) it was estimated that an average of 26% of the grand fir, cedar, and hemlock cover types were in an old growth structural stage prior to European settlement.
>
> …fire history research in Fire Group 9 for northern Idaho and western Montana (Lesica, 1995) estimated that 19-37% of the moist lower subalpine cover types were in an old growth structural stage (trees > 200 yrs.) prior to European settlement. While this estimate is lower than suggested by Losensky's research…
>
> Lesica found an estimated 18% of the cool lodgepole pine sites was in an old growth structural stage (>200 years) prior to European settlement, approximately the mid 1800's. … This same research in Fire Group 8 in drier, lower subalpine types of Montana had over 25% of the stands in an old growth structural stage during the same historical period.

For the EOTW analysis, the FS is relying upon Forest Inventory and Analysis (FIA) data to determine forestwide amounts of old growth—and therefore Forest Plan consistency and viability assurance. There are significant methodological flaws with this approach, one of those being that the FIA data do not determine the size of any particular old-growth stand.

The FS Region 1 report Bollenbacher, et al., 2009 states concerning the FIA inventory: "All northern Idaho plots utilized a primary sample unit (PSU) composed of four fixed radius plots with trees 5 – 20.9 inches tallied on a 1/24th acre plot and trees 21.0 inches DBH and larger tallied on a ¼ acre plot." Also, Czaplewski, 2004 states, "Each FIA sample location is currently a cluster of field sub-plots that collectively cover an area that is nominally one acre in size, and FIA measures a probability sub-sample of trees at each sub-plot within this cluster." In addition, Bollenbacher and Hahn, 2008 under "Defining Old Growth" state: "There are no specific criteria for minimum patch size for OG in the Northern Region definitions" but recognize "There are, however, some Forest Land Management Plans that may include guidance for a minimum map unit for OG stands." As Forest Plan Appendix N indicates, the Nez Perce NF has one of those Plans with minimum old-growth stand size requirements. Despite that, Bollenbacher and Hahn, 2008 try to make a case for smaller minimum stand sizes, saying "The regional vegetation minimum map unit of 5 acres for a stand polygon would be a reasonable lower limit for all vegetation classes of forest vegetation including OG stands." Clearly, whether the FS is using a ¼-acre, one-acre, or five-acre minimum map unit, none conform to the Forest Plan old-growth minimum stand size criteria. Furthermore, it would be ludicrous to propose that any old-growth associated MIS, Sensitive, or ESA-listed species could survive on even a five-acre old-growth stand—there is no scientific evidence to support such a premise.

The EA does not disclose how old the FIA data that the old-growth analysis (forestwide and project level) relies upon. It also does not indicate how many FIA plots fall within the project area or Forest, and how many of those are classified as old growth.

It also appears the FS may be using the Green et al. criteria for evaluating FIA plots—not the Forest Plan criteria. The Wildlife Specialist Report states:

> Recent FIA data indicates that, based on Green et al. (1992), old growth currently comprises 14% (11.4-16.2% @ 90% CI) of the forested landscape and approximately 17% meets the Forest Plan definition of old growth (15 trees per acre greater than 21 inches DBH) (90% Confidence interval = 14.4-20.2%). Based on this information, the Nez Perce National Forest is above the Forest Plan minimum standard of 10% old growth forest-wide.

However, this is an over-simplification of the Forest Plan old-growth criteria. Appendix N actually states:

> Old-growth stand refers to a stand of timber that, generally, meets the following criteria:
> 1. At least 15 trees per acre $\geq$21 inches diameter at breast height (DBH). Providing trees of this size in the lodgepole pine and sub-alpine fir stands may not be possible.
> 2. Two or more canopy layers.
> 3. At least .5 snags per acre $\geq$21 inches DBH and at least 40 feet tall.
> 4. Signs of rot and decadence present.
> 5. Overstory canopy closure of 10-40 percent; understory canopy closure of at least 40 percent; total canopy closure at least 70 percent.
> 6. Logs on the ground.

And again, this 17% claim also totally ignores the size of the plots vs. the stand size based more closely upon biological needs of old-growth associated wildlife, as Appendix N recognizes:

> Where available, stands should be at least 300 acres. Next best would be a core block of 150 acres with the remaining blocks of no less than 50 acres and no more than 1/2 mile away. If existing old-growth blocks are less than 100 acres, the stands between the old-growth blocks should be designated old growth replacement. The entire unit consisting of old-growth blocks and replacement old growth should be managed as an old-growth complex. If the old-growth component is less than 50 percent of the complex, the complex should be considered replacement old growth. Within the old-growth complex, only the stands that meet old-growth criteria will be counted toward meeting the allocation for existing old growth. The replacement stands will be counted toward meeting the allocation for replacement old growth.

The EA does not disclose the historical range of variability (HRV) for old-growth habitat on the Forest and in its failure to analyze cumulative effects it fails to disclose how much old growth has been destroyed or degraded in the Forest or Project Area. The Overview for Wildlife Specialist Report, however, states

> …clearcut harvests have contributed to forest conditions and landscape patterns that differ from those that would have occurred in the absence of such actions. …Early- and **late-successional forest stages have been reduced in extent** and diversity of patch size. (Emphasis added.)

So it is without doubt that the amount of old growth on the Forest and in the Project Area are well below the HRV. The FS has not analyzed the wildlife viability implications of managing the Forest well outside the HRV for old growth, based upon the best available scientific information.

The EA does not consider scientific information on the patch size of the old-growth habitat to minimum sizes needed for utilization by old-growth associated wildlife.

The EA doesn't disclose how the designated "replacement" old growth was determined to meet Forest Plan criteria. In any case, "replacement old growth" is pretty meaningless. The Forest Plan allows a very liberal interpretation that for such stands, they must be old growth within 100 years but includes no other species habitat component requirements.

Since old growth is below the HRV for the Forest and project area, then viability for old-growth associated species cannot be assured—especially in the context of more proposed logging of mature/old forest and large trees.

USDA Forest Service 1987a considers smaller patches of old growth to be of lesser value for old-growth associated wildlife:

> A unit of 1000 acres would probably meet the needs of all old growth related species (Munther, et al., 1978) but does not represent a realistic size unit in conjunction with most other forest management activities. On the other hand, units of 50-100 acres are the smallest acceptable size in view of the nesting needs of pileated woodpeckers, a primary cavity excavator and an old growth related species (McClelland, 1979). However, **managing for a minimum size of 50 acres will preclude the existence of species which have larger territory requirements**. In fact, Munther, et al. (1978), report that **units of 80 acres will meet the needs of only about 79 percent of the old growth dependent species**

> (see Figure 1). Therefore, while units of a minimum of 50 acres may be acceptable in some circumstances, 50 acres should be the exception rather than the rule. Efforts should be made to provide old growth habitat in blocks of 100 acres or larger. …**Isolated blocks of old growth which are less than 50 acres and surrounded by young stands contribute very little to the long-term maintenance of most old growth dependent species**. (Bold emphasis added.)

The defining characteristics of old growth are acknowledged by Green et al., 1992:

> Old growth forests encompass the late stages of stand development and are distinguished by old trees and related structural attributes. These attributes, such as tree size, canopy layers, snags, and down trees generally define forests that are in and old growth condition.
>
> Definition
>
> Old growth forests are ecosystems distinguished by old trees and related structural attributes. Old growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics which may include tree size, accumulations of large dead woody material, number of canopy layers, species composition, and ecosystem function.
>
> (O)ld growth is typically distinguished from younger growth by several of the following attributes:
>
> 1. Large trees for species and site.
> 2. Wide variation in tree sizes and spacing.
> 3. Accumulations of large-size dead standing and fallen trees that are high relative to earlier stages.
> 4. Decadence in the form of broken or deformed tops or bole and root decay.
> 5. Multiple canopy layers
> 6. Canopy gaps and understory patchiness.

Green et al., 1992 also recognize that "Rates of change in composition and structure are slow relative to younger forests."

In adopting Green et al. 1992 old-growth guidelines, R-1 did not use an independent scientific peer review process, as discussed by Yanishevsky, 1994:

> As a result of Washington Office directives, Region 1 established an Old-Growth Committee. In April 1992, Region 1 issued a document entitled "Old-Growth Forest Types of the Northern Region," which presented Old-Growth Screening Criteria for specific zones on Western Montana, Eastern Montana, and North Idaho (U.S.D.A. Forest Service 1992). This was an attempt to standardize criteria for classifying the variety of old-growth types across the Region. …The committee, however, executed this task without the benefit of outside scientific peer review or public input, either during or after the process (Yanishevsky 1990, Shultz 1992b). Moreover, the methodology used by the committee was unscientific and did not even include gathering field data to verify the characteristics of old-growth stands as a basis for the definition (*id.*). A former member of the Region 1 Old-Growth Committee described a "definition process" that relied heavily upon the Committee

members' pre-conceived notions of the quantifiable characteristics of old-growth forests (Schultz 1992b).

> The old-growth definition in its present state, without field verification of assumptions, and without addressing the issue of quality, is inadequate to scientifically describe, define, delineate, or inventory old-growth ecosystems.

(*id.*) Not only did the Committee fail to obtain new field data on old-growth forest characteristics, it failed even to use existing field data on old-growth definition and classification previously collected for Region 1 (Pfister 1987). Quality of old growth was not addressed during the definition process. The Committee did not take into account the legacy of logging that has already destroyed much of the best old growth. This approach skewed the characteristics that describe old-growth forests toward poorer remaining examples. …It's premature for the Forest Service to base management decisions with long-term environmental effects on its Region 1 old-growth criteria, until these criteria are validated by the larger scientific community.

Yanishevsky (1994) also points out the scientific inadequacy of maintaining merely "minimum" amounts of old-growth habitat and its components such as snags.

It seems the FS wants to make the definition of old growth to be a simplistic numbers and database analysis game, devoid of biologically vital data gathered in the field which might document what is unique about old growth—not just a few large trees left over after logging, but decadence, rot, snags, down logs, patchy irregular canopy layers—things that can't be created by the agency's version of "restoration" and which would be depleted by such management actions as EOTW.

The IPNF's 1987 Forest Plan included standards for protection of old growth and associated wildlife (USDA Forest Service 1987c). 1987 Forest Plan Appendix 27 (USDA Forest Service, 1987d) provided other direction and biological information concerning old growth and old-growth associated wildlife species.

Likewise the Kootenai National Forest's 1987 Forest Plan included standards for protection of old growth and associated wildlife, along with Appendix 17 (USDA Forest Service 1987a, USDA Forest Service 1987b).

We incorporate USDA Forest Service, 1987a as well as USDA Forest Service, 1987b which contains a list of "species …(which) find optimum habitat in the "old" successional stage…" We also incorporate Kootenai National Forest, 1991 which states that "we've recognized its (old growth) importance for vegetative diversity and the maintenance of some wildlife species that depend on it for all or part of their habitat." USDA Forest Service 1987a, and USDA Forest Service 1987b also provides biological information concerning old growth and old-growth associated wildlife species.

The NPCNF has conducted no research or monitoring comparing pre- and post-logging old growth occupancy by or abundance of the wildlife species with strong biological association with habitat components found in old growth.

The NPCNF has failed to cite any evidence that its managing for old growth habitat (i.e., logging and burning to restore old growth, or to help create old growth) strategy will improve old-growth wildlife species' habitats over the short-term or long-term. In regards to this theory often offered by the FS, Pfister et al., 2000 state:

> (T)here is the question of the appropriateness of management manipulation of old-growth stands… Opinions of well-qualified experts vary in this regard. As long term results from active management lie in the future – likely quite far in the future – considering such manipulation as appropriate and relatively certain to yield anticipated results is an informed guess at best and, therefore, encompasses some unknown level of risk. **In other words, producing "old-growth" habitat through active management is an untested hypothesis.** (Pp. 11, 15 emphasis added).

Hutto, et al., 2014 set out to understand the ecological effects of forest restoration treatments on several old-growth forest stands in the Flathead National Forest. They found:

> Relative abundances of only a few bird species changed significantly as a result of restoration treatments, and these changes were characterized largely by **declines in the abundances of a few species associated with more mesic, dense-forest conditions, and not by increases in the abundances of species associated with more xeric, old-growth reference stand conditions.** (Emphasis added.)

The FS ignores scientific information that such active management is the very antithesis of old growth. The FS cites no scientific research or monitoring results which demonstrate management manipulations will create net ecological benefit rather than harm old growth and old-growth associated wildlife.

USDA Forest Service, 1987a states:

> Richness in habitat translates into richness in wildlife. Roughly 58 wildlife species on the Kootenai (about 20 percent of the total) find optimum breeding or feeding conditions in the "old" successional stage, while other species select old growth stands to meet specific needs (e.g., thermal cover). Of this total, **five species are believed to have a strong preference for old growth and may even be dependent upon it for their long-term survival** (see Appendix I[34]). While individual members or old growth associated species may be able to feed or reproduce outside of old growth stands, **biologists are concerned that <u>viable populations</u> of these species may not be maintained without an adequate amount of old growth habitat.**
>
> Wildlife richness is only a part of the story. Floral species richness is also high, particularly for arboreal lichens, saprophytes, and various forms of fungus and rots**. Old growth stands are genetic reservoirs for some of these species, the value of which has probably yet to be determined.** (Bold emphases added.)

Also, Lesica (1996) states, "Results of this study and numerous fire-history studies suggest that **old growth occupied 20-50% of many pre-settlement forest ecosystems in the Northern Rockies**." (Emphasis added.) Lesica, 1996 (also cited in Gautreaux, 1999) stated forest plan

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[34] USDA Forest Service 1987b.

standards of maintaining approximately 10% of forests as old-growth in the Northern Region **may extirpate some species**. This is based on his estimate that 20-50% of low and many mid-elevation forests were in old-growth condition prior to European settlement. This should be considered some of the best science on historic range of old growth necessary for insuring viability of old-growth associated species.

Remedy: Select the No Action alternative. Alternatively, prepare an EIS that addresses the analytical and scientific issues identified above.

F. The old growth cumulative effects of this project are insufficiently discussed and warrant preparing an environmental impact statement

As noted above, we did not see how this EA could not lead to the preparation for an environmental impact statement.

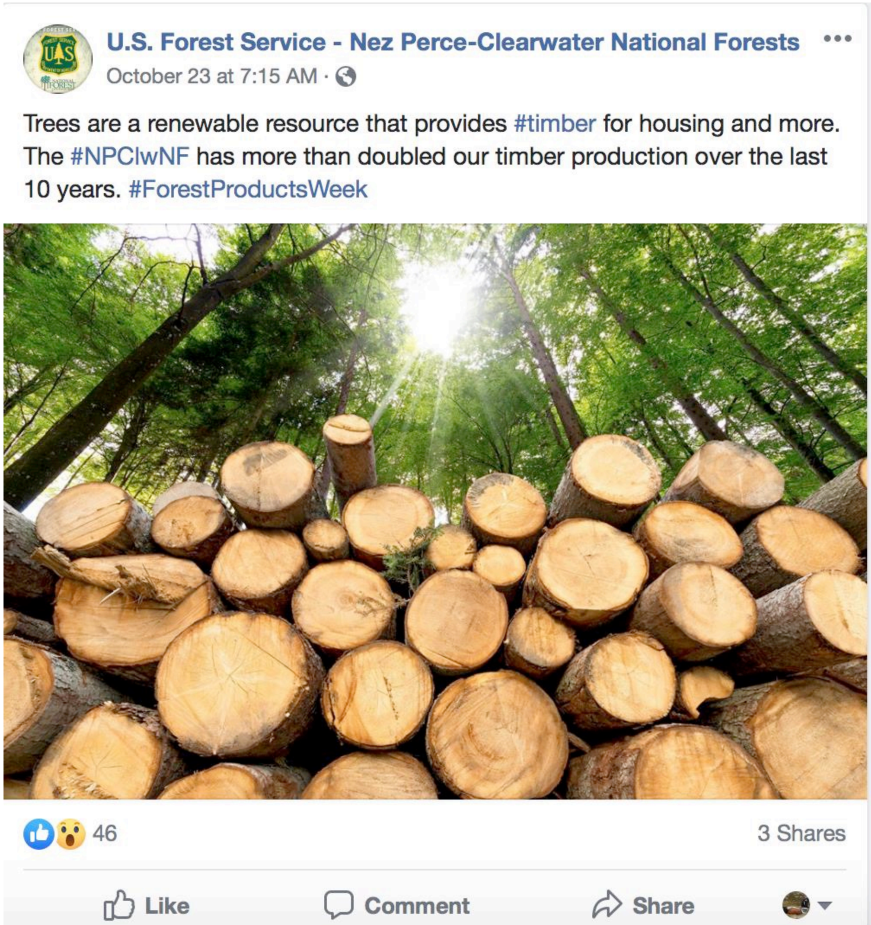
> As we discuss below, multiple aspects of the End of the World PA raise questions of significant and/or cumulative effects, necessitating the preparation of an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA). The effects of over 18,800 acres of logging, including 1,700 acres of clearcut-type logging would be "significant" under any reasonable definition, even without cumulative effects.

FOC End of the World PA comments, p. 1.

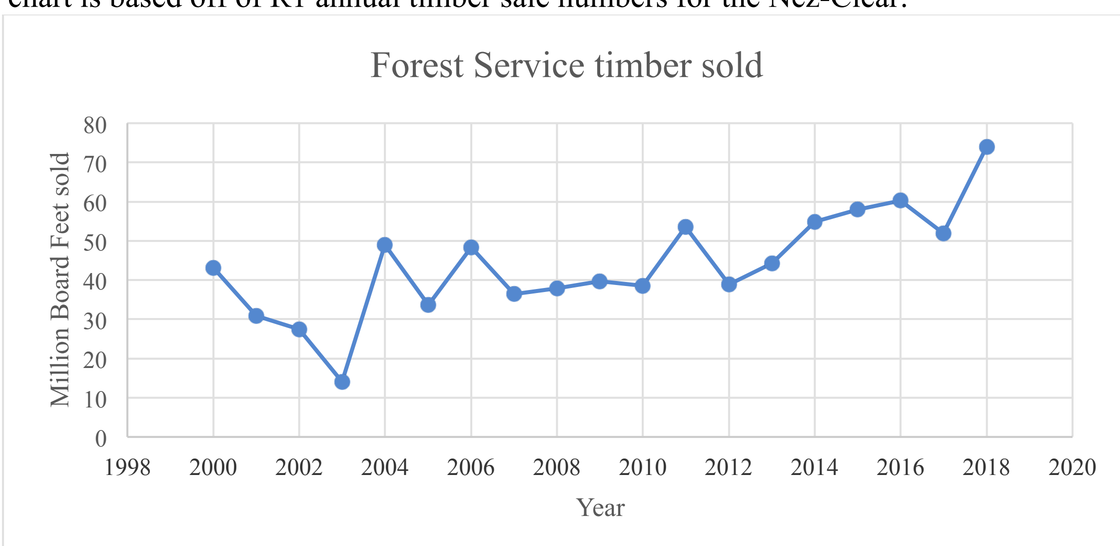
We also commented that, if the Forest Service chose to proceed with one open comment period (discussed in an above objection), there would "be no opportunity for the public to comment on the genuine direct, indirect, and cumulative effects analysis," among other lost opportunities. FOC End of the World PA comments, p. 2. This first time we have seen information that went into the cumulative-effects analysis is when the draft EA was released, so this is new information about which we couldn't have commented.

You have not considered cumulative effects for logging in old growth. The information the agency is using for a preliminary number for old growth on this forest is outdated, and is not proof that the agency is complying with the forest plan minimums.

The agency has undoubtedly increased timber sales. On October 23, 2019, on Facebook, it posted the following:



This chart is based off of R1 annual timber sale numbers for the Nez-Clear: [35]



[35] *See also* R1 Timber sold annual report folder, which contains the chart and the support for the numbers used in the chart.

Despite doubling timber production in the last decade, the Forest Service is using Bush et al. 2010 Forest Inventory and Analysis data from the last decade. Since 2010 and that analysis, however, some of this increased timber production has come from old growth forests on the Nez Perce National Forest, and the Forest Service has also found the 2010 figures to contain areas that don't meet forest-plan old growth standards:

Center Johnson: Approved logging in forest plan OG (final EA p. 46).
Dutch Oven Vegetation Management Project: Also used the Bush et al. 2010 analysis to identify old growth, but upon field visits to only some of what Bush et al. 2010 identified, the Forest Service found on-the-ground that the area did not in fact have old-growth characteristics, and even that one unit had been harvested. (Final EA May 2017 pdf p.168).
Windy Shingle: Used the Bush et al. 2010 analysis as a starting point and approved logging in areas the Forest Service identified as old growth. (Windy Shingle wildlife report, pdf pp. 7, 119).
Iron Mountain: Cited same 12.9% figure from 2010 (EA pdf p. 76), and likely approved logging in old growth (EA pdf p. 79).
Hungry Ridge: Proposed action to log in MA20 with a forest plan amendment, with up to 826 acres of forest-plan old growth (DEIS pdf p. 29).

We don't know if these are all the projects because the Forest Service has not reviewed its impact on old growth in the Nez Perce National Forest since 2010—it keeps using the Bush et al. 2010 number of 12.9% as a starting place, even though field visits in at least one project (above) demonstrated the inaccuracies with even this number.

These projects represent cumulative effects on old growth that the agency has ignored, making the EA insufficient; the effects likely lead to the necessity for an environmental impact statement. Failing to address this issue would be a violation of NEPA because it would not take a hard look at the project and it would ignore significance factors. Failing to address this issue would also be a failure to demonstrate that the Forest Service is complying with the forest-plan minimums for old growth, in violation of NFMA.

Finally, you have not discussed the impacts of logging on old growth. Even if large-diameter, oversized trees are retained, other old-growth characteristics are going away with logging, including downed woody debris. Old growth is an area where nature has managed, and the legacies from fire and insects remain in the form of dead and dying trees that create habitat for species.[36] You need to address how you are changing ecological responses when your entire project removes dead or dying trees and avoids allowing trees to die.[37] Snags won't be created.

Suggested remedies:
1) Choose the no-action alternative;

[36] Spies, T. 2003. *New Findings about Old-Growth Forests*, USDA, Forest Service Pacific Northwest Research Station; Lidenmayer and Franklin 2002. Conservation Biology, Ch. 4 *Using Information about Natural Forests, Landscapes, and Disturbance Regimes* pp. 55-60.
[37] Franklin et al. 1987. *Tree Death as an Ecological Proeces: The causes, consequences, and variability of tree mortality*, BioScience Vol. 37(8) pp. 550-556.

2) Drop the project; or
3) Perform an up-to-date analysis on the levels of old growth on this forest

G. The Forest Service is logging in MA20, in violation of the forest plan

As stated above with the recount of our old-growth comments, we are concerned about the amount of old-growth on the forest and in the project area, and are concerned the Forest Service may be logging it. Additionally, we did not see a map of old-growth and unit activities until the EA was released, so this was new information for us, prejudicing our comments because there was no EA comment period (only an objection period). In addition to on-the-ground reconnaissance, which the Forest Service has not done, the Forest Service is also logging in MA20 areas. According to the maps for the proposed action and Alternative B,[38] which overlay MA20, variable density thinning and regeneration logging will happen in some MA20 areas. The forest plan prohibits timber harvest in MA20 areas absent a forest-plan amendment.[39] Thinning will eliminate old growth characteristics identified in the forest plan, and will eliminate future old-growth characteristics, like standing snags or downed logs.

Suggested remedies:
1) Choose the no-action alternative;
2) Drop all logging in what the Forest Service has identified as MA20 areas; or
3) Drop the project.

H. The Forest Service has not demonstrated that it has complied with Appendix N

Appendix N of the Nez Perce Forest Plan requires the Forest Service to identify old growth stands by using three strategies in tandem: stand exam information, aerial photos, *and* field reconnaissance. We raised old growth issues on page 13-14 of our scoping comments.

> Are all existing old-growth stands (meeting applicable criteria) in the project area designated as old growth? What is the status of the forestwide oldgrowth inventory?
>
> Is logging being proposed for stands that meet the applicable old growth criteria? How many FIA plots (locations in the project area) show the plot is old growth?

We also stated,

> The best available science for determining if stands meet old-growth criteria requires actual field examinations. What are the results of field examinations of the project area for old growth?

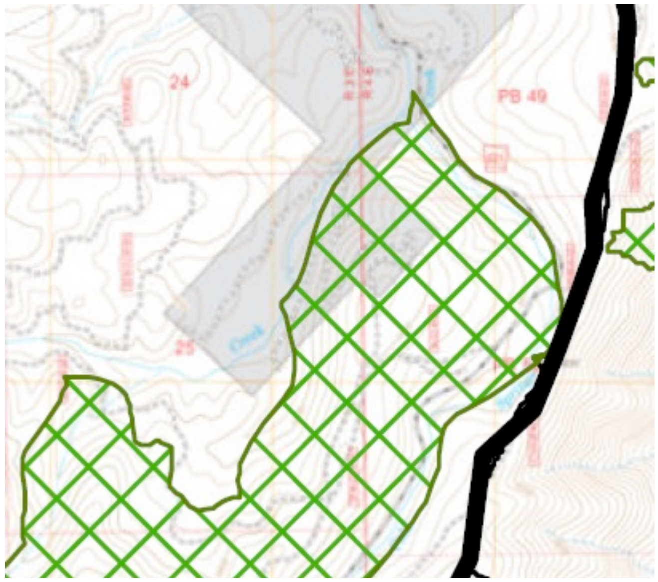
[38] Documents *42-44_Map_OldGrowthProposedAction.pdf* and *42-43_MapOldGrowthAlternativeB.pdf*.
[39] *See* Forest Plan MA 20; Macfarlane Declaration.

We demonstrated our concern with logging old growth, and the levels of old growth on the forest as demonstrated by the comments under the OLD GROWTH heading as well as the comments above. Additionally, we did not see a map of old-growth and unit activities until the EA was released, so this was new information for us. We could find nothing in the project file posted online demonstrating that there have been actual field examinations of what the Forest Service is counting as old growth. The instructions for developing old growth reports, document *42-65_OGAnalysisProcess.pdf*, is a process done entirely remotely, from which no one could tell what old-growth habitat is occupied by dependent species; additionally, some of the stand information dates back to the 1980s, which is very stale. Without field examinations, the agency would not be able to follow Appendix N as directed under "Identification and Designation of Old-Growth Stands," and it would not be able to tell the quality of the habitat that currently exists. We also did not find in the wildlife folder where photos were used to identify old-growth.

Nor could we find any evidence of ranking—also required by Appendix N of the forest plan—that demonstrates that the Forest Service is maintaining the best old growth for the wildlife that needs it.[40] We could not find sizes for the old-growth set aside for this project in relation to the map. Appendix N states that, when available, stands should be at least 300 acres, with a second-choice a core block of 150 acres with remaining blocks of no less than 50 acres and no more than ½ mile away. And, if existing old-growth stands are less than 100 acres, the stands between the old-growth blocks and be designated as old-growth replacement. There is no evidence that you have done that, either, and in fact the maps depicted in *42-44_Map_OldGrowthProposedAction.pdf* and *42-43_MapOldGrowthAlternativeB.pdf* indicate that you are logging between smaller areas of old growth, which should be preserved—logging will fragment that as well as violate directives in Appendix N.

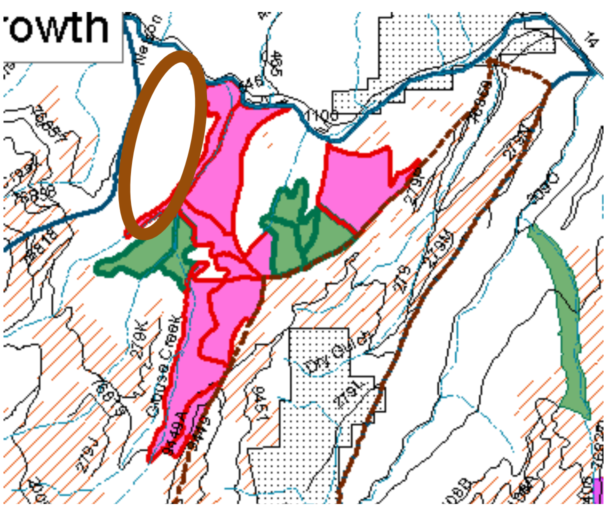
There are other discrepancies with the EOTW old-growth map that are problematic. For example, some of what the Forest Service has marked as "MA20" on the map overlaps private property.[41]

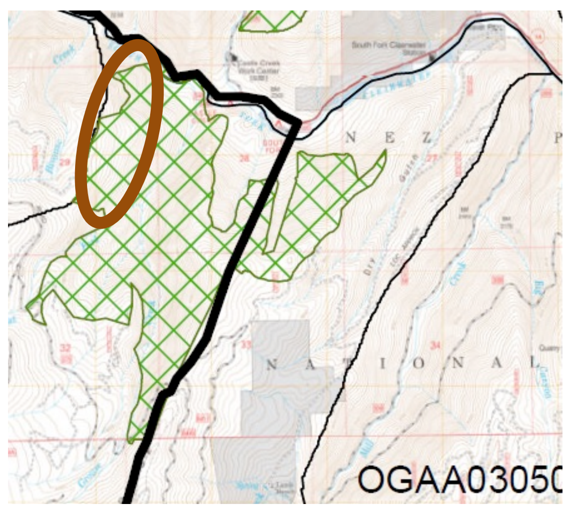
[40] In compliance with the plain language of the forest plan, the Forest Service used to conduct on-the-ground reconnaissance and ranking for each proposed project in the days when the forest plan was new. *See* Macfarlane Decl. Exhibits A, B, and C, which show the process that the Forest Service employed to comply with the forest plan when the forest plan was new.
[41] *See 42-44_Map_OldGrowthProposedAction.pdf* and *42-43_MapOldGrowthAlternativeB.pdf*.



Excerpt from EOTW Old Growth map. *42-42_Map_OldGrowth.pdf*

This isn't the only place where MA20 was mapped over private property. And this calculation needs to be accounted for and discounted from what the Forest Service is counting on as old-growth. There is no evidence that this is the case. Also, some of the old-growth, marked in the Doc Denny map has seemed to have grown, seven years later, without explanation.





Doc Denny Appendix C
Old Growth Habitats (EA p. 154)

EOTW Doc 42-42_Map_OldGrowth.pdf
Legend marks green above as MA20

In the Doc Denny map (Appendix C of the Doc Denny EA) blue denoted future old growth, so seven years earlier, the Forest Service did not even recognize this as future old growth. And now it is an MA20 area? This is also only an example, as there seems to be other places where MA20 has grown from the Doc Denny map even though that map identified no future old growth.

Also, when comparing the EOTW map with the Nez Perce Forest Plan management area map, which should already be in this project file because it is part of the forest plan, there appears to be more MA20 areas now than there were originally. When did these get designated? When did new MA20 acreage get designated after the Doc Denny project? These are all issues resolved by on-the-ground field reconnaissance and high-quality disclosures to the public.

The above shortcomings highlight a real concern that the Forest Service is not meeting forest-plan requirements and is not taking a hard look at the impacts of logging in areas that could be old growth or step-down old growth. For example, in the Dutch Oven Vegetation Management project (May 2017), the Forest Service used the same FIA data (Bush et al. 2010) to come up with old growth numbers, but after field visits to the units slated for cutting, found that the units did not have forest-plan old growth characteristics, and in fact one area that the Forest Service had counted as old growth based on the remote data had actually been harvested.[42] And these findings were only for a couple of places (the places the Forest Service was considering logging). This raises questions of the condition of areas the Forest Service is counting as "old growth" but is not visiting to confirm.

Without correcting any of these issues, the Forest Service has not taken a hard look at the impacts of old growth, has used the best information available, nor has the agency followed forest-plan requirements. Without field examinations, i.e., on-the-ground reconnaissance, and without following the forest plan's Appendix N directives, the agency has not followed forest plan standards, in violation of NFMA. For these reasons the Forest Service has violated NEPA, and the agency also has not followed forest plan standards, in violation of the NFMA.

The FS fails to consider the quality of old growth in terms of Forest Plan Appendix N Standards. These include:

> Where available, stands should be at least 300 acres. Next best would be a core block of 150 acres with the remaining blocks of no less than 50 acres and no more than 1/2 mile away. If existing old-growth blocks are less than 100 acres, the stands between the old-growth blocks should be designated old-growth replacement. The entire unit consisting of old-growth blocks and replacement old growth should be managed as an old-growth complex. If the old-growth component is less than 50 percent of the complex, the complex should be considered replacement old growth. Within the old-growth complex, only the stands that meet old-growth criteria will be counted toward meeting the allocation for existing old growth. The replacement stands will be counted toward meeting the allocation for replacement old growth.
>
> Ideally the perimeter to area ratio of old-growth blocks should be minimized. Linear strips at least 300 feet wide along streams are acceptable if more suitable sites are not available.
>
> Where possible, roads should not be located through or adjacent to old-growth stands in order to reduce human disturbance, loss of snags to firewood cutters, windthrow, and micro-climate changes.

[42] Dutch Oven Final EA pp. 167-168.

> To increase the probability of species immigration and colonization of old-growth islands and to facilitate genetic interchange between isolated population demes, a system of corridors interconnecting old-growth islands is required. Because of Forest direction to manage riparian areas to enhance riparian-dependent species and because the dendritic pattern of stream-side riparian zones readily facilitates connecting old-growth islands, riparian zones will serve as the principal means to provide interconnecting corridors. Corridors should be extensions of closed or nearly closed canopy of forest of sufficient width to resist blow-down.

Possible remedies:
1) Choose the no-action alternative;
2) Do an EIS. In that EIS, conduct field examinations of MA20 and potential old growth areas. Figure out and report to the public when and why these new areas were designated. Evaluate and rank them according to the forest plan, ensure that the acreage meets Appendix N and there is connecting replacement habitat, and drop all activities that would have occurred within these areas; or
3) Drop the project.

WEEDS

On page 22 of our comments on the Proposed Action we ask a lot of questions about noxious weeds, but the EA fails to answer them.

USDA Forest Service, 2015a indicates:

> Infestations of weeds can have wide-ranging effects. They can impact soil properties such as erosion rate, soil chemistry, organic matter content, and water infiltration. Noxious weed invasions can alter native plant communities and nutrient cycles, reduce wildlife and livestock forage, modify fire regimes, alter the effects of flood events, and influence other disturbance processes (S-16). As a result, values such as soil productivity, wildlife habitat, watershed stability, and water quality often deteriorate.

Noxious weeds are the proverbial Pandora's Box loosed on the forest ecosystem—no amount of herbicide use reverses their spread for long. The financial costs of noxious weeds are another aspect of this elephant in the room. The agency does not account for the economic impacts of increased weed treatments due to projects such as this one, nor of the loss of ecosystem services attributed to noxious weeds getting cultivated by project activities.

The impacts of noxious weeds are exacerbated by every action that disturbs soil or otherwise upsets the balance of native vegetation. Weed spread from management activities such as logging and burning and use of mechanized vehicles or equipment are a chronic symptom of resource extraction management.

The Forest Plan includes a nondiscretionary standard requiring the FS to "Implement a weed control program to confine present infestations and prevent establishment of new areas of noxious weeds." The FS is not managing consistent with this standard.

The EA states, "Any ground-based spraying of weeds in the project area is authorized under the Nez Perce Forest Invasive Weeds Environmental Assessment (1988)." The EA doesn't cite any monitoring following from the authorization of that plan, to give some idea as to its effectiveness or lack of effectiveness. Or the costs of that plan, or if it's been funded as anticipated. Or if it has had other, unintended environmental impacts. It says nothing about how well that plan has been implemented.

The EA admits, "The action alternatives proposed in the End of the World project area would likely cause the spread of invasive species to some degree." Yes, project activities will worsen the noxious weed spread in the project area. The FS's solution:

> However, invasive species are most likely to increase along roadways which can be easily monitored and treated by Cooperative Weed Management Area (CWMA) cooperators. In addition, invasive species that are introduced to, or increase in density, proposed units post-harvest activities will eventually be replaced by native vegetation through succession and treated under the Early Detection Rapid Response (EDRR) protocol if identified as a high priority target species by the CWMA.

We have no idea as to the efficacy of such mitigation methods, because the FS isn't disclosing. Even if post-disturbance treatments are implemented, their uncertain efficacy means that the significance of increased noxious weed occurrence remains unknown. NEPA's requirement for analysis and disclosure of direct, indirect, and cumulative effects is violated.

The EA mentions:

> Aerial restoration efforts of invasive annual grass communities often produce poor results; therefore, aerial seeding both native grass/forb and introduced annual grasses that stay greener, longer may be utilized if an effective seedbed can be achieved by prescribed fire, and funding is secured.

The EA doesn't say which species of invasive annual grasses occur in the project area, nor their extent or impacts. If it is cheatgrass, that species also tends to increase in acreage with fire. We mention this because the EA utterly fails to examine such direct, indirect, and cumulative effects.

Also, the EA proposes use of herbicides apparently not contemplated under the Nez Perce Forest Invasive Weeds Environmental Assessment or forest plan. The EA provides no information on the safety or environmental impacts of the application of "classified bio-pesticides such as Pseudomonas fluorescens."

Controlling noxious weeds and preventing their spread is a huge issue that the FS does not have a grip on. Current methods are obviously not working, weeds spread on forest roads, in cutting units, landings, burn piles, and onto private property. The best way to prevent weeds from spreading out of control is not to disturb the soil and native vegetation.

The selected alternative would create a high risk of weed introduction, spread, establishment, and persistence due to more soil disturbance, as well as travel through infestations, proximity to known infestations and increasing available direct sunlight in the road corridors.

The FS fails to present good estimates of noxious weed infestations in the project area. There appears to be no on-the-ground survey data. The FS apparently does not know the forestwide trend in noxious weed infestation, in acres or any meaningful metric.

There is no analysis of how the spread of noxious weeds will impact wildlife habitat in old growth.

There is no cumulative effects analysis of how the spread of noxious weeds impacts land and soil productivity.

The EA does not analyze and disclose adverse ecological impacts of herbicide treatments on native species.

For the above reasons, the EA violates NEPA.

Remedy: Select the No Action Alternative. Otherwise, prepare an EIS that addresses these issues.

WILDLIFE

Our comments on the Proposed Action (PA) state on page 3:

> The "Concerns Raised During the Collaborative Process Prior to Scoping" don't include such important issues as maintaining wildlife populations, security, soil productivity, and there is not a single restoration goal or metric. That the collaborators don't represent wildlife, fish, biological diversity, sustainability, good science reveals their illegitimacy for the pre-NEPA process.

Also, our PA comments stated on page 10:

> Schultz (2010) concludes "the lack of management thresholds allows small portions of habitat to be eliminated incrementally without any signal when the loss of habitat might constitute a significant cumulative impact." (See also Schultz 2012, who notes these analytical problems for many wildlife.) The geographic scope of wildlife viability analyses must be forestwide, or at least encompass the cumulative effects area of a truly viable population.

Then, our PA comments continue with wildlife discussions through page 12-13. Because old growth is intricately connected with wildlife, old-growth-related objections (found in the viability objection) are incorporated here).

The Wildlife Specialist Report states, "The effects to wildlife species and habitat is primarily measured by the amount of habitat affected and the degree of effects to threatened, endangered, sensitive, and management indicator species."

The EOTW wildlife analyses:

- Rely upon overly narrow definitions of suitable habitat, while providing no indication of the reliability of the data, and no indication of the validity of suitable habitat modeling.
- Fail to explain how the suitable habitat definitions fit with the biological needs of species so that "suitable habitat" amounts and distribution sustain viable populations.
- Fail to utilize best available science in adopting conservation strategies.
- Fail to describe the quantity and quality of habitat that is necessary to sustain viability.
- Don't translate to analysis or comparison of alternatives in the EA.
- Fail to consider cumulative impacts of past management actions in the project area.
- Fails to consider cumulative impacts of management actions following from the Doc Denny and Hungry Ridge projects which are adjacent to the EOTW project area.
- Conflate old growth with Management Area 20, which the FS admits is not the same thing.

The EA discloses that "Past timber harvest records date to the 1940s. The total area harvested from 1940 to 2016 was 26,705 acres (approx. 54%)." However, the word "cumulative" barely occurs in the EA's wildlife analyses. In other words, the FS isn't disclosing how the past logging—which affected over half of the project area acreage—might have adversely affected wildlife.

The Wildlife Specialist Report Table 11 indicates that the "Analysis Timeframes" for Cumulative Effects analyzes "Up to 10 years" for "Short-term" and "25 years" for "Long-term" (example, for Canada lynx) but all such time frames only consider post-treatment—not impacts of past management.

The Overview for Wildlife Specialist Report discloses:

> …clearcut harvests have contributed to forest conditions and landscape patterns that differ from those that would have occurred in the absence of such actions. Past regeneration harvest units typically contain **few large snags and lower amounts of coarse woody debris** than untreated areas. (Emphasis added.)

Despite the above emphasized acknowledgement, there is no analysis as to how those areas are currently and foreseeably affecting population numbers and distribution of any native wildlife.

Such acknowledged habitat deficiencies apparently have been given no consideration, because for the proposed 119 acres of "Overstory removal" such structure (and for future/recruitment) is to be further depleted: "Remove all remaining unhealthy overstory trees from areas which have been previously-regenerated with a clearcut, seedtree, or shelterwood regeneration harvest."

And the FS isn't saying how much of the already depleted large dead wood—standing or on the ground—would be lost due to safety or to meet "fuel reduction" goals as part of routine project actions.

The Wildlife Specialist Report states:

> Habitat relationships were used to model available habitat in and near the project area. The models used are based on existing vegetation, as modified from recent vegetation management projects, using the Region 1 VMap database (2014) and in some cases NLCD Data for the End of the World project area. … A 2015 accuracy assessment of VMap derived Lifeform, Tree Canopy Cover, Dominance Type (DOM_40), and Tree Size for the Nez Perce-Clearwater National Forest yielded 91%, 88%, 84%, and 99% overall accuracy respectively (Brown 2015).

However Brown, 2015 states "the 99% overall accuracy estimated for the Tree Size class is questionable and is likely attributed to the amount of manual editing that went into the Tree Size map." Also:

> The take home message is that even the accuracy assessment, which is judged as "truth" because there has to be some standard by which to compare the map, needs to be taken with a grain of salt. While the accuracy assessment is an attempt at a numerical quantification of the error structure in the map products, this is no substitute for a qualitative map evaluation prior to it's use in any analysis. Both the "good" and the "bad" performances noted within the error matrices should be mitigated by a solid qualitative evaluation of the map products based on the User's understanding of the vegetation classification system and in-depth knowledge of the on the ground conditions. (Id.)

Bottom line—the FS's use of VMAP needs validation for analyzing impacts on wildlife habitat in projects such as EOTW, which is entirely lacking.

Canada Lynx

The U.S. Fish & Wildlife Service (FWS) listed the Canada lynx as a threatened species under the Endangered Species Act (ESA) in 2000 due to "lack of guidance for conservation of lynx and snowshoe hare habitat..." and subsequent authorization of actions that may cumulatively adversely affect the lynx.

The EA doesn't even state if this Threatened native species is found in the project area, or if surveys have been conducted. The EA does claim "the Nez Perce National Forest is not considered to be occupied by lynx." This is despite the PA admitting "There have been two documented sightings within the project area near Goodwin Meadow (2002) and Schwartz Meadow (2001) along the Grangeville Salmon Road."

The EA states, "Should a transient lynx be present in nearby areas, project activities would not significantly interrupt critical life history factors such as foraging for food, due to the difference in activity periods since lynx primarily forage at night or crepuscular periods." The EA also states the project is "Consistent with the northern Rockies Lynx Management Decision." Still, the EA hedges with the concession that the project "*may affect"* Canada Lynx. The FS can't explain why the FS believes a species native to the ecosystem, with documented occurrence in the project area, should merely be considered a "transient" that isn't really "occupying" the places it happens to be found.

A big problem with the Forest Plan, including the Northern Rockies Lynx Management Direction (NRLMD) is that it allows with few exceptions the same level of industrial forest management activities that occurred prior to Canada lynx listing under the ESA. The FS approval and implementation of the NRLMD is arbitrary and capricious, violates NEPA's hard look requirement and scientific integrity mandate and fails to apply the best available science necessary to conserve lynx. For example, the NRLMD contains no protection or standard for conservation of winter lynx habitat (old growth forests).

The EA doesn't disclose if snowshoe hare occurrence is documented determined in project area forest considered unsuitable for lynx. And the EA doesn't disclose if surveys of Canada lynx "unsuitable" habitat in the project area were conducted to find out if such habitat might in fact meet the FS definition of suitable after all. More often than not, when the FS conducts logging projects in Lynx Analysis Units (LAUs), surveys of stands for lynx habitat result in less suitable habitat than previously assumed. The FS needs to step back and consider the likelihood that its range-wide Canada lynx suitable habitat estimations and assumptions for the NRLMD are too high.

Best available science demonstrates that lynx travel between areas of high hare densities but tend to avoid low cover areas in winter.

The Montana Federal District Court ruled on 10/15/2018[43] that the FS must complete forest-wide consultation with the FWS to determine effects Forest Plans may have on lynx.

The EA doesn't analyze and disclose cumulative impacts of recreational activities on lynx, such as snowmobiles. As the Kootenai NF's Galton FEIS states, "The temporal occurrence of forest uses such … winter (skiing and snowmobiling) … may result in a temporary displacement of lynx use of that area…"

The EA doesn't analyze and disclose the cumulative effects on Canada lynx from trapping or from use of the road and trail networks in the project area.

Lynx are highly mobile and generally move long distances [greater than 60 mi. (100 km.)]; they disperse primarily when snowshoe hare populations decline; subadult lynx disperse even when prey is abundant, presumably to establish new home ranges; and lynx also make exploratory movements outside their home ranges. 74 Feg. Reg. at 8617. The contiguous United States is at the southern edge of the boreal forest range, resulting in limited and patchy forests that can support snowshoe hare and lynx populations.

Lynx subsist primarily on a prey base of snowshoe hare, and survival is highly dependent upon snowshoe hare habitat, forest habitat where young trees and shrubs grow densely. In North America, the distribution and range of lynx is nearly "coincident" with that of snowshoe hares, and protection of snowshoe hares and their habitat is critical in lynx conservation strategies.

Squires et al. (2013) noted that long-term population recovery of lynx, as well as other species as the grizzly bear, require maintenance of short and long-distance connectivity. The importance of

[43] *Native Ecosystems Council v. Krueger*, 348 F.Supp.3d 1065 (2018).

maintaining lynx linkage zones is also recognized by the FS's Lynx Conservation Assessment and Strategy (LCAS) which stresses that landscape connectivity should be maintained to allow for movement and dispersal of lynx.

Squires et al. (2013) noted in their research report that some lynx avoided crossing highways; in their own report, they noted that only 12 of 44 radio-tagged lynx with home ranges including 2-lane highways crossed them.

The current best science indicates that lynx winter foraging habitat is critical to lynx persistence (Squires et al. 2010), and that this habitat should be "abundant and well-distributed across lynx habitat." (Squires et al. 2010; Squires 2009.) Existing clearcuts not yet recovered are likely to be avoided by lynx in the winter. (Squires et al. 2010; Squires et al. 2006a.)

Lynx winter habitat, provided only in older, multi-storied forests, is critical for lynx preservation. (Squires et al. 2010.) Winter is the most limiting season for lynx in terms of resource use; starvation mortality has been found to be the most common during winter and early spring. (Squires et al. 2010.) Prey availability for lynx is highest in the summer. (Squires et al. 2013.)

Openings, whether in uneven-aged management such as the proposed "variable density thinning" or with the proposed "regeneration" (aka clearcut or modified clearcut) logging, remove lynx winter travel habitat on those affected acres, since lynx avoid such openings. (Squires et al. 2010.)

Squires et al., 2010 reported that lynx winter habitat should be "abundant and spatially well-distributed across the landscape." Those authors also note that in heavily managed landscapes, retention and recruitment of lynx habitat should be a priority.

The LCAS (Ruediger et al. 2000) recommends agencies retain future options until conclusive information is developed concerning lynx management; that is, err on the side of maintaining and restoring habitat for lynx and their prey. To err on the side of caution, the FS would retain all remaining stem exclusion forests for recruitment into lynx winter habitat, so that this key habitat would more closely resemble historic conditions.

The LCAS notes that lynx seem to prefer to move through continuous forest (1-4); lynx have been observed to avoid large openings, either natural or created (1-4); opening and open forest areas wider than 650 feet may restrict lynx movement (2-3); large patches with low stem densities may be functionally similar to openings, and therefore lynx movement may be disrupted (2-4). Squires et al. 2006a reported that lynx tend to avoid sparse, open forests and forest stands dominated by small-diameter trees during the winter. Squires et al. 2010 again reported that lynx avoid crossing clearcuts in the winter; they generally avoid forests composed of small diameter saplings in the winter; and forests that were mechanically thinned were generally avoided in the winter.

Squires et al. 2010 show that the average width of openings crossed by lynx in the winter was 383 feet, while the maximum width of crossed openings was 1240 feet.

And scientific findings since the Forest Plans were amended by the NRLMD call into question much Forest Plan/NRLMD direction. This creates a scientific controversy the FS fails to resolve, and in fact it essentially ignores it.

For one, Kosterman, 2014 found that 50% of lynx habitat must be mature undisturbed forest for it to be optimal lynx habitat where lynx can have reproductive success and no more than 15% of lynx habitat should be young clearcuts, i.e. trees under 4 inched dbh. Young regenerating forest should occur only on 10-15% of a female lynx home range, i.e. 10-15% of an LAU. This renders inadequate the agency's assumption in the Forest Plan/NRLMD that 30% of lynx habitat can be open, and that no specific amount of mature forest needs to be conserved. Kosterman, 2014 demonstrates that Forest Plan/NRLMD standards are not adequate for lynx viability and recovery.

Also, the Forest Plan essentially assumes that persistent effects of vegetation manipulations other than regeneration logging and some intermediate treatments are essentially nil. However, Holbrook, et al., 2018 "used univariate analyses and hurdle regression models to evaluate the spatio-temporal factors influencing lynx use of treatments." Their analyses "indicated …there was a consistent cost in that lynx use was low up to ~10 years after **all silvicultural actions**." (Emphasis added.) From their conclusions:

> First, we demonstrated that lynx clearly use silviculture treatments, but there is a ~10 year cost of implementing any treatment (thinning, selection cut, or regeneration cut) in terms of resource use by Canada lynx. This temporal cost is associated with lynx preferring advanced regenerating and mature structural stages (Squires et al., 2010; Holbrook et al., 2017a) and is consistent with previous work demonstrating a negative effect of precommercial thinning on snowshoe hare densities for ~10 years (Homyack et al., 2007). Second, if a treatment is implemented, Canada lynx used thinnings at a faster rate post-treatment (e.g.,~20 years posttreatment to reach 50% lynx use) than either selection or regeneration cuts (e.g., ~34–40 years post-treatment to reach 50% lynx use). Lynx appear to use regeneration and selection cuts similarly over time suggesting the difference in vegetation impact between these treatments made little difference concerning the potential impacts to lynx (Fig. 4c). Third, Canada lynx tend to avoid silvicultural treatments when a preferred structural stage (e.g., mature, multi-storied forest or advanced regeneration) is abundant in the surrounding landscape, which highlights the importance of considering landscape-level composition as well as recovery time. For instance, in an area with low amounts of mature forest in the neighborhood, lynx use of recovering silvicultural treatments would be higher versus treatments surrounded by an abundance of mature forest (e.g., Fig. 3b). This scenario captures the importance of post-treatment recovery for Canada lynx when the landscape context is generally composed of lower quality habitat. Overall, these three items emphasize that both the spatial arrangement and composition as well as recovery time are central to balancing silvicultural actions and Canada lynx conservation.

So Holbrook et al., 2018 contradicts Forest Plan assumptions that clearcuts can be considered useful lynx habitat as early as 20 years post-logging.

Results of a study by Vanbianchi et al., 2017 also conflict with Forest Plan/NRLMD assumptions: "Lynx used burned areas as early as 1 year postfire, which is much earlier than the

2–4 decades postfire previously thought for this predator." The NRLMD erroneously assumes clearcutting/regeneration logging have basically the same temporal effects as stand-replacing fire as far as lynx re-occupancy.

Kosterman, 2014, Vanbianchi et al., 2017 and Holbrook, et al., 2018 demonstrate that Forest Plan direction is not adequate for lynx viability and recovery.

Grizzly Bear

Since there is solid documentation of recent and ongoing grizzly bear occupancy in the Bitterroot National Forest[44], and with recent documented sightings on the Clearwater NF, grizzly bear residency in the NPCNF should be considered permanent. Formal consultation on the Forest Plans are out of date. Formal consultation with the FWS is needed for this project.

Schwartz et al. (2010) noted that management for grizzly bears requires provisions for security areas and limits of road densities between security areas. Otherwise, grizzly bear mortality risks will be high as bears attempt to move across highly roaded landscapes to other security areas. The forest plan lacks direction regarding road densities located outside of and between security areas.

The FS is aware of the best programmatic agency direction it has adopted to date, that established in Flathead Forest Plan Amendment 19.[45] It established Open Motorized Route Density (OMRD)/Total Motorized Route Density (TMRD)/Security Core indices. These are based upon the scientific information concerning security from roads and road density requirements for grizzly bears as found in Mace and Manley, 1993 and Mace et al., 1996.

Fisher

The EA doesn't even state if this MIS and Sensitive native species is found in the project area, or if surveys have been conducted. The EA does state that there would be an adverse impact to fisher habitat. The PA states, "There have been …observations of fisher within the project area …in the southeastern portion of the project area in the upper portions of the South Fork of White Bird Creek subwatershed."

Jones and Garton, 1994 found that 54% of fisher use during the winter was in mature/old growth forest. More recently, scientific literature (Aubry et al. 2013, Olsen et al. 2014, Raley et al. 2012, Sauder 2014, Sauder and Rachlow 2014, Schwartz et al. 2013, Weir and Corbould 2010) suggest that fishers are heavily associated with older forests throughout the year.

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[44] See newspaper articles "Wandering grizzly leaves Bitterroot, returns to Idaho" (https://helenair.com/news/state-and-regional/wandering-grizzly-leaves-bitterroot-returns-to-idaho/article_9dfe0e30-b6da-5671-9f77-3f2eac4a9c6c.html#tracking-source=home-the-latest) and "Grizzly bear captured Saturday at golf course near Stevensville" (https://ravallirepublic.com/news/local/article_10f3f415-9cc5-5df4-91f8-2bc045650fdc.html).

[45] Although that Forest Plan has been revised and the Amendment 19 direction dropped and/or weakened, Alliance for the Wild Rockies has objected to the Flathead NF's revised forest plan and filed notice on their intent to sue on this issue.

Sauder, 2014 found that "fishers selected landscapes for home ranges with larger, more contiguous patches of mature forest arranged in connected, complex shapes with few isolated patches and open areas comprising ≤ 5% of the landscape" (Sauder and Rachlow 2014).

Most studies have found that fishers are reluctant to stray from forest cover and that they prefer more mesic forests (Olson et al. 2014, Schwartz et al. 2013, Sauder 2014, Sauder and Rachlow 2014, Weir and Corbould 2010). Both Sauder and Rachlow (2014) and Weir and Corbould (2010) predicted the influence of openings on fisher habitat occupancy based on their data. For example, Weir and Corbould predicted that a 5% increase in forest openings would decrease the likelihood of fisher occupancy by 50%. Sauder and Rachlow (2014) suggested that an "increase of open area from 5% to 10% reduces the probability of occupation by fishers by 39%. Sauder and Rachlow (2014) reported that the median amount of open area within fisher home ranges was 5.4%. This was consistent with "results from California where fisher home ranges, on average, contained < 5.0% open areas" (Raley et al. 2012).

Sauder and Rachlow (2014) report the average home range size is approximately 12,200 acres and for a female fisher and approximately 24,300 acres for a male fisher. Home ranges generally do not overlap greatly for the individual sexes (21.3% for females and 15.3% for males), but male home ranges can overlap female home ranges. Preferred habitat would likely occur in upland areas and stands composed of cedar and grand fir forests (Schwartz et al. 2013).

This species needs large areas for recovery and most of the preferred habitat on the Nez Perce Clearwater National Forest that is preferred by this species has been target of historical and proposed timber management activities (Nez Perce Clearwater Forest Plan Revision Proposed Action). Sauder (2014) accurately portrays his concerns with this statement: "Although these figures represent relatively large areas, taken in the context of the large forested landscapes that individual fishers require (male and female home ranges average 98.4 km^2 and 49.3 km^2, respectively; Sauder and Rachlow 2014), this does not constitute a surplus of habitat". Looking at potential population numbers it is a little easier to understand, why the species has been extirpated across much of its range. The literature (Sauder 2014) suggests that roadless areas will not be the salvation for this species, and that management guidelines are sorely needed in areas like the EOTW project area, in order to assure species viability.

Sauder (2014) suggests that five national forests (Clearwater, Nez Perce, Coeur d'Alene, Kaniksu, and Kootenai) hold the key to recovery of the species in the Northern Region. These Forests along with the St. Joe National Forest (Number 6 on the list) are currently being managed as three Forests (Nez Perce/Clearwater, Idaho Panhandle and the Kootenai). They include the Forests with the highest historical and proposed timber cuts in the Region and most of the existing and proposed harvest is scheduled in habitats preferred by fishers. On the Nez Perce-Clearwater Forests this area has been termed the "Front Country" and several large projects have been proposed for these areas (Slate Creek, Clear Creek, Lolo Creek, Orogande, French Larch, Johnson Bar, etc.). The Nez Perce-Clearwater Forests have no idea on what the cumulative impact of all this activity will be on fishers. Much like the EOTW analysis, they dismiss all impacts.

As with most of the Sensitive wildlife, fishers receive little habitat protection emphasis in the Forest Plan—mostly just move it (via logging) toward desired conditions. The EA fails to disclose the direct, indirect and cumulative impacts on important habitat components such as snags, logs, foraging habitat configuration, connectivity, cover, and impacts on predator and prey species.

The EA fails to include a quantitative cumulative effects analysis for fisher considering trapping and use of the road and trail networks in the project area. Hayes and Lewis, 2006 state "The two most significant causes of the fisher's decline were over-trapping by commercial trappers and loss and fragmentation of low to mid-elevation late-successional forests." Hayes and Lewis, 2006 also present a science synthesis in the context of a recovery plan for fisher in the state of Washington. Hayes and Lewis, 2006 state:

> Trapping reduced populations quickly. Despite decades of protection from harvest, fisher populations never recovered in Washington. Fishers use forest structures associated with late-successional forests, such as large live trees, snags and logs, for giving birth and raising their young, as well as for rest sites. Travel among den sites, rest sites, and foraging areas occurs under a dense forest canopy; large openings in the forest are avoided. Commercial forestry removed the large trees, snags and logs that were important habitat features for fishers, and short harvest rotations (40-60 years) didn't allow for the replacement of these large tree structures. Clearcuts fragmented remaining fisher habitat and created impediments to dispersal, thus isolating fishers into smaller populations that increased their risk of extinction.

The EA also fails to disclose the direct, indirect or cumulative impacts on important habitat components, such as snags, logs, foraging habitat configuration, connectivity, cover, prey species impacts, etc.

Wisdom et al. (2000) state:

> Carnivorous mammals such as marten, fisher, lynx, and wolverine are vulnerable to over-trapping (Bailey and others 1986, Banci 1994, Coulter 1966, Fortin and Cantin 1994, Hodgman and others 1994, Hornocker and Hash 1981, Jones 1991, Parker and others 1983, Thompson 1994, Witmer and others 1998), and over-trapping can be facilitated by road access (Bailey and others 1986, Hodgman and others 1994, Terra-Berns and others 1997, Witmer and others 1998).

Ruggiero et al. 1994b state, "(T)he fisher is unique to North America and is valued by native and nonnative people as an important member of the complex natural communities that comprise the continent's northern forests. Fishers are an important component of the diversity of organisms found in North America, and the mere knowledge of the fisher's existence in natural forest communities is valued by many Americans." Ruggiero et al. 1994b discuss fisher habitat disruption by human presence:

> …The fisher's reaction to humans in all of these interactions is usually one of avoidance. Even though mustelids appear to be curious by nature and in some instances fishers may associate with humans (W. Zielinski, pers. obs.), they seldom linger when they become aware of the immediate presence of a human. In this regard, fishers generally are more common where the density of humans is low and human disturbance is reduced. Although

> perhaps not as associated with "wilderness" as the wolverine (V. Banci, Chapter 5), the fisher is usually characterized as a species that avoids humans (Douglas and Strickland 1987; Powell 1993).

Also Jones, (undated) recognizes:

> Roads are directly correlated with trapper access, and consequently, fisher vulnerability. Even in areas where fishers cannot be legally trapped, trapping pressure for other furbearers (i.e., marten) may contribute significantly to fisher mortality. Roads bisecting or adjacent to preferred habitats (i.e., drainage bottoms) have the greatest potential of increasing a trapper's probability of encountering fishers."

And Witmer et al., 1998 state, "The range and population levels of the fisher have declined substantially in the past century, primarily the result of trapping pressure and habitat alteration through logging (Powell and Zielinski 1994)."

Heinemeyer and Jones, 1994 state:

> Fishers are susceptible to trapping, and are frequently caught in sets for other furbearers. Additionally, populations are vulnerable to trapping, as even light pressure may cause local extinction. Western fisher populations may have lower natality and higher natural mortality rates as compared to eastern populations. Consequently, western populations may be more susceptible to over-trapping. It has been suggested that incidental captures may limit population growth in some areas.

Jones and Garton, 1994 noted "Fishers seemed to prefer large-diameter Engelmann spruce trees and hollow grand fir logs as resting sites in north-central Idaho (Jones 1991)." The FS's silvicultural focus would reduce grand fir, a fact which is not reconciled in the analysis.

Northern Goshawk

The EA doesn't even state if this MIS is found in the project area, or if surveys have been conducted. The PA states:

> There are at least three locations within the project area where surveys have indicated breeding (i.e. territorial behavior) or nests have been located. The most recent surveys of historic nests conducted in 2016 by IBO indicated one of these locations as being occupied and breeding success was indicated at another (presence of a hatch year bird). These three territories were again surveyed in 2017 however survey results are not in yet.

The FS must utilize goshawk survey methodology consistent with the best available science. For example the recent and comprehensive protocol, "Northern Goshawk Inventory and Monitoring Technical Guide" by Woodbridge and Hargis 2006. Also, USDA Forest Service 2000b state:

> A common thread in the interviews was the lack of a landscape approach in providing goshawk habitat well distributed across the Forest (Squires, Reynolds, Boyce). Reynolds was deeply concerned that both alternatives focus only on 600 acres around known goshawk nests. He was concerned that this direction could be keeping the goshawk population artificially low**. Because goshawks move around within their territories, they are very difficult to find (Reynolds). There might be more goshawks on the Forest than currently known (Squires). One or two years of goshawk surveys is not**

> **enough (Reynolds). Some pairs may not lay eggs for five years (Reynolds). To get confidence in identifying nesting goshawk pairs, four to six years of surveys are needed (Reynolds).** (Emphasis added.)

Reynolds et al. 1992 goshawk guidelines recommend ratios of (20%/20%/20%) each in the mid-aged forest, mature forest, and old forest Vegetative Structural Stage (VSS) classes for post-fledging areas (PFA)s and foraging areas. Reynolds et al. 1992 calls for 100% in VSS classes 5 & 6 and 0% in VSS classes 1-4 in nest areas.

In addition, Reynolds et al. 1992 recommend logged openings of no more than 2 acres in size or less in the PFAs, depending on forest type, and logged openings of no more than 1-4 acres or less in size in the foraging areas, depending on forest type. Clough (2000) noted that in the absence of long-term monitoring data, a very conservative approach to allowing logging activities near active goshawk nest stands should be taken to ensure that goshawk distribution is not greatly altered. This indicates that the full 180-acre nest area management scheme recommended by Reynolds et al. (1992) should be used around any active goshawk nest. Removal of any large trees in the 180-acre nesting area would contradict the Reynolds et al. (1992) guidelines.

Crocker-Bedford (1990) noted:

> After partial harvesting over extensive locales around nest buffers, reoccupancy decreased by an estimated 90% and nestling production decreased by an estimated 97%. Decreases were probably due to increased competition from open-forest raptors, as well as changes in hunting habitat and prey abundance.

Moser and Garton (2009) reported that all goshawk nests examined in their study area were found in stands whose average diameter of overstory trees was over 12.2 inches and all nest stands had ≥ 70% overstory tree canopy. They described their findings as being similar to those described by Hayward and Escano (1989), who reported that nesting habitat "may be described as mature to overmature conifer forest with a closed canopy (75-85% cover)…."

Moser (2007) and Moser and Garton (2009) reported the mean home range size of male goshawks (N=7) was 12,710 acres and female goshawks (N=12) was 9,532 acres in Northern Idaho. Studies in other areas have reported smaller home range sizes in the neighborhood of 5,000-6,000 acres (Reynolds et al. 1992). Moser's larger home range sizes may be related to the fact that Moser's study was conducted in an industrial forest landscape with a large amount of timber harvest. Other factors may be differences in methodology, use of satellite technology by Moser (2007) or differences prey availability in Northern Idaho.

Moser reported that, home range size was largely related to nesting success and the amount of openings and mature forest within the home range. Birds of both sexes with successful nests generally had smaller home ranges. For example, males with successful nests (N=4) had an average home range size of 9,657 acres and females with successful nests (N=8) had an average home range size of 6,600 acres. Male bird home range size increased as the number of openings in the home range increased and the amount of closed canopy forest decreased, but these factors weren't significant for female birds.

The FS's Samson (2006) reports says that 110 breeding individuals (i.e. 55 pairs) are necessary for a viable goshawk population in R1. USDA Forest Service, 2005e is a map showing the results from the 2005 R1 region-wide goshawk survey using the FS's Woodbridge and Hargis goshawk monitoring protocol. That 2005 detection map says there were 40 detections in 2005 in Region 1. So the results of this survey essentially show that the population in Region 1 has not been viable according to the agency's own science (only 40 instead of 55). And some of the detections may have been individuals using the same nest, so the number of nests (and therefore number of breeding pairs) could be even lower than 40.

Also please consider Beier and Drennan, 1997; Greenwald et al., 2005; La Sorte, et al., 2004 and Patla, 1997 as best available science for northern goshawk biology.

<u>Black-Backed Woodpecker</u>

The EA doesn't even state if this Sensitive native species is found in the project area, or if surveys have been conducted. The PA acknowledges they "are known to occur in the project area…"

FS biologists Hillis et al., 2002 note that "In northern Idaho, where burns have been largely absent for the last 60 years, black-backed woodpeckers are found amid bark beetle outbreaks, although not at the densities found in post-burn conditions in Montana." Those researchers also state, "The greatest concerns for this species, however, are decades of successful fire suppression and salvage logging targeted at recent bark beetle outbreaks." Hillis et al., 2002 also state:

> Black-backed woodpeckers occupy forested habitats that contain high densities of recently dead or dying trees that have been colonized by bark beetles and woodborer beetles (Buprestidae, Cerambycidae, and Scolytidae). These beetles and their larvae are most abundant within burned forests. In unburned forests, bark beetle and woodborer infested trees are found primarily in areas that have undergone natural disturbances, such as wind-throw, and within structurally diverse old-growth forests (Steeger and Dulisse in press, Bull et al. 1986, Goggans et al. 1987, Villard 1994, Hoffman 1997, Weinhagen 1998).

The Boise National Forest (USDA Forest Service, 2010d) adopted this species as an indicator species in its revised forest plan in 2010:

> The black-backed woodpecker depends on fire landscapes and other large- scale forest disturbances (Caton 1996; Goggans et al. 1988; Hoffman 1997; Hutto 1995; Marshall 1992; Saab and Dudley 1998). It is an irruptive species, opportunistically foraging on outbreaks of wood-boring beetles following drastic changes in forest structure and composition resulting from fires or uncharacteristically high density forests (Baldwin 1968; Blackford 1955; Dixon and Saab 2000; Goggans et al.1988; Lester 1980). Dense, unburned, old forest with high levels of snags and logs are also important habitat for this species, particularly for managing habitat over time in a well-distributed manner. These areas provide places for low levels of breeding birds but also provide opportunity for future disturbances, such as wildfire or insect and disease outbreaks (Dixon and Saab 2000; Hoyt and Hannon 2002; Hutto and Hanson 2009; Tremblay et al. 2009). Habitat that supports this species' persistence benefits other species dependent on forest systems that develop with fire and insect and disease disturbance processes. The black-backed woodpecker is a secondary consumer of terrestrial invertebrates and a primary cavity nester. Population levels of black-backed woodpeckers are often synchronous with insect outbreaks, and

> targeted feeding by this species can control or depress such outbreaks (O'Neil et al. 2001). The species physically fragments standing and logs by its foraging and nesting behavior (Marcot 1997; O'Neil et al. 2001). These KEFs influence habitat elements used by other species in the ecosystem. Important habitat elements (KECs) of this species are an association with medium size snags and live trees with heart rot. Fire can also benefit this species by stimulating outbreaks of bark beetle, an important food source. Black-backed woodpecker populations typically peak in the first 3–5 years after a fire. This species' restricted diet renders it vulnerable to the effects of fire suppression and to post-fire salvage logging in its habitat (Dixon and Saab 2000).
>
> … Black-backed woodpeckers are proposed as an MIS because of their association with high numbers of snags in disturbed forests, use of late-seral old forest conditions, and relationship with beetle outbreaks in the years immediately following fire or insect or disease outbreaks. Management activities, such as salvage logging, timber harvest, and firewood collection, can affect KEFs this species performs or KECs associated with this species, and therefore **its role as an MIS would allow the Forest to monitor and evaluate the effects of management activities on identified forest communities and wildlife species.** (Emphasis added.)

All the areas to be logged are potential habitat of the highest quality. All it takes is a fire, which could happen naturally or as a result of project activities. Those areas logged before a fire would have far less habitat value to this species.

The EA doesn't disclose the FS's strategy and best available science for insuring viable populations of the black-backed woodpecker.

Current forest management policies serious implications for the black-backed woodpecker. Forestwide suppression of habitat conditions would eliminate population viability. The Wildlife Specialist Report states, "By reducing the potential for stand-replacing wildfire and beetle outbreaks in the project area, project implementation would reduce the potential for black-backed woodpecker occupancy in the future in the project area." Yet that Report and the EA and other analyses fail to <u>quantify</u> these impacts—directly, indirectly, and cumulatively. Such failures to quantify and meaningfully analyze and disclose cumulative effects is pervasive throughout the analyses for all ESA-listed, MIS, and Sensitive species.

Hutto, 2006 addresses this subject; from the Abstract:

> The bird species in western North America that are most restricted to, and therefore most dependent on, severely burned conifer forests during the first years following a fire event depend heavily on the abundant standing snags for perch sites, nest sites, and food resources. Thus, it is critical to develop and apply appropriate snag-management guidelines to implement postfire timber harvest operations in the same locations. Unfortunately, existing guidelines designed for green-tree forests cannot be applied to postfire salvage sales because the snag needs of snag-dependent species in burned forests are not at all similar to the snag needs of snag-dependent species in green-tree forests. Birds in burned forests have very different snag-retention needs from those cavity-nesting bird species that have served as the focus for the development of existing snag-management guidelines.

> Specifically, many postfire specialists use standing dead trees not only for nesting purposes but for feeding purposes as well. Woodpeckers, in particular, specialize on wood-boring beetle larvae that are superabundant in fire-killed trees for several years following severe fire. Species such as the Black-backed Woodpecker (Picoides arcticus) are nearly restricted in their habitat distribution to severely burned forests. Moreover, existing postfire salvage-logging studies reveal that most postfire specialist species are completely absent from burned forests that have been (even partially) salvage logged. I call for the long-overdue development and use of more meaningful snag-retention guidelines for postfire specialists, and I note that the biology of the most fire-dependent bird species suggests that even a cursory attempt to meet their snag needs would preclude postfire salvage logging in those severely burned conifer forests wherein the maintenance of biological diversity is deemed important.

Hutto, 2008 cautions against the common practice of landscape scale thinning to "restore" forests to a condition thought to be more congruent with historical conditions:

> Black-backed Woodpeckers …require burned forests that are densely stocked and have an abundance of large, thick-barked trees favored by wood-boring beetles (Hutto 1995, Saab and Dudley 1998, Saab et al. 2002, Russell et al. 2007, Vierling et al. 2008). Indeed, data collected from within a wide variety of burned forest types show that **the probability of Black-backed Woodpecker occurrence decreases dramatically and incrementally as the intensity of traditional (pre-fire) harvest methods increases.** (Emphases added.)

The Hutto, 2008 Abstract states:

> I use data on the pattern of distribution of one bird species (Black-backed Woodpecker, *Picoides arcticus*) as derived from 16,465 sample locations to show that, in western Montana, this bird species is extremely specialized on severely burned forests. Such specialization has profound implications because it suggests that the severe fires we see burning in many forests in the Intermountain West are not entirely "unnatural" or "unhealthy." Instead, severely burned forest conditions have probably occurred naturally across a broad range of forest types for millennia. These findings highlight the fact that severe fire provides an important ecological backdrop for fire specialists like the Black-backed Woodpecker, and that the presence and importance of severe fire may be much broader than commonly appreciated.

Please see Hanson Declaration, 2016 for an explanation of what a cumulative impact is with regard to the backed woodpecker, how the FS failed apply the best available science in their analysis of impacts to Black-backed Woodpeckers for a timber sale, why FS's (including Samson's) reports are inaccurate and outdated, and why FS's reliance on them results in an improper minimization of adverse effects and cumulative impacts to black-backed woodpeckers with regard to the agency's population viability assessment.

The viability of the black-backed woodpecker is threatened by fire suppression and other "forest health" policies which specifically attempt to prevent its habitat from developing. "Insect infestations and recent wildfire provide key nesting and foraging habitats" for the black-backed woodpecker and "populations are eruptive in response to these occurrences" (Wisdom et al. 2000). A basic purpose of the FS's management strategies are to negate the natural processes that the black-backed woodpecker biologically relies on; the emphasis in reducing the risk of stand loss due to stand density coupled with the increased risk of stand replacement fire events. Viability of a species cannot be assured, if habitat suppression is a forestwide policy.

Hutto, 1995 states: "Fires are clearly beneficial to numerous bird species, and **are apparently necessary for some**." (p. 1052, emphasis added.) Hutto, 1995 whose study keyed on forests burned in the 1988 season, noted:

> Contrary to what one might expect to find immediately after a major disturbance event, I detected a large number of species in forests that had undergone stand-replacement fires. Huff et al. (1985) also noted that the density and diversity of bird species in one- to two-year-old burned forests in the Olympic Mountains, Washington, *were as great as adjacent old-growth forests*…
>
> …Several bird species seem to be relatively *restricted* in distribution to early post-fire conditions… I believe it would be difficult to find a forest-bird species more restricted to a single vegetation cover type in the northern Rockies than the Black-backed Woodpecker is to early [first 6 years] post-fire conditions. (Emphasis added).

USDA Forest Service 2011c states:

> Hutto (2008), in a study of bird use of habitats burned in the 2003 fires in northwest Montana, found that within burned forests, there was one variable that exerts an influence that outstrips the influence of any other variable on the distribution of birds, and that is fire severity. Some species, including the black-backed woodpecker, were relatively abundant only in the high-severity patches. . **Hutto's preliminary results also suggested burned forests that were harvested fairly intensively (seed tree cuts, shelterwood cuts) within a decade or two prior to the fires of 2003 were much less suitable as post-fire forests to the black-backed woodpecker and other fire dependent bird species. Even forests that were harvested more selectively within a decade or two prior to fire were less likely to be occupied by black-backed woodpeckers.** (Emphasis added.)

Also see the agency's Fire Science Brief, 2009, which states, "Hutto found that Black-backed Woodpeckers fared best on sites unharvested before fire and poorest in the heavily harvested sites."

Hutto, 2008 states, "severely burned forest conditions have probably occurred naturally across a broad range of forest types for millennia. These findings highlight the fact that severe fire provides an important ecological backdrop for fire specialists like the black-backed woodpecker, and that the presence and importance of severe fire may be much broader than commonly appreciated."

Cherry (1997) states:

> The black-backed woodpecker appears to fill a niche that describes everything that foresters and fire fighters have attempted to eradicate. For about the last 50 years, disease and fire have been considered enemies of the 'healthy' forest and have been combated relatively successfully. We have recently (within the last 0 to 15 years) realized that disease and fire have their place on the landscape, but the landscape is badly out of balance with

> the fire suppression and insect and disease reduction activities (i.e. salvage logging) of the last 50 years. Therefore, the black-backed woodpecker is likely not to be abundant as it once was, and **continued fire suppression and insect eradication is likely to cause further decline.** (Emphasis added.)

FS management emphasis continues to suppress this species' habitat, as evident from the EA's Purpose and Need.

The black-backed woodpecker is a primary cavity nester, and also the closest thing to an MIS for species depending upon the process of wildland fire in the ecosystem. Cherry (1997) notes:

> Woodpeckers play critical roles in the forest ecosystem. Woodpeckers are primary cavity nesters that excavate at least one cavity per year, thus making these sites available to secondary cavity nesters (which include many species of both birds and mammals). Black-backed and three-toed woodpeckers can play a large role in potential insect control. The functional roles of these two woodpecker species could easily place them in the 'keystone' species category—a species on which other species depend for their existence.
>
> Wickman (1965) calculated that woodpeckers may eat up to 50 larvae per day that were each about 50 mm in length. The predation on these larvae is significant. It has been estimated that individual three-toed woodpeckers may consume thousands of beetle larvae per day, and insect outbreaks may attract a many-fold increase in woodpecker densities (Steeger et al. 1996). The ability of woodpeckers in to help control insect outbreaks may have previously been underestimated.

Cherry (1997) also notes:

> Black-backed woodpeckers preferred foraging in trees of 34 cm (16.5 in) diameters breast height and (63 ft) 19 m height (Bull et al. 1986). Goggans et al. (1987) found the mean dbh of trees used for foraging was 37.5 cm (15 in) and the mean dbh of trees in the lodgepole pine stands used for foraging was 35 cm (14 in). Steeger et al. (1996) found that both (black-backed and three-toed) woodpecker species fed in trees from 20-50 cm (8-20 in) dbh.
>
> Black-backed woodpeckers excavate their own cavities in trees for nesting. Therefore, they are referred to as primary cavity nesters, and they play a critical role in excavating cavities that are later used by many other species of birds and mammals that do not excavate their own cavity (secondary cavity nesters). Black-backed woodpeckers peel bark away from the entrance hole and excavate a new cavity every year. Other woodpeckers sometimes take over their cavities (Goggans et al. 1987).

Also, FS biologists Goggans et al., 1989 studied black-backed woodpecker use of unburned stands in the Deschutes NF in Oregon. They discovered that the black-backed woodpeckers used unlogged forests more than cut stands. In other words, effects to the black-backed woodpecker accrue from logging forest habitat that has not been recently burned.

Bond et al., 2012a explain the need for a conservation strategy for the black-backed woodpecker:

> In California, the Black-backed Woodpecker's strong association with recently burned forest, a habitat that is ephemeral, spatially restricted, and often greatly modified by post-fire logging, as well as the species' relative rarity, may make the woodpecker vulnerable to declines in the state. Additionally, Black-backed Woodpeckers in California are affected by the management of unburned forests – both because pre-fire stand conditions affect the suitability of post-fire habitat for the species, and because a substantial proportion of California's Black-backed Woodpeckers nest and forage at a low population density in unburned forests. Conserving the Black-backed Woodpecker in California likely requires appropriate management and stewardship of the habitat where this species reaches its highest density – recently burned forest – as well as appropriate management of 'green' forests that have not burned recently.

In the nearby Blue Mountains of Eastern Oregon (Bull et al. 1986, Nielsen-Pincus 2005), it was found that grand fir cover types were used approximately 27% of the time for nesting in Bull's 1970s study and 14% of the time in Nielsen-Pincus's study of the same general area in 2003-2004.

The emphasis on stand thinning and salvage of dying trees is of a concern for the black-backed woodpecker (Hutto 2008, Dudley et al. 2012, and Tingley et al. 2014).

<u>**Pileated Woodpecker**</u>

The EA doesn't even state if this MIS is found in the project area, or if surveys have been conducted.

The proposed logging would impact forest that provides habitat for species needing the kind of habitat features found in mature and old-growth forests, such as the pileated woodpecker.

The Committee of Scientists, 1999 define Keystone species as a:

> …species whose effects on one or more critical ecological processes or on biological diversity are much greater than would be predicted from their abundance or biomass (e.g., the red-cockaded woodpecker creates cavities in living trees that provide shelter for 23 other species).

Consistent with the notion of the pileated woodpecker as a keystone species, USDA Forest Service 2011c states:

> Many types of disturbances, such as timber harvest, fuel reduction, road construction, blow-down, wildland fire, or insect or disease outbreaks, can affect old growth habitat and old growth associated species. This is well illustrated by **the pileated woodpecker, a "keystone" species**, which provides second-hand nesting structures for numerous old growth species such as boreal owls, kestrels, and flying squirrels (McClelland and McClelland 1999, Aubry and Raley 2002). A disturbance can reduce living tree canopy cover to levels below that needed by the pileated woodpecker's main food source, carpenter ants, forcing the pileated to forage and possibly nest elsewhere. Carpenter ants, which live mostly in standing and downed dead wood, can drastically reduce populations of species

> such as spruce budworm (Torgersen 1996), the most widely distributed and destructive defoliator of coniferous forests in Western North America. (Emphasis added.)

The EA fails to disclose the FS's strategy and best available science for insuring viable populations of the pileated woodpecker. Bull et al. 2007 represents over 30 years of investigation into the effects of logging on the pileated woodpecker and is the latest information on such effects.

The Idaho Panhandle NF's original Forest Plan old-growth standards (USDA Forest Service, 1987c) were largely built around the habitat needs of its indicator species, the pileated woodpecker. Bull and Holthausen (1993) recommend that approximately 25% of the home range be old growth and 50% be mature forest. They suggested that 50% of the area should have stands with greater than 60% canopy closure and at least 40% should remain unlogged (any type of logging). Follow up work (Bull et al. 2007) found that bird density did not change in 30 years (despite major infestations of spruce budworm) in home ranges meeting these guidelines, unless extensive regeneration harvesting had occurred in the home range. Also see Bull et al., 1992, Bull and Holthausen, 1993, and Bull et al., 1997 for biology of pileated woodpeckers and the habitats they share with cavity nesting wildlife.

Long-term studies (Bull et al. 2007) suggest that the pileated woodpecker is highly sensitive to both regeneration harvest and other activities like commercial thinning and improvement harvest. Fuel treatments on the Starkey Experimental Forest which were similar to activities proposed in EOTW, where shown to reduce reproductive success for pileated woodpeckers significantly (Id.).

USDA Forest Service, 1990 indicates measurements of the following variables are necessary to determine quality and suitability of pileated woodpecker habitat:

- Canopy cover in nesting stands
- Canopy cover in feeding stands
- Number of potential nesting trees >20" dbh per acre
- Number of potential nesting trees >30" dbh per acre
- Average DBH of potential nest trees larger than 20" dbh
- Number of potential feeding sites per acre
- Average diameter of potential feeding sites

This preferred diameter of nesting trees for the pileated woodpecker recognized by R-1 is notable. USDA Forest Service, 1990 uses an index of the "Number of potential nesting trees >30" dbh per acre" for the pileated woodpecker, and McClelland and McClelland (1999) found in their study in northwest Montana, with the average nest tree being 73 cm. (almost 29") dbh. The pileated woodpecker's strong preference for trees of rather large diameter is not adequately considered in the Forest Plan. Project specifications provide vague and inadequate commitments for leaving specific numbers and sizes of largest trees favored by the pileated woodpecker and thus so many other wildlife species.

The Wildlife Specialist Report states, "Foraging habitat consisting of mixed conifer forest that are greater than 10 inches DBH and greater than 25% canopy cover… Nesting habitat is a subset of

foraging habitat therefore all nesting habitat could also be considered foraging habitat but not all forging habitat qualifies as nesting habitat. .. There is about 1,214 acres of nesting habitat with average tree size greater than 20 inches DBH and canopy cover >60% in mixed conifer habitat (ponderosa pine, Douglas-fir, grand fir, and western red cedar)." But this means the FS is claiming 21" dbh for nesting pileated woodpeckers is adequate, which conflicts with the Region 1's own science (and other science we cite above) which highlights the necessity for considering up to 30" dbh trees for nesting. The FS's problem with the pileated woodpecker is—they have no database entry for trees that large.

As a result of this analysis obfuscation, "26% of suitable pileated woodpecker nesting habitat within the Project Area" (Wildlife Specialist Report) would be destroyed.

Hutto 2006, notes from the scientific literature: "The most valuable wildlife snags in green-tree forests are relatively large, as evidenced by the disproportionate number of cavities in larger snags (Lehmkuhl et al. 2003), and are relatively deteriorated (Drapeau et al. 2002)."

USDA Forest Service, 1990 states, "To provide suitable pileated woodpecker habitat, strips should be at least 300 feet in width…"

B.R. McClelland has extensively studied the pileated woodpecker habitat needs. McClelland, 1985 (a letter to the Flathead NF forest supervisor) states:

> Co-workers and I now have a record of more than 90 active pileated woodpecker nests and roosts, …the mean dbh of these trees is 30 inches… A few nests are in trees 20 inches or even smaller, but the minimum cannot be considered suitable in the long-term. Our only 2 samples of pileateds nesting in trees <20 inches dbh ended in nest failure… At the current time there are many 20 inch or smaller larch, yet few pileateds selected them. Pileateds select old/old growth because old/old growth provides habitat with a higher probability of successful nesting and long term survival. They are "programmed" to make that choice after centuries of evolving with old growth.

McClelland (1977), states:

> (The Pileated Woodpecker) is the most sensitive hole nester since it requires old growth larch, ponderosa pine, or black cottonwood for successful nesting. The Pileated can be considered as key to the welfare of most hole-nesting species. If suitable habitat for its perpetuation is provided, most other hole-nesting species will be accommodated.
>
> Pileated Woodpeckers use nest trees with the largest dbh: mean 32.5 inches;
>
> Pileated Woodpeckers use the tallest nest trees: mean 94.6 feet;
>
> The nest tree search image of the Pileated Woodpecker is a western larch, ponderosa pine, or black cottonwood snag with a broken top (status 2), greater than 24 inches dbh, taller than 60 feet (usually much taller), with bark missing on at least the upper half of the snag, heartwood substantially affected by Fomes laracis or Fomes pini decay, and within an old-growth stand with a basal area of at least 100 sq feet/acre, composed of large dbh classes.

> A cluster analysis based on a nine-dimensional ordination of nest tree traits and habitat traits revealed close association between Yellow-bellied Sapsuckers, Mountain Chickadees, and Red-breasted Nuthatches. These three species plus the Pileated Woodpecker and Hairy Woodpecker are relatively grouped by coincident occurrence in old growth. Tree Swallows, Black-capped Chickadees, and Common Flickers are separated from the above five species by their preference for more open areas and their frequent use of small dbh nest trees.
>
> (Most) species found optimum nesting habitat in stands with a major component of old growth, particularly larch. Mean basal area for pileated woodpecker nest sites was 150 square feet per acre. (McClelland. B.R. and others, 1979)
>
> Many large snags are being cut for firewood. Forest managers should limit firewood cutting to snags less than 15 inches in d.b.h. and discourage use of larch, ponderosa pine, and black cottonwood. Closure of logging roads may be necessary to save high-value snags. Logging slash can be made available for wood gatherers.

Lorenz et al., 2015 state:

> Our findings suggest that higher densities of snags and other nest substrates should be provided for PCEs (primary cavity excavators) than generally recommended, because past research studies likely overestimated the abundance of suitable nest sites and underestimated the number of snags required to sustain PCE populations. Accordingly, the felling or removal of snags for any purpose, including commercial salvage logging and home firewood gathering, should not be permitted where conservation and management of PCEs or SCUs (secondary cavity users) is a concern (Scott 1978, Hutto 2006).

This means only the primary cavity excavators themselves, such as the pileated woodpecker, are able to decide if a tree is suitable for excavating. This also means managers know little about how many snags per acre are needed to sustain populations of cavity nesting species. The FS and Forest Plan fails to recognize this scientific finding. Lorenz et al., 2015 must be considered best available science to replace inadequate forest plan direction for snag retention.

Spiering and Knight (2005) examined the relationship between cavity-nesting birds and snag density in managed ponderosa pine stands and examined if cavity-nesting bird use of snags as nest sites was related to the following snag characteristics (DBH, snag height, state of decay, percent bark cover, and the presence of broken top), and if evidence of foraging on snags was related to the following snag characteristics: tree species, DBH, and state of decay. The authors state:

> "Many species of birds are dependent on snags for nest sites, including 85 species of cavity-nesting birds in North America (Scott et al. 1977). Therefore, information of how many and what types of snags are required by cavity-nesting bird species is critical for wildlife biologists, silviculturists, and forest managers."
>
> "Researchers across many forest types have found that cavity-nesting birds utilize snags with large DBH and tall height for nest trees (Scott, 1978; Cunningham et al., 1980; Mannan et al., 1980; Raphael and White, 1984; Reynolds et al., 1985; Zarnowitz and Manuwal, 1985; Schreiber and deCalesta, 1992)."

Spiering and Knight (2005) found the following.

> Larger DBH and greater snag height were positively associated with the presence of a cavity, and advanced stages of decay and the presence of a broken top were negatively associated with the presence of a cavity. Snags in larger DBH size classes had more evidence of foraging than expected based on abundance.
>
> Percent bark cover had little influence on the presence of a cavity. Therefore, larger and taller snags that are not heavily decayed are the most likely locations for cavity-nesting birds to excavate cavities.
>
> The association of larger DBH and greater height of snags with cavities is consistent with other studies (Scott, 1978; Cunningham et al., 1980; Mannan et al., 1980; Raphael and White, 1984; Reynolds et al., 1985; Zarnowitz and Manuwal, 1985; Schreiber and deCalesta, 1992).

Spiering and Knight (2005) state that the "lack of large snags for use as nest sites may be the main reason for the low densities of cavity-nesting birds found in managed stands on the Black Hills National Forest. ...The increased proportion of snags with evidence of foraging as DBH size class increased and the significant goodness-of-fit test indicate that large snags are the most important for foraging."

The EA fails to disclose the cumulative snag loss in areas previously logged areas, or other sites (such as roadside) subject to other causes of snag loss.

The FS's Vizcarra, 2017 notes that researchers "see the critical role that mixed-severity fires play in providing enough snags for cavity-dependent species. Low-severity prescribed fires often do not kill trees and create snags for the birds."

Bate et al. (2007), found that snag numbers were lower adjacent to roads due to removal for safety considerations, removal as firewood, and other management activities.

Other literature has also indicated the potential for reduced snag abundance due to human influence (Wisdom et al. 2000). And Bate and Wisdom, 2004 investigated management and other human influences on snag abundance. Some findings include:

> 1. Stands far from roads had almost three times the density of snags as stands adjacent to open or closed roads. No difference in snag density existed for stands adjacent to open versus closed roads. Rather, snag density declined with increasing proximity to nearest road. Consequently, the presence of any road near or adjacent to a stand is an important predictor of substantially reduced density of snags. Ease of access for firewood cutting and other forms of timber harvest is the most likely explanation for reduced snag density near roads.
>
> 2. Stands closer to the nearest town had a lower density of snags than those farther from nearest town. This finding implies that stands closer to town, and therefore more accessible

to human activities, also are likely areas where firewood cutting is concentrated, resulting in reduced snag density.

3. Stands in the late-seral stage had three times the density of snags as stands in the mid-seral stage, and almost nine times that of stands in the early-seral stage. Stands in the late-seral stage provide essential snag habitat for wildlife that does not appear to be consistently present in younger stands.

4. Stands with no history of timber harvest had three times the density of snags as stands that were selectively harvested, and 19 times the density as that in stands that had undergone a complete harvest. These results suggest that past timber harvest practices have substantially reduced the density of snags, and that snag losses have not been effectively mitigated under past management.

5. Stands adjacent to private land had a lower density of snags within mid- and late-seral stages, in contrast to a higher density in stands surrounded by Forest Service land. These results are likely explained by safety and fire management policies, which call for removal of snags along property boundaries, where such snags often are deemed to pose safety or fire hazards. In addition, increased human access likely contributes to lower snag densities in stands adjacent to private land.

The EA fails to quantify the degree of snag loss expected because of safety concerns during project activities, and also from both the proposed methods of prescribed burning and log removal.

Dudley & Vallauri, 2004 state:

> Up to a third of European forest species depend on veteran trees and deadwood for their survival. Deadwood is providing habitat, shelter and food source for birds, bats and other mammals and is particularly important for the less visible majority of forest dwelling species: insects, especially beetles, fungi and lichens. Deadwood and its biodiversity also play a key role for sustaining forest productivity and environmental services such as stabilising forests and storing carbon.
>
> Despite its enormous importance, deadwood is now at a critically low level in many European countries, mainly due to inappropriate management practices in commercial forests and even in protected areas. Average forests in Europe have less than 5 per cent of the deadwood expected in natural conditions. The removal of decaying timber from the forest is one of the main threats to the survival of nearly a third of forest dwelling species and is directly connected to the long red list of endangered species. Increasing the amounts of deadwood in managed forests and allowing natural dynamics in forest protected areas would be major contributions in sustaining Europe's biodiversity.
>
> For generations, people have looked on deadwood as something to be removed from forests, either to use as fuel, or simply as a necessary part of "correct" forest management. Dead trees are supposed to harbour disease and even veteran trees are often regarded as a

> sign that a forest is being poorly managed. Breaking up these myths will be essential to preserve healthy forest ecosystems and the environmental services they provide.
>
> In international and European political processes, deadwood is increasingly being accepted as a key indicator of naturalness in forest ecosystems. Governments which have recognised the need to preserve the range of forest values and are committed to these processes can help reverse the current decline in forest biodiversity. This can be done by including deadwood in national biodiversity and forest strategies, monitoring deadwood, removing perverse subsidies that pay for its undifferentiated removal, introducing supportive legislation and raising awareness.

The EA doesn't disclose how statistically robust the project area surveys are for making accurate estimates and analyses.

The FS has stated: "Well distributed habitat is the amount and location of required habitat which assure that individuals from demes, distributed throughout the population's existing range, can interact. Habitat should be located so that genetic exchange among all demes is possible." (Mealey, 1983.) That document also provides guidance as to how habitat for the pileated woodpecker must be distributed for populations to persist.

Pine Marten

The pine marten is an MIS under the Forest Plan. The EA doesn't even state if this native species is found in the project area, or if surveys have been conducted.

The pine marten is a species whose habitat is significantly altered by thinning and other active forest management (Moriarity et al., 2016; Bull and Blumton, 1999; Hargis et al., 1999 and Wasserman et al., 2012).

Numerous recent studies have found that the species is particularly vulnerable to habitat fragmentation (Webb and Boyce 2009, Hargis et al. 1999, Moriarty et al. 2011, Potvin et al. 2000). For example, Hargis et al. (1999) reported that "Martens were nearly absent from landscapes having >25% non-forest cover, even though forest connectivity was still present." Effects seem to be more pronounced in western conifer forests like the project area.

Marten avoidance of openings is well documented in the literature (Potvin et al. 2000, Koehler and Hornocker 1977, Chapin et al. 1998).

Moriarty et al., 2016 found that the odds of detecting a marten was 1,200 times less likely in openings and almost 100 times less likely in areas treated to reduce fuels, compared to structurally-complex forest stands.

Home range estimates are highly variable for marten (Burskirk and McDonald 1989, Powell 1994) and no good estimates are available for Idaho in the literature. We suggest using the findings of Bull and Heater (2001) who found that female home ranges averaged 3,500 acres in nearby Northeastern Oregon. They report that home ranges do not overlap significantly in the same sex, but larger male home ranges (6,700 acres) often overlap female home ranges.

Ruggiero et al. 1994b recognize that for martens, "trapper access is decreased, and de facto partial protection provided, by prohibitions of motorized travel."

Old growth allows martens to avoid predators, provides resting and denning places in coarse woody debris and large diameter trees, and allows for access under the snow surface. USDA Forest Service, 1990 reviewed research suggesting that martens prefer forest stands with greater than 40% tree canopy closure and rarely venture more than 150 feet from forest cover, particularly in winter. USDA Forest Service, 1990 also cites research suggesting that at least 50% of female marten home range should be maintained in mature or old growth forest. Also, consideration of habitat connectivity is essential to ensuring marten viability: "To ensure that a viable population of marten is maintained across its range, suitable habitat for individual martens should be distributed geographically in a manner that allows interchange of individuals between habitat patches (Ibid.).

Ruggiero et al. 1994b recognize that for martens, "trapper access is decreased, and de facto partial protection provided, by prohibitions of motorized travel."

The FS's strategy for protecting marten is summed up in the EA: "Individuals would move away from areas of active treatment and would not be injured or killed. Sufficient habitats are available outside the treatment units to support local marten during project implementation."

Wolverine

The EA states there is "no wolverine habitat" for this Sensitive native species in the project area, and doesn't discuss records of occurrence within or near the project area. The PA presents contradictory information:

> There have been four observations of wolverine in the project area, all of them incidental, with the most recent from 2000. However, there is no wolverine habitat (Inman primary habitat model) within the project area and it is likely that any use of the project area by wolverines would be transient in nature.

We wonder why the wolverine that use the project area don't know any better than to use habitat that doesn't conform to "Inman primary habitat."

The Sensitive wolverine is proposed for listing as a threatened species under the ESA. The proposed rule was issued in 2013. 78 Fed. Reg. 7864 (February 4, 2013). FWS withdrew the rule on August 13, 2014, and the withdrawal of the rule was deemed unlawful and vacated in 2016. *Defenders of Wildlife v. Jewell*, 176 F.Supp.3d 975 (D. Mont. 2016). Thus, the wolverine is currently proposed for listing under the ESA.1 81 Fed. Reg. 71670 (October 18, 2016). The FS must undergo formal consultation with the U.S. Fish & Wildlife Service.

Logging and road activities may affect wolverines; published, peer-reviewed research finds: "Roaded and recently logged areas were negatively associated with female wolverines in summer." Fisher et al., 2013. The "analysis suggests wolverines were negatively responding to human disturbance within occupied habitat. The population consequences of these functional habitat relationships will require additional focused research." Id.

Wolverines use habitats ranging from Douglas-fir and lodgepole pine forest to subalpine whitebark pine forest (Copeland et al., 2007). Lofroth (1997) in a study in British Columbia, found that wolverines use habitats as diverse as tundra and old-growth forest. Wolverines are also known to use mid- to low-elevation Douglas-fir forests in the winter (USDA Forest Service, 1993).

Aubry, et al. 2007 note that wolverine range in the U.S. had contracted substantially by the mid-1900s and that extirpations are likely due to human-caused mortality and low to nonexistent immigration rates.

May et al. (2006) cite: "Increased human development (e.g. houses, cabins, settlements and roads) and activity (e.g. recreation and husbandry) in once remote areas may thus cause reduced ability of wolverines to perform their daily activities unimpeded, making the habitat less optimal or causing wolverines to avoid the disturbed area (Landa & Skogland 1995, Landa et al. 2000a)."

Ruggiero, et al. (2007) state: "Many wolverine populations appear to be relatively small and isolated. Accordingly, empirical information on the landscape features that facilitate or impede immigration and emigration is critical for the conservation of this species."

Roads result in direct mortality to wolverines by providing access for trappers (Krebs et al., 2007). Trapping was identified as the dominant factor affecting wolverine survival in a Montana study (Squires et al. 2007). Female wolverines avoid roads and recently logged areas, and respond negatively to human activities (Krebs et al., 2007)

Ruggiero et al. (1994b) recognized that "Over most of its distribution, the primary mortality factor for the wolverines is trapping." Those authors also state, "Transient wolverines likely play a key role in the maintenance of spatial organization and the colonization of vacant habitat. Factors that affect movements by transients may be important to population and distributional dynamics."

Results from Scrafford et al., 2018:

> …show that roads, regardless of traffic volume, reduce the quality of wolverine habitats and that higher-traffic roads might be most deleterious. We suggest that wildlife behavior near roads should be viewed as a continuum and that accurate modeling of behavior when near roads requires quantification of both movement and habitat selection. Mitigating the effects of roads on wolverines would require clustering roads, road closures, or access management."

Roads and human density are important factors influencing current wolverine distribution (Carroll et al. 2001b); and wolverine habitat selection is negatively correlated with human activity – including roads (Krebs et al. 2007). Wolverine occurrence has shown a negative relationship with road densities greater than 2.8 mi/mi^2 (1.7 km/km^2) (Carroll et al. 2001b).

(T)he presence of roads can be directly implicated in human-caused mortality (trapping) of this species. Trapping was identified as the dominant factor affecting wolverine survival in a Montana study (Squires et al. 2007).

Krebs et al. (2007) state, "Human use, including winter recreation and the presence of roads, reduced habitat value for wolverines in our studies."

Wisdom et al. (2000) state:

> Carnivorous mammals such as marten, fisher, lynx, and wolverine are vulnerable to over-trapping (Bailey and others 1986, Banci 1994, Coulter 1966, Fortin and Cantin 1994, Hodgman and others 1994, Hornocker and Hash 1981, Jones 1991, Parker and others 1983, Thompson 1994, Witmer and others 1998), and over-trapping can be facilitated by road access (Bailey and others 1986, Hodgman and others 1994, Terra-Berns and others 1997, Witmer and others 1998).
>
> …Snow-tracking and radio telemetry in Montana indicated that wolverines avoided recent clearcuts and burns (Hornocker and Hash 1981).
>
> Copeland (1996) found that human disturbance near natal denning habitat resulted in immediate den abandonment but not kit abandonment. Disturbances that could affect wolverine are heli-skiing, snowmobiles, backcountry skiing, logging, hunting, and summer recreation (Copeland 1996, Hornocker and Hash 1981, ICBEMP1996f).

Carroll et al. (2001b) state:

> The combination of large area requirements and low reproductive rate make the wolverine vulnerable to human-induced mortality and habitat alteration. Populations probably cannot sustain rates of human-induced mortality greater than 7–8%, lower than that documented in most studies of trapping mortality (Banci 1994, Weaver et al. 1996).
>
> … (T)he present distribution of the wolverine, like that of the grizzly bear, may be more related to regions that escaped human settlement than to vegetation structure.

Wisdom et al. (2000) offered the following strategies:

- Provide large areas with low road density and minimal human disturbance for wolverine and lynx, especially where populations are known to occur. Manage human activities and road access to minimize human disturbance in areas of known populations.
- Manage wolverine and lynx in a metapopulation context, and provide adequate links among existing populations.
- Reduce human disturbances, particularly in areas with known or high potential for wolverine natal den sites (subalpine talus cirques).

The Analysis of the Management Situation Technical Report for Revision of the Kootenai and Idaho Panhandle Forest Plans states:

> Direct mortality (related to access) from trapping, legal hunting, and illegal shooting has impacted all wide-ranging carnivores (e.g. lynx, wolverine, grizzly and black bears, wolves)…

> …Wolverine populations may have declined from historic levels, as a result of over-trapping, hunting, habitat changes, and intolerance to human developments. As the amount of winter backcountry recreation increases, wolverine den sites may become more susceptible to human disturbance.

In regards to the 2013 memo from the Regional Office (USDA Forest Service, 2013c), we see that district-level specialists are not allowed to arrive at effects conclusions based upon their own expertise and judgment.

Western (Boreal) Toad

The EA doesn't even state if this Sensitive native species is found in the project area, or if surveys have been conducted.

USDA Forest Service, 2003a states:

> Little quantitative data are available regarding the boreal toad's use of upland and forested habitats. However, boreal toads are known to migrate between the aquatic breeding and terrestrial nonbreeding habitats (TNC Database 1999), and that juvenile and adult toads are capable of moving over 5 km between breeding sites (Corn et al. 1998). It is thought than juveniles and female boreal toads travel farther than the males (Ibid). A study on the Targhee National Forest (Bartelt and Peterson 1994) found female toads traveled up to 2.5 kilometers away from water after breeding, and in foraging areas, the movements of toads were significantly influenced by the distribution of shrub cover. Their data suggests that toads may have avoided macro-habitats with little or no canopy and shrub cover (such as clearcuts). Underground burrows in winter and debris were important components of toad selected micro-sites in a variety of macro-habitats. The boreal toad digs its own burrow in loose soil or uses those of small mammals, or shelters under logs or rocks, suggesting the importance of coarse woody debris on the forest floor. …(T)imber harvest and prescribed burning activities could impact upland habitat by removing shrub cover, down woody material, and/or through compaction of soil.

Montana Fish, Wildlife & Parks, 2005 (a more recent version of the above cite "TNC Database, 1999") also discuss boreal toad habitat:

> Habitats used by boreal toads in Montana are similar to those reported for other regions, and include low elevation beaver ponds, reservoirs, streams, marshes, lake shores, potholes, wet meadows, and marshes, to high elevation ponds, fens, and tarns at or near treeline (Rodgers and Jellison 1942, Brunson and Demaree 1951, Miller 1978, Marnell 1997, Werner et al. 1998, Boundy 2001). Forest cover in or near encounter sites is often unreported, but toads have been noted in open-canopy ponderosa pine woodlands and closed-canopy dry conifer forest in Sanders County (Boundy 2001), willow wetland thickets and aspen stands bordering Engelmann spruce stands in Beaverhead County (Jean et al. 2002), and mixed ponderosa pine/cottonwood/willow sites or Douglas-fir/ponderosa pine forest in Ravalli and Missoula counties (P. Hendricks personal observation).
>
> Elsewhere the boreal toad is known to utilize a wide variety of habitats, including desert springs and streams, meadows and woodlands, mountain wetlands, beaver ponds, marshes,

ditches, and backwater channels of rivers where they prefer shallow areas with mud bottoms (Nussbaum et al. 1983, Baxter and Stone 1985, Russell and Bauer 1993, Koch and Peterson 1995, Hammerson 1999). Forest cover around occupied montane wetlands may include aspen, Douglas-fir, lodgepole pine, Engelmann spruce, and subalpine fir; in local situations it may also be found in ponderosa pine forest. They also occur in urban settings, sometimes congregating under streetlights at night to feed on insects (Hammerson 1999, P. Hendricks personal observation). Normally they remain fairly close to ponds, lakes, reservoirs, and slow-moving rivers and streams during the day, but may range widely at night. Eggs and larvae develop in still, shallow areas of ponds, lakes, or reservoirs or in pools of slow-moving streams, often where there is sparse emergent vegetation. Adult and juvenile boreal toads dig burrows in loose soil or use burrows of small mammals, or occupy shallow shelters under logs or rocks. At least some toads hibernate in terrestrial burrows or cavities, apparently where conditions prevent freezing (Nussbaum et al. 1983, Koch and Peterson 1995, Hammerson 1999).

Maxell et al., 1998 state:

> We believe that the status of the Boreal toad is largely uncertain in all Region 1 Forests. …Briefly, factors which are a cause for concern over the viability of the species throughout Region 1 include: (1) a higher degree of genetic similarity within the range of Region 1 Forests relative to southern or coastal populations; (2) a general lack of both historical and current knowledge of status in the region; (3) indications of declines in areas which do have historical information; (4) low (5-10%) occupancy of seemingly suitable habitat as detected in recent surveys; (5) some evidence for recent restriction of breeding to low elevation sites and; (6) recent crashes in boreal toad populations in the southern part of its range which may indicate the species' sensitivity to a variety of anthropogenic impacts.

Bartelt and Peterson, 1994 note:

> Female toads traveled up to 2.5 km away from water after breeding and their dispersal movements were significantly linear. In foraging areas, the movements of all toads were significantly influenced by the distribution of shrub cover. The data suggest that toads may have avoided macrohabitats with little or no canopy and shrub cover (e.g., clearcuts).
>
> …if a forested area that lies between a breeding pond and a traditional hibernaculum of toads is clearcut and becomes hot and dry for toads, this could interrupt their seasonal migrations and could endanger these toads. If a forested area lying between two breeding sites is clearcut, this could interrupt gene flow between these sites, and thus isolate these gene pools and may reduce the stability of both populations.

The PACFISH buffer does not cover the possible terrestrial dispersal. There is no specific acreage about how many acres of their habitat that treatment will impact.

<u>White-headed Woodpecker</u>

The EA doesn't even state if this Sensitive native species is found in the project area, or if surveys have been conducted. Long-term impacts can last from 100-150 years.

<u>Fringed Myotis, Long-eared Myotis, Long-legged Myotis, Townsend's Big-eared Bat</u>
The EA doesn't even state if these Sensitive native species are found in the project area, or if surveys have been conducted. The EA is deficient in analysis, does not use the best available science, and does not take a hard look at impacts.

The amount of existing habitat for bat species appears to be underestimated or downplayed. This in turn results in significant underestimates of potential habitat loss for these bat species.

Fringed myotis bats are associated with drier forest types particularly Ponderosa Pine (Keinath 2004, Lacki and Baker, 2007). Lacki and Baker (2007) demonstrated that most roost snags extended above the existing canopy by an average of 33.8 feet and were larger than random snags (32.5 inches for roost trees and 20.8 inches for random snags). Random snags generally had heights that did not extend above the existing canopy (-8.2 feet). Roost trees occurred in stands with more trees per acre (239 vs 119 per acre) and higher basal areas of trees over 9.8 inches in diameter (125.5 ft^2/acre vs 69.7 ft^2/acre).

For long-legged myotis bats, intact snags were preferred over broken topped snags, since they were more likely to extend above the canopy. In Oregon, bats preferred areas with high snag basal area and a diversity of stands within 250 meters of the roost tree. Bats in Oregon also preferred trees without broken tops. In Idaho, bats preferred roost trees in stands with lessor amounts of edge and fewer stand types within 750 meters of the roost tree.

<u>Moose</u>
The EA doesn't even state if this MIS is found in the project area, or if surveys have been conducted. The EA is deficient in analysis, does not use the best available science, and does not take a hard look at impacts.

The EA doesn't demonstrate the project would meet the Peek et al., 1997 guidelines. Previous studies of moose habitat on the NPNF have documented the importance of dense understories of Pacific yew stands under old-growth grand fir communities (Pierce and Peek 1984). The importance of these habitats has been documented in the Forest Plan with a special management area (MA-21) and local habitat management guidelines that have been developed based on that past research (Peek et al. 1987).

These guidelines are the best available science regarding this management indicator species and have been prepared by one of the most preeminent moose biologists in North America (Dr. James Peek). Co-authors on the paper are graduate student John Pierce (Currently Chief Wildlife Research Scientist for the Washington Department of Fish and Wildlife), Dean Graham (Former Nez Perce National Forest Biologist) and Dan Davis (Former Clearwater National Forest Biologist). The guidelines suggest that no more than 45% of MA 21 should be in age classes younger than 90 years and that no more than 14% should be logged in any 30-year period.

We also believe that Peek et al., 1987 guidelines should be considered on moose winter range outside of MA-21.

The EA fails to demonstrate project consistency with Forest Plan MA-21 Management area direction.

Remedy for all issues with wildlife above:
1) Select the No Action alternative; or
2) Alternatively, prepare an EIS that addresses the analytical and scientific issues identified above.

THE ELK ANALYSIS IS DEFICIENT
The Forest Service has made a mistake in how it has calculated its elk habitat effectiveness. In our PA comments, we were concerned about impacts to wildlife:

- "The proposal to log more heavily along project area roads contradicts large tree retention requirements, conflicts with the needs of wildlife which need cover, and is outside of the range of actions analyzed in the Forest Plan EIS." FOC PA comments, p. 3.
- "Insects and diseases are natural and necessary agents of change and forest succession. They are also necessary to create vital wildlife habitat components." FOC PA comments, p. 3.
- We recognized "wildlife security problems created by open motorized roads and trails." FOC PA comments p. 5.
- We expressed concern that you couldn't deliver on the PA's promise to correct the lack of availability for movement corridors: "And yet, the FS has no explicit plan to manage any differently. If you do, the EIS must explain in detail how the proposed activities will reverse all these negative results, based on science and monitoring of successes in such endeavors—not just make promises. FOC PA comments p. 11
- We asked for analysis of unauthorized motorized users and their impacts on wildlife. FOC PA comments p. 16.
- We asked for analysis of livestock grazing on wildlife. FOC PA comments p. 18.

All of the above comments relate to elk because elk is among the wildlife impacted by building roads; failing to stop illegal motorized use from roads this project (a consequence of reconstructing, maintaining, or building roads); and logging (thinning and regeneration cuts, both of which will reduce cover and security for this particular species of wildlife). Also, in terms of the agency's analysis, which was not disclosed or discussed in the environmental assessment (instead only stating a conclusion), the first we could review the agency's analysis was with the supporting documents, which we did not have until the EA and those documents were released, so we comment on new information and are prejudiced from the lack of an environmental assessment open comment period.

There are several concerns with this analysis. First, the agency has not used the actual environmental baseline to begin an analysis, instead opting for a hypothetical baseline by combining the real baseline with two travel plan alternatives (which close or limit various roads on the Forest, neither of which have been adopted because there is no final decision on the travel plan). Second, with this inflated elk habitat effectiveness hypothetical baseline, the agency is not using the correct edition of the forest plan's formula for calculating elk habitat effectiveness. Finally, the agency has not sufficiently accounted for the hiding cover that will disappear across most elk analysis areas as a result of 18,000 acres of logging. The combination of these errors completely and optimistically skews any result, and because each minimizes the more probable impacts of logging, the real impacts may be more significant than the agency has forecasted. The potential of significance renders this EA insufficient, suggests that this project would not comply with elk habitat effectiveness minimums set out in these areas, and minimally warrants the preparation of an environmental impact statement. These are violations of NEPA and NFMA.

Use of hypothetical and not actual baseline

The Forest Service is calculating a baseline that does not currently exist, which is an improper starting point for an environmental analysis. For the existing condition, the Forest Service seems to have combined it with two travel plan alternatives to create one of two baselines. But, the travel plan has no final decision, so neither of the alternatives boosting the elk habitat effectiveness percentage are actually in place, making both "baselines" hypothetical and not an accurate reflection of the existing condition. We explain below.

In the proposed action, the Forest Service stated,

> Forest Plan objectives for Elk Habitat Effectiveness within the EAAs affected by the Project are 25% each for Bully Creek, Camp Creek, Cold Springs, Fish Creek, Goodwin Meadows, Goose Creek, Grouse Creek, and Pinnacle Ridge EAAs. Analysis conducted as part of the Designated Routes and Areas for Motorized Vehicle Use (DRAMVU) indicates that all EAAs are currently exceeding EHE objectives (29%, 37%, 33%, 26%, 30%, 40%, 36%, and 46% respectively). Only Fish Creek EAA is close to not meeting EHE objectives due partly to the motorized trail network around the Fish Creek Campground.

Proposed Action p. 46. There has been no final decision issued on the travel plan,[46] yet the agency's analysis created two "baseline" conditions from which it evaluated impacts. Each environmental baseline was calculated by combining the existing condition with one of two potential travel plan alternatives, as noted by this example table that we've created below for the Fish Creek Elk Analyses Area.

Elk Analysis Area	Existing condition EHE disclosed in proposed action p. 46	"Existing Condition + DRAMVU Alt 2" EHE[47]	"Existing Condition + DRAMVU FROD Alt5MOD" EHE[48]
Fish Creek	26%	37%	34%

[46] *See* Fischer response Re: Nez Perce travel plan inquiry (email, October 21, 2019).

[47] *42-18_FishCrkEHECalc.pdf* p. 1. We presume that DRAMVU stands for "Designated Routes & Areas for Motor Vehicle Use," as referenced in Probert DRAMVU cover letter re: FEIS (3-22-17).

[48] *42-18_FishCrkEHECalc.pdf* p. 4. We presume that "FROD" stands for what it commonly does in Forest Service parlance, which is the "Final Record of Decision," even though there has been no final record of decision signed for the travel plan. We also presume, based on common abbreviations the agency uses, that "Alt5Mod" means "Alternative 5 Modified," which we notice is an alternative in the travel plan final EIS. If we have misunderstood any of these abbreviations because the agency is using them in a new way, please clarify for us.

Again, there has been no travel plan decision, so no travel plan alternative is in place (and there is no information as to how up-to-date the existing condition in the proposed action is). As can be seen in comparing the percentages, the hypothetical baselines used by combining the existing condition with a potential travel plan alternative artificially inflates the starting baseline. Although Fish Creek is the example provided above, the same calculation problem seems to exist for every elk analysis area in this project.

The agency cannot use travel-plan alternatives as environmental baselines from which to calculate impacts because there has been no final decision implementing any of these alternatives, so these starting points are not actual existing conditions. This does not take the hard look that NEPA requires, and certainly does not demonstrate compliance with the forest plan. For the above reasons, the elk analysis is insufficient, does not take a hard look at either the existing baseline conditions or the potential impacts of this project, cannot demonstrate the agency has complied with the forest plan, and suggests a degree of uncertainty that should be addressed with an environmental impact statement. These are violations of NEPA and NFMA.

The agency is not using the correct forest plan formula for calculating elk habitat effectiveness

In complying with the forest plan, the Forest Service has to "Use 'Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho" to manage for and to assess the attainment of summer elk habitat objectives in project evaluations (see Appendix B of Forest Plan).'" This appendix B contains worksheets identical to Servheen et al. 1997. An excerpt from "Form 1" of Servheen et al. is below, and this same excerpt can be found in the forest plan at Appendix B, p. 26:

FORM 1

Calculated by: ______________________ AREA: ________________

Date: ______________________________ ALTERNATIVE: ______________

ESTIMATING QUALITY OF ELK SUMMER HABITAT IN NORTHERN IDAHO

1. Total size of evaluation area in usable acres[1] ____ (A); and square miles (A÷640) ____(B)

2. Potential elk use as affected by roads.[2]

		Vegetation Adjacent to Roads					
		Hiding Cover			Open		
Road Type	Road Status	Miles (C)	Coeff. (D)	Std. Miles (C x D) (E)	Miles (C)	Coef. (D)	Std. Miles (CxD) (E)
Arterial/Collector	Open	______	.80	______	______	1.20	______
	Closed w/ gates	______	.24	______	______	.36	______
	Closed w/ barrier	______	.08	______	______	.12	______
	Closed completely	______	.00	______	______	.00	______
Local	Open	______	.50	______	______	.90	______
	Closed w/ gates	______	.15	______	______	.27	______
	Closed w/ barrier	______	.05	______	______	.09	______
	Closed completely	______	.00	______	______	.00	______
Temporary Road & System Trail	Open	______	.03	______	______	.07	______
	Closed w/ gates	______	.01	______	______	.02	______
	Closed w/ barrier	______	.01	______	______	.01	______
	Closed completely	______	.00	______	______	.00	______

Subtotal Std. Miles ________ (F) ______(F)

Total Std. Miles (F+F) ________ (G)

Miles of standard road per square mile (G÷B) ______(H)

Percent of potential elk use after road effects [use (H) and Fig. 2] ______(I)

There is a calculation that must be done to adjust all roads to a standard number in order to evaluate existing conditions and impacts to elk. According to the above form, which is required by the forest plan (Appendix B), to get to a "standard mile," one has to multiply road mileage by one of two possible coefficients for roads, one for mileage that traverses hiding cover[49] adjacent to the road, and one for mileage where an opening that borders the road. As seen in the above excerpt, for Arterial/Collector roads where the road status is "Open," mileage is supposed to be

[49] "Vegetation must be dense enough to qualify as hiding cover within 300 feet on both sides of road or it is classified as open." Servheen et al. 1997 p. 26.

calculated by the .80 coefficient if the road has hiding cover adjacent to the road. But, one is supposed to use the coefficient of 1.20 if there is an opening adjacent to the road, which would apply if, for example, a segment of road borders or cuts through the clearcut. Servheen et al. directs one to apply the calculation on pdf p. 72 to the graph, Figure 2, on Servheen et al. pdf p. 43.[50] The higher the open road density on this graph, the lower the percent of potential elk use. But, in all of the various elk analyses that we found for this project (see the excerpt from *42-08_BullyCreekEHECalc* below), every category of road and system trail had one coefficient, and not two coefficients depending upon the presence or absence of hiding cover.

Calculated by:	J. Lutes	Date:	5/22/2018	Page 1of 1

End of the World Project - Fish Creek Elk Analysis Area (EAA) Existing Condition + DRAMVU Alt 2			
EAA Area (ac):	6,956	10.87	mi²
Security Area:	390	acres	6%
Openings:	566	acres	8%
Hiding Cover:	6150	acres	88%

		ROADS			TRAILS		
Road Type	Access Prescription	Miles	Coeff.	Std. Miles	Miles	Coeff.	Std. Miles
	Open	1.5	1	1.5		0.1	0.0
	H-2		0.6	0.0		0.06	0.0
	H-3		0.7	0.0		0.07	0.0
	H-4		0.85	0.0		0.09	0.0
	W-2		0.5	0.0		0.05	0.0
	W-3	23.9	0.6	14.3		0.06	0
	W-4	15	0.75	11.3		0.08	0.0
	W-5		0.75	0.0		0.08	0.0
	C-2		0.25	0.0		0.03	0.0
	C-3		0.35	0.0		0.04	0.0
	C-4		0.5	0.0		0.05	0.0
	Y-1		0	0.0		0	0.0
	Y-2	3.4	0.01	0.0		0	0.0
	Y-3		0.15	0.0		0.02	0.0
	Y-4		0.25	0.0		0.03	0.0
	Y-5		0.25	0.0		0.03	0.0
	B		0	0.0		0	0.0
			Standard Road Miles	27.1		Standard Road Miles	0.0
			Total Std Road Miles	27.1			
			Std Rd Density (mi²)	2.5			

POTENTIAL ELK USE RELATED TO ROADS (%)		44
Area Used by Livestock (sq. mi.)	10.3	
Total Cattle Equivalents	78.8	
Cattle Equivalents per mi²	7.650485437	
Potential Elk Use (From Fig. 3, page 31)	100	
Period Used by Cattle	33	
Weighted Elk Use In Livestock Grazing Areas	100	
Weighted Elk Use In EAA	100	
POTENTIAL ELK USE RELATED TO CATTLE DENSITY (%)		100
Size & Distribution of Cover	0	
Size & Distribution of Forage	0	
Adequacy of security	17	
POTENTIAL ELK USE RELATED TO OTHER FACTORS (%)		83
ELK USE RELATED TO ROADS		44
ELK USE RELATED TO CATTLE DENSITY		100
ELK USE RELATED TO OTHER FACTORS		83
ESTIMATED ELK HABITAT EFFECTIVENESS (%)		37

This problem is pervasive in all the agency's elk analyses for this project; there aren't two coefficients for roads, so roads next to openings and the ones next to hiding cover are treated identically, which is not accurate according to the scientific process that the agency recognizes. This doesn't measure the existing condition (and resulting elk habitat effectiveness) accurately, and it doesn't measure the alternatives' impacts accurately. None of this was disclosed or discussed in the EA. For these reasons, this isn't a hard look under NEPA and incorrect calculations cannot show compliance with the forest plan, in violation of NFMA.

[50] So does the Nez Perce forest plan, Appendix B, p. 23

The agency has not taken a hard look at whether hiding cover will disappear as a result of over 18,000 acres of logging.

We also question the amount of acreage that is currently hiding cover and what the agency presumes will still be hiding cover after all of the Forest Service has presumed to be existing conditions for hiding cover. Hiding cover, as defined by Servheen et al. 1997, Glossary p. 4 (pdf p. 86):

> *Structural definition:* Vegetation capable of hiding 90 percent of a standing adult elk from the view of a human at a distance equal to or less than 200 feet. As a site-specific vegetative component of SECURITY, the quality of HIDING COVER varies inversely with SIGHT DISTANCE.

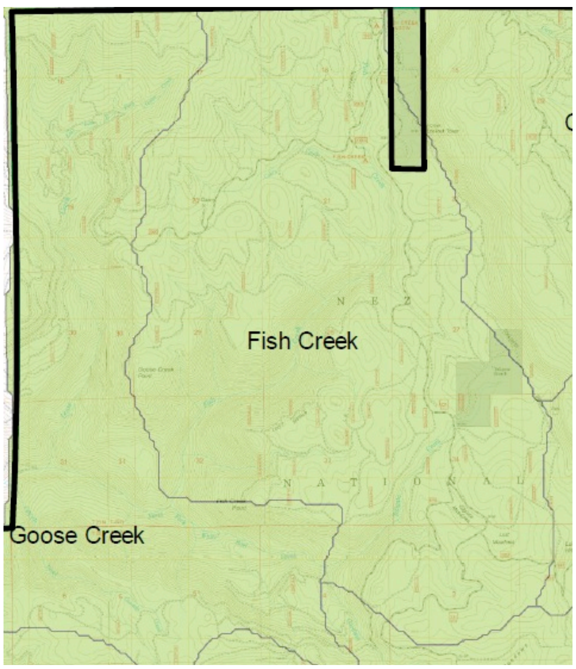
Regeneration cutting looks like below:

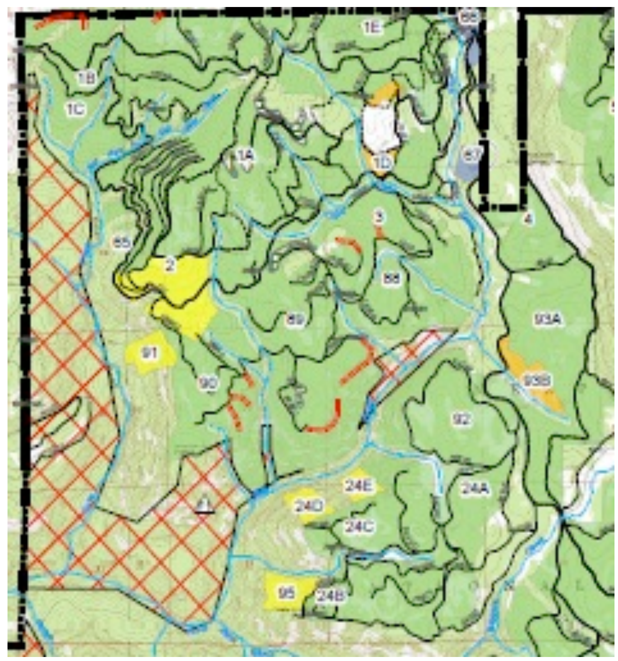
This is a clearcut with reserves in the Little Slate Project Area.[51]

The Forest Service has presented commercial thinning with these photo examples:[52]

[51] See Bilodeau Declaration (2017), Little Slate ROD pdf p. 147 (Map 1).
[52] 171004_EOTW_PublicPresentationCommunityMeetingGville, slides 17, 22

The regeneration cuts provide no hiding cover to elk. The open, park-like stands in the above pictures (commercial thinning) is likely not hiding cover, either, because the vegetation likely could not hide 90 percent of a standing adult elk 200 feet or closer from the view of a human. Therefore, hiding cover will certainly be eliminated in all of the regeneration harvest units (1,720 acres to 1,568 acres, depending upon alternative), and likely also up to 16,340-17,141 acres in intermediate (thinning) harvest units, depending upon alternative. This might significantly reduce the hiding cover in all elk analysis units in the project area. Yet, this is not recognized, discussed, or otherwise explained in the EA. For example, the agency's analysis states that the existing condition of Fish Creek elk analysis area has 6,150 acres of hiding cover, which amounts to 88 percent of the area.[53] When comparing the Elk Analysis Area Map[54] with a map of either alternative,[55] logging is pervasive across the entire analysis area, whether it is precommercial thinning, intermediate harvest, or regeneration cuts.





Above left: Excerpt from *42-24_Map_ElkAnalysisAreas.pdf*. **Above right**: Excerpt from *02-02_180524_EOTW_ProposedAction_Map.pdf* (green is intermediate cuts (thinning), orange is regeneration cuts, yellow is precommercial thinning, red lines are temporary roads)

Based on how intermediate harvest (i.e., commercial thinning) looks afterwards (noted by the pictures above), and applying the definition of hiding cover above, there appears to be at least a real potential that logging (regeneration harvest and intermediate harvest) will eliminate just about all hiding cover in this elk analysis area, yet for the Fish Creek analysis area, the agency has found that, despite the pervasive logging, hiding cover would only be reduced by one percentage as a result of Action Alternative and hiding cover would not be reduced at all in Alternative B, which looks visually similar to the Action Alternative based on its map.[56]

[53] *42-18_FishCrkEHECalc.pdf* pp. 1, 4
[54] *42-24_Map_ElkAnalysisAreas.pdf*
[55] *02-02_180524_EOTW_ProposedAction_Map* or *02-03_180524_EOTW_Alternative_B_Map.pdf.*
[56] *02-03_180524_EOTW_Alternative_B_Map.pdf.*

Potentials for significant impacts mean an environmental impact statement should be done. Also, the standard road miles don't change between alternatives, so it doesn't appear as if the agency has accounted for the temporary roads it plans to plow into the Fish Creek Analysis Area. Although we've provided the Fish Creek Elk Analysis Area to illustrate as an example, these analysis issues exist in all the elk analysis areas. Not only does the EA insufficiently address this, the potential of significant impact means that an EIS is the only appropriate way forward if this project isn't dropped, and the insufficient analysis cannot demonstrate that the agency is complying with the forest plan. These are violations of NEPA and NFMA.

Each of these issues render the EA insufficient on its own, but together they amplify the inaccuracies for a completely unreliable analysis. This violates NEPA and cannot demonstrate compliance with the forest plan.

Suggested Remedies for all elk issues:
1) Drop the project; or
2) Re-analyze the elk impacts, fixing the issues noted above and do an environmental impact statement.

WATER QUALITY AND FISHERIES

Our comments addressed these issues in some detail. Specifically:

> The PA claims, "existing sediment yield as estimated by NEZSED ranges from 0% to 24% over base, indicating all prescription watersheds currently meet their assigned sediment yield guideline." Has the FS recently measured sediment in project area streams to validate the NEZSED-modeled estimates?
>
> What is the scientific basis for the "Sediment Yield % over Base Guideline"? What is the field data relied upon to estimate "Existing Condition % Over Base"?
>
> The PA states, "Cobble embeddedness sampling was conducted on the fish bearing streams in 2017 to assess existing conditions related to the Forest Plan fishery/water quality objectives." Please disclose in the EIS all previous measures of cobble embeddedness of the streams in the project area, so trends can be determined.
>
> The PA states, "Cold Springs and Jungle Creek (White Bird) do not meet their fishery objectives." How long have levels of percent cobble embeddedness failed to meet the stated objectives?
>
> Has the FS scientifically validated its "Equivalent Clearcut Area (ECA)" methodology as used in the project analysis?
>
> How does the FS account for the fact that adverse management effects persist in streams for many decades after ECA has recovered to within your general ECA guidance?

Has the FS conducted recent field surveys to measure and account for all management-induced sources of ongoing sediment yields to streams? Has the FS conducted recent field surveys to measure and account for all management-induced conditions that are not now, but could potentially become, sediment sources to streams given likely storm, snowmelt, or rain-on-snow events?

The PA indicates that chinook salmon, steelhead, bull trout, interior redband trout and westslope cutthroat trout occur in some project areas streams. Does the FS have enough information to confidently state that these fish, along with Pacific lamprey, and pearlshell mussels, never occurred in streams in which they are currently absent in the project area?

Please disclose in the EIS the population numbers of chinook salmon, steelhead, bull trout, interior redband trout and westslope cutthroat in project area streams, and also population trends. Please disclose the historic, pre-management populations of these species in project area streams.

Please analyze and disclose cumulative effects on native fish species and their habitat in the Salmon River and South Fork Clearwater River, which are affected by cumulative impacts including from project area tributaries.

Please disclose in the EIS the project area streams' trends in measured values for Riparian Management Objectives (RMOs).

Has the FS conducted research or monitoring to correlate Stream Reach Inventory and Channel Stability (Pfankuch) evaluations with RMOs, cobble embeddedness, or other measures of fish habitat? How has the FS measured channel stability of project area streams?

If a stream's Percent Bank Stability RMO is not being met or if channel stability is of concern, will the FS apply a lower ECA increase threshold?

If the Percent Bank Stability RMO is not being met, does this mean that sediments in streams will remain elevated above natural until which time the banks stabilize?

Is the FS targeting road decommissioning in watersheds surrounding streams that are not meeting RMOs? Or is it mainly a matter of prioritizing decommissioning roads where future logging is not so imminent?

"No perceptible change in annual water yield would be expected by implementation of the proposed actions." (This despite the large-scale clearcutting proposed.) Does the FS actually monitor/measure water yield on the ground, or only estimate with modeling? If the latter, how was the modeling validated for use in project analyses?

"Streamside buffers of varying widths were retained along the fish bearing streams and were also retained on some smaller streams." Because of the past logging in what later came to be known as RHCAs, what are the current conditions in terms of large wood deficits in RHCAs, and how does that affect stream function?

What is the extent of livestock grazing in project area RHCAs?

The EA and record don't fully address these issues nor do they support the conclusions, in violation of NEPA. We address these topics separately in the following subsections. We also incorporate our section on scientific integrity.

TES and Sensitive Species and Habitat/Upward Trend

Projects within the Nez Perce National Forest must be consistent with the Forest Plan. 16 U.S.C. § 1604(i). The feasibility of the End of the World (EOTW) proposal is based upon the premise that the upward trend standard for water quality objectives (Forest Plan, Appendix A) exists. Timber management concurrent with improvement efforts can occur in below objective watersheds as long as an upward trend in habitat carrying capacity is documented. Cobble embeddedness is the critical parameter as it relates to the water quality objectives of the Forest Plan.

The claim of compliance with the Forest Plan objectives is based upon samples of cobble embeddedness obtained at the mouths of the streams (see project record maps) which meet the standard (two of the streams do not meet the standard). Obviously, these sample sites were not selected randomly. There is no comparison of these CE measurements with those obtained in previous sampling periods. Further, using PIBO as a surrogate for CE sampling is not credible as the methodologies and sites of cobble embeddedness monitoring significantly differ from those used in the 2012 PIBO study. Thus, the comparison of PIBO % fines data with CE data (historical) is not valid as sampling sites, parameters, and methodologies significantly differ. For example, the PIBO % fines parameter is a surface estimate and differs significantly from the % fines by depth that requires coring of the substrate. The two parameters cannot be validly compared. There is no valid claim of **upward trend** compliance with only one year (2017) of cobble embeddedness data for most steams or old data, 1992, for streams that flow into the South Fork Clearwater).

Factual documentation of an upward trend requires a credible set of time-series data in order to deal with statistical variation. The project record provides no such trend information.

The EOTW PA states:

> There are a minimum of 175 miles of stream within the project area. Of those, 50 miles of fish bearing streams are in the White Bird drainage including the North and South Forks of White Bird, Fish, Goodwin, Pinnacle, Jungle, Asbestos, and Cold Springs Creek. Rainbow trout, both the anadromous steelhead and resident inland redband forms, are found in these streams. Brook trout were found only in Cold Springs Creek but may have a wider distribution. No listed spring Chinook salmon occur in the project area; however, they do occur downstream in the mainstem of White Bird Creek. Bull trout have not been documented in the White Bird Creek drainage. Westslope cutthroat trout have not been observed but are expected to occur in some project area tributaries. No

> observations of Pacific lamprey or pearlshell mussel have been noted in past stream surveys.

PA at 35. We commented:

> The PA indicates that chinook salmon, steelhead, bull trout, interior redband trout and westslope cutthroat trout occur in some project areas streams. Does the FS have enough information to confidently state that these fish, along with Pacific lamprey, and pearlshell mussels, never occurred in streams in which they are currently absent in the project area?

We also said:

> Please disclose in the EIS the population numbers of chinook salmon, steelhead, bull trout, interior redband trout and westslope cutthroat in project area streams, and also population trends. Please disclose the historic, pre-management populations of these species in project area streams.
> Please analyze and disclose cumulative effects on native fish species and their habitat in the Salmon River and South Fork Clearwater River, which are affected by cumulative impacts including from project area tributaries.

All streams listed as fish bearing in the PA are below fishery habitat potential and water quality objective, and over the baseline sediment yield to meet the fishery water quality objective (Table A-1, Appendix A-2 Nez Perce Forest Plan). In addition, Pinnacle, Jungle, and Little White Bird are considered 3/ streams indicating:

> Sediment is the primary limiting factor in these streams. Improvements will be scheduled between 1986 and 1995. Timber management can occur in these watersheds, concurrent with improvement efforts, as long as a positive, upward trend in habitat carrying capacity is indicated.

According to the Forest Plan, you must provide evidence of upward trend in habitat carrying capacity for both Jungle and Pinnacle streams in order to move forward with any timber management projects. There is no evidence of this upward trend.

The PA states:

> The Forest Plan Appendix A contains three prescription watersheds which would require an upward trend analysis if they do not meet their fishery/water quality objectives as mentioned in the Hydrology report above. Those streams are Pinnacle, Jungle, and Little White Bird Creeks. All three are within the South Fork White Bird drainage. Data indicates that Pinnacle and Little White Bird Creek meet their fishery/water quality objectives and therefore do not require an analysis. Jungle does not meet its fishery objective (cobble embeddedness) and will require an analysis.

PA at 36. While Pinnacle and Little White Bird Creek meet their fishery/water quality objectives, do you also have evidence that both of these streams are currently in upward trend for habitat carrying capacity, as required by the Forest Plan? Please disclose plans for conduction of upward trend analysis on specified streams. Will the project area or project plans be altered if upward trend analyses do not pass?

The PA indicated that % yield sediment over baseline would increase during project activity in all three upward trend streams (Pinnacle, Jungle, and Little White Bird Creeks) indicating significant habitat loss for these fisheries. As stated in the Forest Plan:

> The amount of sediment in a stream above the natural rate is directly related to fish habitat loss. As excess sediment from road construction increases, fish habitat potential decreases. The majority of man-caused sediment in Forest management activities has been shown to be produced by road construction. Nez Perce streams drain the Idaho Batholith and the bordering Belt series soils. Both are highly erosive and often occur with steep, unstable landforms.

Forest Plan at VI-16. These impacts should be considered, especially as related to the three streams listed above where sediment is the primary limiting factor on fisheries habitat and management activities in this project are likely to increase sediment in these streams. The sediment increase resulting in habitat loss can also been interpreted as cumulative effects on native fish species and their habitat in the Salmon River and South Fork Clearwater River, which are affected by cumulative impacts including from project area tributaries.
The Forest Plan states:

> The fisheries/water quality objectives and associated sediment limits in this Plan are needed to maintain existing productivity in drainages that are functioning at or near capacity and allow drainages that are below potential to recover. Increased emphasis needs to be placed on data gathering pertaining to the quality and quantity of habitat, especially at the District level. Fish habitat improvement activities should be upgraded to a substantial program to accelerate recovery of impaired habitats and to enhance carrying capacity where opportunities exist.

Forest Plan at VI-16. More data is required on which fish species will be impacted including values for population trends, habitat, and water quality in order to effectively assess if this project follows the fisheries/water quality objectives set out by the Forest Plan.
The fishery report tacitly admits there is no upward trend. For example, "Cobble embeddedness, however was measured at 54% in 2017 and when assessed against the desired future conditions (Espinosa 1992), the watershed is currently at 56% of its habitat potential, or 14% less than the Forest Plan objective."[57and 58]

The EA states:

> NEZSED modeling for the Proposed Action indicates that the proposed actions would result in Jungle Creek (in the South Fork White Bird Creek HUC12) and Grouse Creek would both exceed their 60% sediment yield guidelines by 2%. Due to the assumptions

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[57] Watershed report at 11. See also pages 10 and 22.
[58] The use of percentages here is confusing since 54% cobble embeddedness and 56% of habitat potential would certainly be more than 14% below Forest Plan standards.

> made for the NEZSED model, the sediment increase from the actual proposed project activities is expected to be negligible and indiscernible from the natural rate. Additionally, WEPP modeling indicates that the proposed actions would result in at most, an upland erosion rate and sediment yield increase of 0.498 tons per acre. This would be a negligible increase in erosion and sediment yield and would be indiscernible from the background rate, even for the worst-case scenario (high-precipitation climate, steep slopes, and highly-erodible soils).

EA at 19. What isn't explained is what assumptions in the NEZSED model were made to reduce modeled sediment. NEZSED already has serious problems. This is addressed elsewhere in the objection. Even "negligible," there cannot be a sediment increase. Logging from this project would maintain sediment yields, which are violating the forest plan already. When sediment yields violate the forest plan, this does not mean it is lawful under NFMA to conduct activities that will prolong that violation.

According to the Forest Plan, westlope cutthroat trout, steelhead and Chinook salmon are all management indicator species on the Forest and therefore it is the responsibility of the Forest Service to monitor the population levels of these species due to the nature of their significant impacts on the Forest.

> Monitor population levels of all Management Indicator Species on the Forest. These include bald eagle, grizzly bear, gray wolf, peregrine falcon, elk, moose, bighorn sheep, pileated woodpecker, goshawk, pine marten, fisher, westslope cutthroat trout, summer steelhead, and spring chinook. These species have been selected because (a) they are threatened and endangered; (b) they have special habitat needs that may be influenced significantly by planned management programs; (c) they are commonly hunted, fished, or trapped; (d) they are non-game species of special interest; or (e) their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality. Population levels will be monitored and evaluated as described in the Forest Plan Monitoring Requirements (Chapter V of the Forest Plan).

Forest Plan at II-18. Furthermore, several of these fishes use the forest streams for spawning and rearing habitat. These activities are vital to Forest fishery maintenance. Proper analysis is required in order to determine any negative effects on these fisheries.

We commented:

> Please disclose in the EIS the project area streams' trends in measured values for Riparian Management Objectives (RMOs).

According to the Forest Plan, it is your responsibility to protect or enhance forest resources dependent on riparian areas. These areas must be evaluated prior to implementation of activity in any project areas. The Forest Plan is in violation without providing values and analysis for proper maintenance of riparian areas.

> 22. Protect or enhance riparian-dependent resources.

> 4. Delineate and evaluate riparian areas in project areas prior to implementing any project activity (FSM 2526.03--3).
> 5. Manage riparian areas to maintain cover and security for riparian-dependent species with emphasis on habitats for threatened and endangered species. Use "Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho" to evaluate the need for and to provide adequate hiding cover and security areas for big game. Biological evaluations, during site-specific project analysis, shall identify needs and recommendations.

Forest Plan at II-2, and at II-22 (amendment). The existing data do not support an upward trend or compliance with the Forest Plan or the Endangered Species Act (ESA) for listed fish species including steelhead, Chinook, or bull trout. The BA doesn't discuss current population levels for steelhead.

ECA
The EA states:

> ECA modeling indicates that for both action alternatives, the habitat quality in the North Fork White Bird Creek and South Fork White Bird Creek HUC12 watersheds will degrade from High to Moderate on the Matrix of Pathways. This modeled habitat quality reduction will be short-term in duration, and as vegetation conditions recover, ECA modeling would reflect this recovery and **the proposed road decommissioning**, which would lead to a long-term decrease in ECA estimates from the existing condition.

EA at 19, emphasis added. The problem with this statement is the ECA measure is one of equivalent clearcut acreage, not a direct measure of sediment production from roads, which is modeled in other programs. This is misleading about what ECA is intended to express.

Sediment and Modeling/NEZSED and WEPP
Our comments noted:

> We know the results from NEZSED are estimates, and not absolute numbers of high statistical precision. Please disclose in the EIS the standard deviations of NEZSED estimates. We want to understand what the FS considers reasonable estimates to be.
>
> …
>
> The PA claims, "existing sediment yield as estimated by NEZSED ranges from 0% to 24% over base, indicating all prescription watersheds currently meet their assigned sediment yield guideline." Has the FS recently measured sediment in project area streams to validate the NEZSED-modeled estimates?

The weaknesses of FISHSED and NEZSED are not discussed. These include critiques of the model(s) such as was done by Gloss (see Gloss 1995), the critique contained in the agency's own implementation guide to Appendix A, how these models don't consider sediment produced from log hauling, how NEZSED was found inadequate (Memorandum Decision Order, page 18, of CASE NO. CV 04-447-S-MHW, an injunction issued against the Whiskey South Integrated

Resource Project), and how NEZSED does not take into account larger mass-wasting events (unlike WATBAL). Inventory techniques developed by the agency including GRIAP to assess the impacts that roads have on watersheds may also yield better results.
The report claims that sediment impacts, modeled by NEZSED as one or two year events (the report on pages 22 and 23 are inconsistent on this point) will be less because they are spread out over a longer period of time. However, that fails to take into account the persistent or press nature of the impacts over the thirteen years of this project, including the temporary roads and road work.

The WEPP model has weaknesses as well. It is not a watershed-based model so it is not calibrated to project negative impacts to prescription watershed.

Indeed, the fact that cobble embeddedness measured in 2017 is so high in both Jungle and Cold Springs Creeks and the fact that the most recent data for cobble embeddedness in Bully and Dump Creeks is from 1992 demonstrates that Forest Plan standards are not being met and the information is inadequate.

On page 37 of the Biological Assessment For Clear Creek (attached), it warns readers of the following critical limitations:

- Predicted sediment yields are not representative of actual sediment loads delivered to streams.
- The model cannot predict actual in-stream conditions (e.g., particle size distribution or cobble embeddedness). Nor can the model predict actual trends in any of these factors.
- The model does not consider climatic variability.
- The model results have their primary utility in comparing differences between proposed alternatives.
- The model is not a substitute for an analysis of cumulative watershed effects.

When something in the Forest Plan does not work, the Agency is quick to develop an amendment and adopt it. With reference to NEZSED, the Agency won't change the management direction in the Forest Plan because the model provides the "right" answers—minimal sediment production and delivery plus supposed compliance with their water quality objectives.

Press Disturbance
While it is commendable that the Forest Service is decommissioning non-system roads, replacing bad culverts and requiring "no harvest" PACFISH buffers, it remains that the Agency is implementing a failed management strategy. The script is: do some rehabilitation and then implement a large timber sale. This is a press disturbance and will not recover degraded watersheds and fish habitats. It has been done countless times. We object to this description as restoration.

The EOTW timber sale would generate impacts with extensive timber harvesting, temporary road construction, and reconstruction of existing roads, road decommissioning, culvert replacement, yarding, and skidding. The contention that no measurable sediment will be delivered to prescription watersheds and fish habitats is largely based on PACFISH buffers

(RHCAs), temporary roads, best management practices (BMPs), and the hope that no large storms will occur. PACFISH buffers are certainly not "fail-safe." The Forest Service only has to consult their documentation of the 1995-96 storm event in the Clearwater Basin that resulted in hundreds, if not thousands, of road failures, stream blowouts, and landslides in developed watersheds to refute the "fail safe" contention (McClelland et al., 1997). During this storm, PACFISH buffers (100-300 ft.) did not effectively stop significant sediment delivery from road failures and other mass erosion events. Large amounts of sediment were delivered to the streams. Further, the results from flood events on the Nez Perce and Clearwater National Forests were associated with roads 60% of the time (see Lloyd 2017). The project record indicates that existing roads compromise many RHCAs. With the advent of climate change, we can expect more frequent and severe storms.

Temporary roads are frequently not temporary. Sediment and impacts delivered to degraded streams from temporary roads are not necessarily temporary or short term. Spawning and rearing habitats already degraded from past development are more vulnerable to long-term impacts from additional sediment loading. In addition, currently depressed populations of steelhead trout could suffer further long-term impacts from lower quality habitats.
The "fail safe" contention extends to best management practices (BMPs). Espinosa et al. (1997) documented the failure of BMPs to adequately protect salmon habitat on the Clearwater National Forest. Failure occurs because recovery is not the primary objective of the BMP concept. Further, the EA fails to look at cumulative impacts from road reconditioning. Many roads, including temporary road templates, are grown over and not contributing much sediment now. They will be rebuilt and contribute sediment under the proposed action.

Livestock
The specialist report at 3 states **"**reducing the sediment effects of cattle watering" is important. However, there is little in the EA that suggests where this would be done and the range section, page 18, has nothing on this issue.[59 and 60] The only range improvements that may result would be because of removal of natural barriers could cause livestock to stray. This is a far cry from a cumulative impact analysis of grazing on watersheds or fisheries. Indeed, that information is completely lacking.[61]

Further, there is no alternative that would reduce livestock numbers or change livestock management. Aside from the hardened crossings done mainly for ATVs, there is nothing directed at mitigating existing and ongoing damage from livestock. Indeed, there are no data or information presented in the EA about allotment monitoring, impacts to riparian vegetation and the like.

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[59] See photos in project record of damage.
[60] The DN and EA conflate cattle crossing and watering with ATV crossings. Hardening of stream crossing areas won't affect the damage to riparian areas adjacent to streams from cattle grazing and watering unless they are hardened too. That would defeat the purpose, as rocks or other hard material, which would lead to greater erosion, would replace the riparian vegetation.
[61] Aside from the concern that livestock could stray, presumably into tree plantations, the maintenance of trails for livestock is the only other concern detailed on page 7.

Monitoring
As with other topics, addressed in this objection, the lack of consistent monitoring makes any determinations by the Forest Service that there is an upward trend in water quality or fish habitat suspect. Point in time studies are useless in determining trend. That is the point of monitoring, to determine trends.

Remedies:
1) Withdraw the DN and EA and prepare and EIS that complies with NEPA, the ESA and NFMA, if this project goes forward
2) Don't construct any new roads, including temporary
3) Don't long or build roads in all watersheds and streams not meeting Forest Plan objectives and standards for CE or any other parameter.
4) Don't log in any watershed with critical steelhead habitat.

TEMPORARY ROADS

We raised issues with temporary roads on page 15 of our comments.

> The PA proposes 15.6 miles of temporary road construction. Is any of this on existing "templates?" If so, were any of these existing templates roads decommissioned under any previous FS decision?
> Does the FS maintain an inventory of "existing templates" on the Forest?
> "All temporary roads would be decommissioned after use." Define "decommission"; does this mean complete obliteration and recontouring?
> "An additional 27.56 miles of road decommissioning is proposed to reduce road-related effects to streams and reduce long term road maintenance costs." Is this guaranteed under the project, or dependent on uncertain funding? Same question with all the road improvements.
> Your recent Center Johnson Proposed Action states "Decommissioning roads by obliteration would directly improve soil conditions by decompacting soils and adding wood and other organic matter to the existing road surface. Slope stability and hydrologic function would improve, reducing the potential risk of mass erosion from culvert or fill failures." Is the End of the World proposal to decommission any roads or motorized trails by abandonment, leaving the road or trail in place with no decompacting of soils, no addition of wood or other hydrological or biological improvements?

We raised these issues because the roads the Forest Service builds are often not temporary. Once built, they either remain or are "decommissioned" to templates, which make them available to be recommissioned—this means they are not temporary impacts to the landscape.

The Forest Service stated,

> Existing road prisms within units may be used for additional temporary roads if necessary.

EA p. 7. This statement about existing road prisms seems to have originated in a September 6, 2019 email from Stephanie Ridley. Ms. Ridley disclosed that the "SZ timber crew" already started the layout for the first End of the World Sale (a month prior to the Forest Service finalizing the EA and releasing the EA to the public) and were "finding many existing road prisms (most are re-vegetated) from past harvest." This is what needs to be disclosed to the public, yet the EA never mentions the number of existing roads or their current impacts.

Either these road prisms were a result of decommissioned or abandoned temporary roads or decommissioned Forest System roads. Either way, that the Forest Service is going to reconstruct temporary roads overtop of these sets the decommissioned road's recovery back to the beginning. Because these "many existing road prisms" will be once again used for roads, from the benefit of retrospect, they have had a much longer-term impact than what the Forest Service predicted. Taking that lesson, the Forest Service needs to figure out—before signing a decision—how many miles of new temporary road it is going to build, because history suggests that even after decommissioning, these roads will not be gone and there will be a road there for a long time.

The Forest Service's mechanism for decommissioning roads will likely not work, and the EA does not have a back-up plan for road decommissioning. The Forest Service stated on EA p. 7, "These road prisms will be obliterated/recontoured after use. (Implemented through mandatory contract provisions B6.63, C6.632#, and C6.633#)." However, road aren't always decommissioned through "mandatory contract provisions" when the Forest Service is also doing prescribed burns. Even though the Forest Service cited contract provision B6.63, the following provision, B6.631, directs the logger to leave temporary roads open for Forest Service "treatment." C6.632# and C6.633# are equally ineffective, as they only require the logger to obliterate or scarify "unless otherwise agreed" or "unless waived in writing." When that happens, the contract will end, and the timber company will be released of further obligations while the temporary road is still on the landscape. Then there will be no mechanism to decommission it.

We have observed this very narrative unfold during implementation of the Orogrande Community Protection Project, where there is now a road in a roadless area. A temporary road was proposed, approved, and punched into a roadless area and the contract. The mechanism by which the Forest Service intended to decommission the temporary road, as outlined by the EA, was by logging contract. The actual Orogrande logging contract, however, re-numbered the temporary road and only required the logging contractor to decommission a third of that temporary road—2/3 of the temporary road was to remain open for Forest Service "treatment." The logging contract terminated, releasing the logging company from all obligations. And presently 2/3 of the temporary road (that the Forest Service said would be decommissioned by logging contract) still exists and there are now no concrete plans to decommission it. Friends of the Clearwater just emailed a letter describing this issue to the regional forester and to the same forest supervisor who will be making this decision, and the full details of how temporary roads are forgotten are described in that letter.[62] We incorporate it here because the same narrative is poised to play out again. Because the EA does not account for how this plays out, it is missing an important problem.

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[62] We've enclosed these documents into our objection. They are "R1 NPCNF letter re Orogrande temp road and roadless_11-1-19"; "R1 NPCNF Orogrande letter Attachment 1 Orogrande EA excerpts"; "R1 NPCNF Orogrande letter Attachment 2-Timber Contract Excerpts"; R1 NPCNF Orogrande letter Attachment 3 Contract map.

SOILS
Our comments stated:

> How does the FS account for management-induced soil compaction (DSD) deeper that "the upper layer (0 to 10 cm)"?
>
> How does the FS measure soil productivity losses or deficits since "Past regeneration harvest units typically contain few large snags and lower amounts of coarse woody debris than untreated areas"?
>
> The Forest Plan includes a "Research Need" to "Determine the effects of various levels of soil displacement and compaction on soil productivity for forest and range vegetation on the Forest." Please disclose in the EIS the results of that research.
>
> The Forest Plan requires "Evaluate the potential for soil …mass wasting …for all ground-disturbing activities." Nothing in the PA demonstrates compliance with this Forest Plan requirement.
>
> Please disclose the amount of existing DSD in each proposed unit from previous logging and grazing activities. Please disclose the expected amount of DSD in each unit after ground disturbance and prior to any proposed mitigation/remediation.
>
> Please disclose that the DSD limits in the R1 Soil Quality Standards had little to do with compliance with NFMA and mostly to do with operational feasibility. USDA Forest Service, 2016a admits that there's no strong empirical connection between what FS Soil Quality Standards focus on as a proxy (DSD) for what NFMA requires (maintaining productivity). USDA Forest Service, 2016a also acknowledges the FS isn't fulfilling its promises about sustained yield.
>
> Please disclose the full extent of soils in the project area that are already hydrologically impacted and/or DSD, and analyze and disclose their watershed impacts.
>
> What is the extent of volcanic ash-capped soils in the project area?
>
> Please disclose the effectiveness of ALL mitigations listed in the PA. For example, soils: how effective is winter logging for protecting soil productivity, based upon NPCNF monitoring and best available science?

There are two important issues dealing with soil productivity. The first concerns the efficacy and applicability of both the Forest Plan and Regional Soils Quality Standards (SQS) on soils. The other is whether those standards are being met.

A- Forest Plan and Regional Standards
There is a difference between the standards. The Regional Standard—15% DSD—on the surface is more stringent than the 20% standard in the Forest Plan. As we show in the next subsection, the regional standards and possibly the Forest Plan standards would be exceeded.

R-1 SQS were developed internally by the agency, without following the public processes such as Forest Planning, NEPA, or independent scientific peer review. In doing so, it has avoided these public processes from illuminating scientific and ecological deficiencies of the R-1 SQS, which we are forced to do here, at the project level.

It's likely the Forest Service chose 15% as its upper limit on soil damage within a unit merely because it believes that modern clearcutting methods can avoid compacting more that 15% of a unit in while removing all the merchantable trees and burning the slash. USDA Forest Service, 2008b states:

> The 15% change in aerial extent realizes that timber harvest and other uses of the land result in some impacts and impairment that are unavoidable. This limit is based largely on what is physically possible, while achieving other resource management objectives.

USDA Forest Service, 2008b admits that the limit is based on the fact that it is not feasible to do much less damage than 15% of an activity area while carrying out industrial logging. **Such a limit has nothing to do with the science of maintaining soil productivity.**

USDA Forest Service, 2007c cites one of the Forest Service's own experts on soil processes, Dr. Bob Powers of the Pacific Southwest Research Station:

> The Regional Soil Quality Standards (R-1 Supplement 2500-99-1) were revised in November 1999 (DEIS, A-11 (EIS Chapter 3). Manual direction recommends maintaining 85% of an activity area's soils at an acceptable productivity potential with respect to detrimental impacts - including the effects of compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter, and soil mass movement. This
> recommendation is based on research indicating that a decline in productivity would have to be at least 15% to be detectable (Powers, 1990). (Myrtle Creek HFRA EIS at F-24.)

It is important to note that Dr. Powers is referring to separate and distinct thresholds when he talks about 15% **increases in bulk density**, which is a threshold of when soil compaction is considered to be detectable, and 15% **areal limit for detrimental disturbance**, which is the R-1 SQS upper limit on detrimental disturbance (including compaction from temporary roads and heavy equipment, erosion resulting from increased runoff, puddling, displacement from skid trails, rutting, severe burning, etc.). With that caveat, what Dr. Powers made these revealing remarks (as quoted in Nesser, 2002[63]):

> (T)he 15% standard for increases in bulk density originated as the point at which we could reliably measure significant changes, considering natural variability in bulk density…

[63] At the time, Nesser was the Soil Scientist at the Region 1 Office.

> (A)pplying the **15% areal limit** for detrimental damage is not correct... (T)hat was never the intent of the 15% limit… and **NFMA does not say that we can create up to 15% detrimental conditions**, it says basically that we cannot create significant or permanent impairment, period...

(Emphasis added.) USDA Forest Service, 2008b states:

> Powers (1990) cites that the rationale bulk density is largely based on collective judgment. The FS estimates that a true productivity decline would need to be as great as 15% to detect change using current monitoring methods. Thus the soil-quality standards are set to detect a decline in potential productivity of at least 15%. This does not mean that the FS tolerates productivity declines of up to 15%, **but merely that it recognizes problems with detection limits.** Also, a 15% increase in bulk density may not be detrimental to productivity; site and soil productivity depends on the soil and ecosystem in which it is found.

(Emphasis added.) So we have the R-1 SQS 15% areal extent limit being based on mere feasibility rather than concerns over soil productivity, and additionally we have the 15% bulk density increase limit based upon **the limitations of detection** by bulk density measurement methods—not concerns over soil productivity. The FEIS's failure to disclose this is a violation of NEPA.

We also note that it doesn't matter how sensitive the soils, how steep the land, how poor the site is for growing trees, the R-1 SQS standard is the same—15%. Truly, the R-1 SQS really *is* mostly a standard based upon feasibility of implementation and measurement detection. Page-Dumroese et al., 2000 emphasize that:

> Research information from short- or long-term research studies supporting the applicability of disturbance criteria is often lacking, or is available from a limited number of sites which have relative narrow climatic and soil ranges.
> …Application of selected USDA Forest Service standards indicate that **blanket threshold variables applied over disparate soils do not adequately account for nutrient distribution within the profile or forest floor depth. These types of guidelines should be continually refined to reflect pre-disturbance conditions and site-specific information.**

(Emphasis added.) The EA does not properly distinguish between the issues of soil disturbance and soil productivity. Whereas soil disturbance measures physical signs of potential soil productivity losses, the FS's measures of soil disturbance do not necessarily provide scientifically valid and reliable measures of **soil productivity**—the latter being the focus of NFMA requirements.

The R1-SQS is the only quantitative standard the agency would have for purposes of complying with NFMA's substantive mandate to insure against irreversible losses in soil productivity. The agency acknowledges the need to validate the assumptions underlying the R1-SQS thresholds for soils disturbance with regard to soil productivity. The Forest Management Handbook at FSH 2509.18 directs the FS to do validation monitoring to "Determine if coefficients, S&Gs, and requirements meet regulations, goals and policy" (2.1 – Exhibit 01). It asks what we are asking: "Are the threshold levels for soil compaction adequate for maintaining soil productivity? Is allowing 15% of an area to be impaired appropriate to meet planning goals?"

A Forest Service scientist report (Grier et al.,1989) adopted as a measure of soil productivity: "the total amount of plant material produced by a forest per unit area per year." They cite a study finding "a 43-percent reduction in seedling height growth in the Pacific Northwest on primary skid trails relative to uncompacted areas" for example. And in another Forest Service scientist report (Adams and Froehlich, 1981) states:

> Measurements of reduced tree and seedling growth on compacted soils show that significant impacts can and do occur. Seedling height growth has been most often studied, with reported growth reductions on compacted soils from throughout the U.S. ranging from about 5 to 50 per cent.

USDA Forest Service 2014a states:

> Management activities can result in both direct and indirect effects on soil resources. Direct and indirect effects may include alterations to physical, chemical, and/or biological properties. Physical properties of concern include structure, density, porosity, infiltration, permeability, water holding capacity, depth to water table, surface horizon thickness, and organic matter size, quantity, and distribution. Chemical properties include changes in nutrient cycling and availability. Biological concerns commonly include abundance, distribution, and productivity of the many plants, animals, microorganisms that live in and on the soil and organic detritus.

(3-279, emphasis added). The R-1 SQS and definition of DSD consider only alterations to physical properties, but not chemical or biological properties. Adoption of the R-1 SQS does not adequately consider best available science, in violation of NEPA.

One of these biological properties is partly represented by naturally occurring organic debris from dead trees. The R-1 SQS recognize the importance of limiting the ecological damage that logging causes due to retaining inadequate amounts of large woody debris, but set absolutely no limits on these losses caused by logging and slash burning.

Some chemical properties are discussed in Harvey et al., 1994, including:

> The ...descriptions of microbial structures and processes suggest that they are likely to provide highly critical conduits for the input and movement of materials within soil and between the soil and the plant. Nitrogen and carbon have been mentioned and are probably the most important. Although the movement and cycling of many others are mediated by microbes, sulfur phosphorus, and iron compounds are important examples.
>
> The relation between forest soil microbes and N is striking. Virtually all N in eastside forest ecosystems is biologically fixed by microbes... Most forests, particularly in the inland West, are likely to be limited at some time during their development by supplies of plant-available N. Thus, to manage forest growth, we must manage the microbes that add most of the N and that make N available for subsequent plant uptake. (Internal citations omitted.)

There continues to be a lack of adequate regulatory mechanisms for protecting soil productivity on the NPNF and Northern Region. (see also Lacy (2001). This violates NFMA.

B. Compliance with Regional (and Forest Plan) Standards

The EA and Soils Report fail to demonstrate consistency with the flawed R-1 SQS.[64] In fact, they ignore the Regional Standards altogether. Specifically, *Table 1 Potential Detrimental Soil Disturbance within Treatment Units* in the project record shows the cumulative impacts of DSD—16% in both cases-- would be exceeded in two tractor units. Drawing units larger so that tractor, cable and hand units are combined is a way to evade compliance with the soils standard.

Further, the EA and project record are contradictory regarding soils disturbance. The specialist report states, "Timber harvest has occurred since the 1950's, totaling about 53% of the project area. Detrimental soil disturbance from past logging activities within the project area is minimal." Soils Report at 4. DSD can't be minimal if 53% of the area has been logged. The email contained in the project record also throws into doubt the current condition of soil in the area. That email string (that part dated September 12, 2019) states, "Drea phoned and left me a message. She said that as long as we are going with 2 entries (which is what we said), we should probably be ok on the NEZSED side of life even switching from cable to tractor." Whether that is accurate or not regarding sediment, and we doubt it, tractor logging will certainly result in more DSD. The email also states (September 6, 2019):

> 1. As we're doing layout we're finding many existing road prisms (most are re-vegetated) from past harvest. **We need a way to be able to use these existing prisms as temp roads when appropriate.** Using the higher-resolution Lidar now available to us, we can see where these existing prisms are (see the attached map). Given the huge amount of "potential temp roads" on the landscape, to make a unit-by-unit assessment of which roads might be necessary prior to layout for the entire EOW project area would be time-consuming and we still might make the wrong call where many stacked prisms exist.
>
> **I need to know if there's a blanket statement we can add to the NEPA stating something like "existing prisms might be used for temporary road construction where necessary."** Would that throw off the analysis numbers? Would it be acceptable to leave it open-ended? The benefit to using temp roads on existing prisms (which could be stated in the NEPA) is that the prism would be re-contoured after use, whereas they are growing suppressed trees and creating erosion issues in their current state.
>
> The current temp roads layer used for the EOW analysis was assuming new temporary road construction. In many cases those "new" temp roads might not be necessary where we have existing prisms. The overall temp road mileage for the project might not change that much (although it's hard to know until field work takes place). In many cases it

[64] The Forest Plan standard is also flawed, with a higher allowance for DSD to be 20%.

would probably be a difference in temp road location (rather than mileage) within units.

Emphasis in original. Thus, the FS admits there are a lot more areas of soil disturbance from road templates on the landscape, and they are supposedly causing erosion, than was previously believed. The late date of that communication suggests this fact was not incorporated in the EA. The upshot is, the agency can't have it both ways. It can't claim there are few areas of DSD on the landscape and yet claim there are a "huge amount" of temporary road prisms on the landscape necessitating the use of these old prisms to presumably reduce impacts.

The above also demonstrates another problem. The Forest Service has not done an accurate site-specific assessment of the existing condition.

Other key problems exist. Road decommissioning does not result in complete recovery, especially immediately, as expressed on page 7 of the Soil Report. The agency is often fond of citing Lloyd et al. 2013 to support this contention. However the researchers did not use presence or absence of DSD, as defined by the Forest Plan and the R-1 SQS, to document the improvement found. The study's real value was showing that better recovery of soil functioning was achieved by recontouring highly disturbed old road templates rather than merely abandoning them to natural recovery. Lloyd et al. 2013 state, "(T)hese findings support the prediction that recontouring accelerates the rehabilitation of key ecohydrologic properties toward reference dynamics." That's "toward" recovered conditions, not recovered to natural or non-DSD conditions. We further note that the NPNF's American River/Crooked River FEIS states:

> **Decompaction** can at least **partly restore** soil porosity and productivity. Soil displacement that mixes or removes the volcanic ash surface layer reduces soil moisture holding capacity, which may be **irreversible and irretrievable**.

(Emphasis added.) USDA 2015c. Neither the EA nor the Soils Report provides information to determine the effectiveness of its mitigations to comply with NEPA or NFMA.

After 28 years of implementing the Nez Perce Forest Plan (which includes Forest Plan Monitoring Requirement 2g, requiring monitoring of "Impacts of management activities on soils" and contains a "Research Need" to "Determine the effects of various levels of soil displacement and compaction on soil productivity for forest and range vegetation on the Forest"), the agency still cannot specify DSD improvement percentages to its management methodology.

REMEDY:

1. Prepare an EIS that meets NEPA and NFMA requirements.
2. Redo the necessary site-specific analysis of existing road prisms, old skid trail, and other areas with DSD to come up with an accurate representation of current DSD.
3. Drop all proposed logging units (activity areas) that would be over the 15% DSD standard.

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