Friends of the Clearwater
Keeping Idaho's Clearwater Basin Wild

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Submitted online to: https://cara.fs2c.usda.gov/Public//CommentInput?Project=52541

Mr. Shinn:

These are comments on the July 2024 End Of The World (EOTW) Draft Environmental Impact Statement (DEIS), on behalf of Friends of the Clearwater (FOC), Alliance for the Wild Rockies (AWR) and WildEarth Guardians.

We incorporate our documented participation in the process of the revision of the NPCNF Land Management Plan (LMP), because those comments, the objection, and other submissions inform and supplement the discussion of resource issues raised in these comments. We also fully incorporate our previous comments submitted during the NEPA process of EOTW, our Objections, and also the Objection and comments of Harry Jageman into these comments.

Please note: unless otherwise attributed, statements within quotation marks in these comments are taken from the DEIS.

INTRODUCTION

Timeline of notable Forest Service actions since the close of the public comment period on the February 2018 EOTW Proposed Action

- October 7, 2019: FS issues EOTW Environmental Assessment (EA) and draft Decision Notice, initiating the Objection process. The EA includes three alternatives: No Action, the original Proposed Action (PA), and Alternative B.

- December 12, 2019: Deputy Regional Forester Keith B. Lannom's letter dismisses all Objections.

- January 25, 2021: Forest Supervisor Cheryl Probert issues final Decision Notice (DN), adopting Alternative B from the 2019 EA.

- April 26, 2024: FS Associate Deputy Chief Troy Heithecker publishes a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for EOTW in the Federal

Register, in response to a June 24, 2022, federal court order enjoining implementation the DN and directing the FS to prepare an EIS. The NOI announces the Forest Supervisor has requested Emergency Action Determination authority under the Bipartisan Infrastructure Law, which would bypass the pre-decisional objection review process (36 CFR 218) for EOTW.

- July 12, 2024: Forest Service publishes a Notice in the Federal Register, releasing the EOTW Draft EIS (DEIS) for a 45-day public comment period. DEIS announces the Emergency Action Determination authority had been approved on May 16, 2024—**eight weeks prior**.

Almost 6½ years have transpired since the original solicitation of public comments on the alternative outlined in PA, but the FS still hasn't provided detailed written responses to any public comments. This subverts the National Environmental Policy Act (NEPA) process.

Under the CEQ's NEPA regulations, the Forest Service (FS) is required to prepare and release for public comment supplemental analysis when there are "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." [40 C.F.R. § 1502.9(c)(1)(ii).] Significant new circumstances and information relevant to environmental concerns have indeed arisen since the only previous time public comments were solicited (on the EOTW PA). These comments address new circumstances and new information. Some of those were not discussed, or received little mention and insufficient analysis in the EOTW PA and EA.

In light of the Court's decision on the FOC lawsuit, new and recent science, and new government policies discussed in these comments, the FS is obligated to consider other alternatives including: no logging of old growth or mature forest; no clearcuts/logged openings greater than 40 acres in extent, and incorporating sensible management implications based on the science regarding the climate crisis.

Deputy Regional Forester Keith B. Lannom's December 12, 2019 letter dismissing the FOC/AWR Objection to the 2019 EOTW draft DN provides instructions to the Responsible Official:

> As a result of the objection review, I am instructing the responsible official to complete the following before signing the decision. More detail regarding these instructions are include in the attached response document.
>
> 1. Identify the temporal and spatial scales of cumulative effects analysis for fire and fuels in compliance with NEPA. (see FSH 1909.15) for cumulative effects. (Issue 3, Contention 3B)
> 2. Correct maps in the project record to show that no treatments are occurring in Management Area 20. (Issue 5, Contention 5C)
> 3. Clarify how roads determinations in the project-level roads travel analysis were made and how they correlate to the 2015 forest-wide Travel Analysis Report (TAR). (Issue 9, Contention 9A)
> 4. Provide rationale regarding forest plan standards for roads. (Issue 9, Contention 9B)

We are not aware of documentation of the Responsible Official's fulfillment of the Deputy Regional Forester's instructions. It is not cited in the DEIS.

In the End of the World Project Objection Responses attached to the letter dismissing our Objection, the FS states in no less than five places:

> CEQ Regulation 40 C.F.R. §1508.9(a) defines an EA as a: ". . . concise public document for which a Federal agency is responsible that 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."

The newspaper Legal Notice announcing this comment period states, "The Forest is asking for substantive comments **only on the content of the Draft Environmental Impact Statement**." (Emphasis added.) But separately, the DEIS states, "The 2021 EA, FONSI, specialist reports for each resource, and other supporting documentation are **incorporated into this EIS** by reference." (Emphasis added.) To us this suggests, confusingly enough, previous EOTW documents are not considered "content of the (DEIS)" even though they are being incorporated within it. The content of the 2019 EA was written to preclude preparation of an EIS. The FS is essentially saying it can prepare an EA for some issues and an EIS for others—for the very same project—which is nonsense. The FS is not even supporting that contention with a scoping period, in essence putting the cart before the horse as the agency leaps before looking. This does not comply with NEPA.

The FS is merely attempting to prop up its previous decision and rule out reasonable alternative management approaches. Please note the February 26, 2021 letter from Advocates for the West concerning Hungry Ridge, which we incorporate into these comments. We urge the FS to retract this DEIS and provide the public with a full opportunity for comment by conducting a genuine NEPA process for all issues applicable and relevant to the EOTW project.

"EMERGENCY!" BYPASSING THE PREDECISIONAL REVIEW/OBJECTION PERIOD/PROCESS TO EXPEDITE LOGGING.

"(T)he Nez Perce-Clearwater Forest (NPC) requested an Emergency Action Determination for this project under the Bipartisan Infrastructure Law section 40807. …The request was approved on May 16, 2024." And without adequate analysis: "The reason for requesting this emergency authority is to mitigate the harm to life and property adjacent to NFS land; to control insects or disease; remove hazardous fuels; and protect and restore water resources and infrastructure." We note that this so-called "Emergency" was declared over six years after the project was initially scoped. So the PA and analyses in the EA, which identified no "Emergency"—were wrong? The FS must replace the entire EA, not merely incorporate it into this DEIS.

The FS decided to invoke this "Emergency Action Determination" (EAD) for EOTW, nearly 2½ years after PL 117-58 became law. Apparently, changed circumstances also include the agency's attempt to shortcut the public process and environmental review. There is nothing in the DEIS

analysis justifying the FS yelling "Emergency!" now. We don't even see a project specialist report written by an expert on fire behavior and fire effects. In place of genuine analyses, the FS substitutes yelling "Emergency" and spouting propaganda about how logging makes the world safe from fire.

A March 10, 2023 memo from FS Chief Moore states explains how the FS plans to move forward with implementing the EOTW timber sales with an EAD determination:

> Within these designated areas, I have the authority to approve emergency actions for which NEPA compliance actions are not subject to administrative review under 36 CFR 218, and an environmental assessment or environmental impact statement need only analyze the no action alternative and the proposed action. In addition, a proposed emergency action is subject to special injunctive relief standards if challenged in court.
>
> Going forward, the Forest Service will coordinate with the Office of the General Counsel and the Department of Agriculture to ensure departmental awareness and coordination in situations where I determine that emergency authorizations are appropriate for use.
>
> It is my expectation that we will take an Agency approach to address these emergency situations. In addition to expedited compliance authorities, we are deploying other administrative authorities within my discretion to accelerate environmental analysis, contracting, hiring, and project implementation such as:
>
> • Emergency and direct hire authorities to support the Wildfire Crisis Strategy with the objective of hiring new personnel in the most critical positions.
>
> • Expedited contracting authorities or mechanisms such as virtual incident procurement and related incident procurement instruments, sole source and small business authorities, simplified procurement processes, and USDA contracting authorities.
>
> • Prioritize grants and agreements for needed emergency work.
>
> • Exemptions, waivers, expanded inclusions, and expedited mechanisms for emergency programs on joint efforts with USDA agencies and Tribes.
>
> • Emergency consultation to comply with the Endangered Species Act.
>
> • Emergency and programmatic consultation to comply with the National Historic Preservation Act.
>
> • Emergency procedures to comply with the Clean Water Act; and,
>
> • Expedited permitting, certification, and qualification processes as defined in Forest Service directives or as directed by the Chief.
>
> I am also empowering our Regions and field units to identify those processes and

> procedures that may limit or delay your ability to implement these emergency actions. To that end, we have created an Emergency Actions Portal [direct link: Emergency Actions Portal - Home (sharepoint.com)] to intake and track your requests to use emergency authorities and identify challenging processes/procedures.
>
> The portal will serve as a one-stop-shop for requesting approval for emergency actions and to request exceptions to existing policy or guidance that is limiting your ability to expedite emergency actions. Use of these authorities must be approved on a case-by-case basis and the portal will be the mechanism to do this…

To best understand what that memo is saying, one need to only substitute the word "lawless" everywhere the Chief says "emergency" or "expedited." The author of these comments attempted to access the Chief's web "Portal" on July 29, 2024 and received the following message:

> # Error
>
> We're sorry, sign-in isn't working right now. But we're on it! Please try again later.
> If this problem persists, contact your support team and include these technical details:
> Correlation ID: ca2441a1-5007-6000-17c3-be46aac10ecd
> Date and Time: 7/29/2024 1:12:48 PM
> URL: https://usdagcc.sharepoint.com/
> Issue Type: Unknown issue.

Apparently the public is not allowed into "the usdagcc.sharepoint directory".

The Chief's "expedited compliance authorities" and other "administrative authorities" call into question the value of the public's participation in what appears to be a sham and perfunctory DEIS comment process. The FS's perspective seems to be: screw the public and the ecosystems, let's get out the logs as soon as possible. Clearly, nothing in our comments will matter one bit to the Forest Service/USDA.

There is also no analysis to demonstrate consistency with (3) "maximize the retention of large trees, as appropriate for the forest type, to the extent that the trees promote fire-resilient stands" or the prohibition on destroying old growth (6) "unless the old growth stand is part of a science-based ecological restoration project authorized by the Secretary concerned that meets applicable protection and old growth enhancement objectives, as determined by the Secretary concerned." The FS's retrofitting of a timber sale with an existing Decision into the category of a PL 117-58 "Emergency" project without adequate analysis reveals the agency's motivation to evade and bypass environmental laws.

FIRE RISK AND WILDLAND FIRE ECOLOGY

See our incorporated LMP Objection, which includes a section entitled "Fire Ecology and Fire Management."

The "Updated Old Growth Analysis" (UOGA) for the EOTW project states:

> In January 2022, the USDA, Forest Service, released a 10-year strategy, and are developing a comprehensive implementation plan for working with partners across jurisdictions to reduce wildfire risk to people, communities, and natural resources while sustaining and restoring healthy, resilient fire-adapted forests (USDA, Forest Service 2022a, 2022b and 2022d). In January 2023, USDA, Secretary Tom Vilsack announced expanded efforts to reduce wildfire risk across the western U.S., directly affecting the USDA Forest Service Northern Region's Nez Perce-Clearwater National Forest in Idaho, including the Lower Salmon Priority Landscape that includes the End of the World project area (USDA, Forest Service 2023). The End of the World project area spans portions of two High-Risk Priority Firesheds. **These firesheds if left untreated present the largest risk to communities and natural resources (including old growth), based on historic fire behavior.**

(Emphasis added.) The "Updated Old Growth Analysis" for the NPCNF's Hungry Ridge (HR) project makes claims such as the following under the No Action alternative: "As fuels increase, particularly those that create a ladder between the ground and live tree canopies, the risk of a lethal crown fire increases. … With increasing fuels due to succession, fire suppression, and insect and disease activity, old growth habitats in the area are at risk of experiencing stand replacing fire, thus reducing the amount of desired early-seral, old growth habitat." And no surprise—the UOGA for the EOTW (and the EOTW DEIS itself) includes the exact same statement. We incorporate our comments and objections to the HR project within these comments.

We recall the EOTW EA states, "The project lies entirely within the Wildland Urban Interface (WUI) for the Grangeville area." That EA and the current DEIS have no map showing the location of the WUI, nor do they explain how the forests of the project area pose this alleged emergency fire risk to Grangeville or any other private land or structures. The perspective of a former Forest Service researcher and a Missoula County commissioner illustrates why the UOGA/DEIS identification of wildlands as "the largest risk to communities" is misleading:

> …research has shown that home ignitions during extreme wildfires result from conditions local to a home. A home's ignition vulnerabilities in relation to nearby burning materials within 100 feet principally determine home ignitions. … Although an intense wildfire can loft firebrands more than one-half mile to start fires, the minuscule local conditions where the burning embers land and accumulate determine ignitions….. Thus, community wildfire risk should be defined as a home ignition problem, not a wildfire control problem.

(Cohen and Strohmaier, undated.) Even if this portion of our national forest creates fire risk to the so-called "WUI", the FS must still explain why the vast majority of American taxpayers, many millions of them struggling economically, should be willing to subsidize the perceived

safety of those few lucky enough to live in the vicinity of forests and other natural places. We say "perceived" because, as we discuss herein, the fire protection for homeowners implied by the FS is pretty much imaginary. Responsibility for reducing risk of fire burning private structures ought to and does rest squarely on the shoulders of the owners of those structures—not on U.S. taxpayers.

The FS completely omits any mention of the well-documented uncertainty of their strategy of using logging for reducing fire behavior, especially logging of mature forests, which could serve as fire refugia. It is increasingly understood that reducing fuels does not consistently prevent large fires and does little to influence the outcome of these fires. *See* Lydersen et al. 2014.

Many scientists, including a growing list of FS scientists, are finding that denser national forests tend to burn at lower—not higher—intensity during wildfires. As one group of U.S. Forest Service scientists found, denser, older forests with high canopy cover had lower fire severity and "buffer the negative effects of climate change" regarding wildfires, largely due to a less fire-prone microclimate in dense forests. (Lesmeister et al., 2019).

Those scientists explained this effect succinctly: "Thinned forests have more open conditions, which are associated with higher temperatures, lower relative humidity, higher wind speeds, and increasing fire intensity. Furthermore, live and dead fuels in young forest or thinned stands with dense saplings or shrub understory will be drier, making ignition and high heat more likely, and the rate of spread higher because of the relative lack of wind breaks provided by closed canopies with large trees."

Former FS Deputy Chief James Furnish weighs in:

> For a long time, we have heard that the problem is in the forests, and that we must ramp the pace and scale of work in these forests. The proponents ask for our continued faith that scaling is possible, even though they have been at it for nearly 30 years and most of our home and community loss happens in grasslands and shrublands.
>
> Let me begin by citing the large Jasper Fire, in SD's Black Hills National Forest, circa 2000. Jasper Fire burned almost 90,000 acres of intensively managed Ponderosa pine forest, about 10 percent of the entire national forest. Human caused, it was ignited on a hot, dry, windy July day – quite typical of weather in peak burning periods nowadays. Suppression efforts were immediate and used every tool in the agency's tool box… to no avail. Notably, the burned terrain exemplifies what we consider the best way to reduce fire intensity, if not fireproof, a forest. This mature forest of small saw timber had been previously thinned to create an open stand intended to limit the likelihood of a crown fire. Yet, the fire crowned anyway and raced across the land at great speed, defying control efforts. Much of the area remains barren 20 years later, while the Forest Service slowly replants the area.
>
> I cite this example, because it represents precisely what agencies posit as the solution to our current crisis: 1) aggressively reduce fuel loading through forest thinning on a massive scale of tens if not hundreds of millions of acres (at a cost of several $ billion, and then do

it again), while trying to 2) come up with sensible answers about how to utilize the finer woody material that has little or no economic value; and 3) rapidly expanding the use of prescribed fire to reduce fire severity. These solutions are predicated on the highly unlikely (less than 1%) probability that fire will occur exactly where preemptive treatments occurred before their benefits expire. These treatments are not durable over time and space, and only work if weather conditions are favorable, and fire fighters are present to extinguish the blaze.

To be blunt, the ineffectiveness of current practices has led many scientists to suggest, based on peer reviewed science and field research as opposed to modeling, that agency "fire dogma" needs to be revisited. The call for a true paradigm shift is occurring both within and outside the agency. Several truths have emerged:

1) Fires burn in ways that do not "destroy", but rather reset and restore forests that evolved with fire in ways that enhance biodiversity.
2) Forest carbon does not "go up in smoke" – careful study shows that more than 90 percent remains in dead and live trees, as well as soil, because only the fine material burned.
3) The biggest trees in the forest are the most likely to survive fire, and thinning efforts that remove mature and older trees are counter-productive. We are seeing more cumulative fire mortality in thinned forests, than in natural forests that burn.
4) Thinning and other vegetation removal increases carbon losses more than fire itself and, if scaled up, would release substantial amounts of carbon at a time when we must do all we can to keep carbon in our forests.
5) If reducing home loss is our goal, experts are telling us that the condition of the structure itself and vegetation immediately adjacent to the home are the primary drivers of home ignition and loss, and that the condition of vegetation more than 100 feet from the home has nothing to do with the ignitability or likelihood a home will burn.
6) Large, wind-driven fires defy suppression efforts and many costly techniques simply waste money and do more damage. Weather changes douse big fires, people do not.

(Furnish, 2022.) And Downing et al 2022 state, "Focusing on minimizing damages to high-value assets may be more effective than excluding fire from multijurisdictional landscapes."

In his opinion piece in the Missoulian, biologist and fire ecologist Hutto (2022) echoes those points. Also see DellaSala (2022). Yet as the District Ranger's "OPPORTUNITY TO COMMENT" letter and the UOGA reveal, the FS keeps spewing fear mongering propaganda, representing to the public that logging is needed to protect people and homes from fire.

Baker et al., 2023 is new scientific information pertaining to fire. The Abstract states:

> The structure and fire regime of pre-industrial (historical) dry forests over ~26 million ha of the western USA is of growing importance because wildfires are increasing and spilling over into communities. Management is guided by current conditions relative to the historical range of variability (HRV). Two models of HRV, with different implications, have been debated since the 1990s in a complex series of papers, replies, and rebuttals. The

> "low-severity" model is that dry forests were relatively uniform, low in tree density, and dominated by low- to moderate-severity fires; the "mixed-severity" model is that dry forests were heterogeneous, with both low and high tree densities and a mixture of fire severities. Here, we simply rebut evidence in the low-severity model's latest review, including its 37 critiques of the mixed-severity model. A central finding of high-severity fire recently exceeding its historical rates was not supported by evidence in the review itself. A large body of published evidence supporting the mixed-severity model was omitted. These included numerous direct observations by early scientists, early forest atlases, early newspaper accounts, early oblique and aerial photographs, seven paleo-charcoal reconstructions, ≥18 tree-ring reconstructions, 15 land survey reconstructions, and analysis of forest inventory data. Our rebuttal shows that evidence omitted in the review left a falsification of the scientific record, with significant land management implications. The low-severity model is rejected and mixed-severity model is supported by the corrected body of scientific evidence.

So let's follow the money. Baker et al., 2023 point out that many research scientists who are funded by or work for the FS promote the "low severity fire model" so they can justify the myth that logging will prevent forests from being "destroyed" by the prevailing fire regime: mixed- and high-severity fires. The so-called "emergency situation" is a smokescreen for expedited logging. Since fire cannot be entirely removed from this landscape that will continue to feature mixed- and high-severity fires, actions taken in the Home Ignition Zone of the privately owned structures in the vicinity of the EOTW project area are the real key for structure survival. Furthermore, the public has never been provided a guarantee of hazard-free ingress/egress—nor should we. That would essentially involve an annual removal of all combustible vegetation adjacent to roads, and furthermore everywhere in the fireshed from where a fire could source firebrands that could be carried by the thermal forces and the wind onto private properties—a ridiculous proposition whereby the U.S. taxpayers provide infinite subsidies for the uncertain benefits of a few. Finney and Cohen, 2003 state: "The probability that a structure burns, …has been shown to depend exclusively on the properties of the structure and its immediate surroundings (Cohen 2000a)."

Baker et al., 2023 reveals manipulation of evidence by researchers associated with the federal approach to fire management, providing an in-depth look at how the FS's prevailing hypothesis underlying forest thinning projects in the western U.S.—its low-severity open forest model—has been falsified. We note that the draft EIS for the NPCNF forest plan revision recognizes that the mixed-severity fire regime is most prevalent on the NPCNF.

Furthermore, those responsible for firefighter safety must always mitigate and minimize the risk. This will always involve the choice to withhold personnel from entering dangerous situations, simply because those dangers are potentially omnipresent.

It is unwise that the FS wants to replace dense, shadier and cooler conifer forests with clearcuts and, eventually, densely packed little trees–in the name of reducing severe fire behavior. Atchley et al., 2021 note that heavier fuels actually slow fire spread. They also state:

> Wind entrainment associated with large, sparse canopy patches resulted in both mean and localised wind speeds and faster fire spread. Furthermore, the turbulent wind conditions in large openings resulted in a disproportional increase in TKE [Turbulence Kinetic Energy] and crosswinds that maintain fire line width.

Good graphics can be found on the interagency "Living with Fire" publications, such as can be found at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_020876.pdf. This booklet spans many regions and on page 4 provides the graphics showing that an open pine forest can burn at 150 acres per hour while dense conifer forest can burn at 15 acres per hour with 20mph wind speeds.

Another version of "Living with Fire" includes an additional graphic showing "dense confer reproduction" can burn at 650 acres per hour with 20 mph winds: (https://firesafemt.org/img/LivingwFireFSM20091.pdf)–second only to grass and brush fires.

The FS completely omits any mention of the well-documented uncertainty of their strategy of using logging to control or mitigate future fire behavior, especially logging of mature forests that could serve as fire refugia. Our LMP Objection elaborates upon what we state below.

It is well understood in scientific circles that reducing "fuels" does not consistently prevent large fires and does not reduce the outcome of these fires. Large fires are driven by conditions that completely overwhelm the presence, quantity, and arrangement of "fuels." (Meyer and Pierce, 2007.) Because weather is often the greatest driving factor of a forest fire, and because the strength and direction of the wildfire is often determined by topography, fuels reduction projects cannot guarantee fires of less severity. (Rhodes, 2007; Carey and Schumann, 2003.)

We question the wisdom of attempting to control wildfire rather than learning to adapt to its inevitability. See Powell 2019 (noting that severe fires are likely inevitable and unstoppable). See also Schoennagel et al., 2017 (explaining, "[o]ur key message is that wildfire policy and management require a new paradigm that hinges on the critical need to adapt to inevitably more fire in the West in the coming decades"). The DEIS ignores the science indicating past logging practices tend to increase the risk of intense fire behavior on this landscape. The FS refuses to learn from mistakes in proposing to inflict intensive logging across the project area.

The risks fires pose to human life and property—the built environment—are best dealt with in the immediate vicinity of the properties, and by focusing on routes for home occupier egress during fire events—not by logging national forest lands far from human occupied neighborhoods.

We strongly support government actions that facilitate cultural change towards landowners taking the primary responsibility for mitigating the safety and property risks of fire, by implementing firewise activities on their property and surrounding structures. The best available science supports such a prioritization.

While also discussing the positive role that old growth ("untreated" old growth) plays in moderating impacts from high-severity fires, Lesmeister et al. (2019) state:

> Because of the spatiotemporal variability across the landscape, mixed-severity fire regimes are the most complex and least understood fire regimes, unique in terms of patch metrics and the life history attributes of native species (Schoennagel et al. 2004, Agee 2005, Halofsky et al. 2011). Fire histories in mixed-severity regimes, in particular, are difficult to determine because most fire history techniques have been developed to study either the low- or high-severity extremes in fire regimes (Agee 2005)."

Project area forest density is a part of a climate solution, not a problem to be solved by logging. There is abundant scientific information implicating FS management practices in increasing severity fire on the landscape.

Lesmeister et al. (2019) provide an enlightened perspective of the kind of fire events demonized by the FS:

> Short-interval severe fires are an important characteristic of mixed-severity fire regimes and are typically considered extreme events and expected to be deleterious to forest succession and diversity (Donato et al. 2009). However, many native plants within these forests possess functional traits (e.g., persistent seed banks, vegetative sprouting, rapid maturation) lending to resilience to short-interval severe fires that result in distinct vegetation assemblages that enhance landscape heterogeneity inherent to mixed-severity fire regimes (Donato et al. 2009). Furthermore, high diversity of vegetation types, driven by short-interval repeat fires in a mixed-severity fire regime landscapes, plays an important role in conservation and the structure of avian communities (Fontaine et al. 2009).

McRae et al. 2001 provide a scientific review summarizing empirical evidence that illustrates several significant differences between logging and wildfire—distinctions the FS 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 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 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." In fact, the study's results suggest the opposite: "(B)urn 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." This study discusses other findings:

> 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).

From a news release announcing the results of the Bradley et al. 2016 study:

> "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."

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." This indicates that logging is more likely to result in severe fires than the current conditions. The DEIS fails to acknowledge or even explore scientific controversies such as this.

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. The DEIS fails to acknowledge or even explore this scientific controversy.

Typically, attempts to control or resist the natural process of fire have been a contributor to deviations from historic conditions. The FS analyses view fire as well as native insects and other natural pathogens as threats to the ecosystem rather than rejuvenating natural processes. The DEIS fails to acknowledge or even explore this scientific controversy.

The FS relies upon its 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.

The implication is clear: under the FS's regime, logging and fire suppression are 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 and implying departures from historic conditions, the FS does not provide a spatial analysis, either for the true reference conditions or of current project area conditions. The FS has no scientifically defensible analysis of the alleged departure of the project area **landscape pattern** from a legitimately determined range of natural conditions.

If the FS predictions of uncharacteristically severe fire were accurate, one might think that would have been by studies and data gathered in the NPCNF by now, concerning recent fires. We find no data or scientific analysis of such fire effects validating the FS's predictions of uncharacteristically severe or intense fire effects if the "fuel reduction" is not conducted. The FS's statements about the impacts of fire are speculative and not based upon data or 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.**

The DEIS fails to explain the fire implications of no treatment applied to untreated portions of the project area under the action alternatives.

The DEIS did not provide a genuine cumulative effects analysis of the varying amounts and levels of effectiveness of fuel changes attributable to: the varying ages of the past logging on varying forest types, the effects of slash treatments, etc.

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.

That actions such as the proposed would result in increased fire severity and more rapid fire spread was recognized in a news media discussion 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 asserts a 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." And for an ecological perspective from the FS 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.)

Frissell and Bayles (1996) state:

> …The concept of range of natural variability …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.** (Emphases added.)

George and Zack, 2001 "recommend that managers: (1) identify the wildlife species they want to target for restoration efforts, (2) consider the size and landscape context of the restoration site and whether it is appropriate for the target species, (3) identify the habitat elements that are necessary for the target species, (4) develop a strategy for restoring those **elements and the ecological processes that maintain them**, and (5) implement a long-term monitoring program to gauge the success of the restoration efforts." (Emphasis added.)

Attachment 5 is a collection of news media articles, quoting experts including those in the FS, who understand the ecological value of severely burned forests.

The FS fails to disclose or acknowledge the scientific information that indicates severe fires burning over large acreages are normal for the NPCNF, 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 DEIS 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.

The FS has no coherent plan for integrating wildland fire back into this ecosystem. The FS management represents a forever war against wildland fire, which is a war against nature.

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 over the years 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.

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."

The FS has never conducted consultation with the U.S. Fish and Wildlife Service on its forestwide fire management plan, which has clear ramifications for species listed under the Endangered Species Act.

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.

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 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 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 DEIS 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[1] 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.

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

In effect, the logging of the EOTW project area would exacerbate any “EMERGENCY” conditions the FS claims it is saving us from. The DEIS also fails to recognize likely alterations of the fire regime due to climate change.

And many direct and indirect effects of fire suppression itself are also ignored in the DEIS, as well as in a 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 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.

Two recent peer-reviewed scientific articles suggest genuine solutions. Baker et al. (2023b) provides an alternative approach to fire and insect outbreaks that focuses on using wildfire for ecosystem benefits and redirecting fire prevention efforts at communities. Importantly, they explain that high-severity fire rotation intervals (landscape scale) are on the order of centuries (within historic bounds), providing ample time for old-growth forests to develop even if fire rates were to double due to climate change. Additionally, beetle/drought cycles are on very long rotation intervals (within historic bounds). This indicates that large-scale logging to contain fires and beetles will not work in a period of changing climate, and in fact will do far more damage.

Law et al. (2023) also redefines the fire problem, emphasizing working with fire for ecosystem benefits and prioritizing community protections over massive thinning/logging that end up emitting far more greenhouse gasses into the atmosphere. They buttress calls from scientists for coexisting with wildfires and rejecting false solutions such as more logging. The lead author, Dr. Law, is a leading climate scientist that has worked on IPCC reports.

The premise that thinning and other mechanical treatments replicate natural fire is contradicted by much science (e.g., Rhodes and Baker 2008, McRae et al 2001, and Rhodes 2007). DellaSala, et al. (1995) are skeptical about the efficacy of intensive fuels reductions as fire-proofing methods.

Hutto (2008) states:

> (C)onsider the question of whether forests outside the dry ponderosa pine system are really in need of "restoration." While stem densities and fuel loads may be much greater today than a century ago, those patterns are perhaps as much of a reflection of human activity in the recent past (e.g., timber harvesting) as they are a reflection of historical conditions (Shinneman and Baker 1997). Without embracing and evolutionary perspective, we run the risk of creating restoration targets that do not mimic evolutionarily meaningful historical conditions, and that bear little resemblance to the conditions needed to maintain populations of native species, as mandated by law (e.g., National Forest Management Act of 1976).

The FS claim that the proposed logging would reduce potential for severe fire behavior represents misguided actions in opposition to natural processes—namely the growth native vegetation (misleadingly referred to as "fuels). The FS oversells the ability of land managers to wisely conduct fire suppression tactics. Many likely fire scenarios involve weather conditions when firefighters can't react quickly enough, or when it's too unsafe to attempt suppression. With climate change, this could occur more frequently. Other likely scenarios include situations where

firefighting might be feasible but resources are stretched thin because of higher priorities elsewhere. Those responsible for firefighter safety must mitigate and minimize the risk. This always includes the option—responsibility, really—to withhold personnel from dangerous situations.

The FS fails to provide a full and detailed accounting of the costs to those who would pay for this never-ending "fuels reduction" cycle—the American taxpayers. It is also in the FS's best interest to know what sort of long-term financial commitments it is making. The FS fails to disclose the inherent uncertainties of perpetually funding these activities, and the implications of their being left undone. The public must be informed as to what the scale of the long-term efforts must be, including the amount of funding necessary, and the likelihood based on realistic funding scenarios for such a program to be adequately and timely funded.

Summing up, the FS has failed to properly analyze and consider the fact that the proposed logging will actually create conditions for more rapid and severe fire spread and cumulative impacts in the coming decades. Please address this issue prior to a final decision on EOTW.

WILDLIFE

The UOGA states, "Forest Plan Management Area 20 are those areas that are to be managed as old growth habitat for old growth- dependent wildlife species." Further, the Forest Plan states, "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."

The UOGA states, "This analysis replaces the old growth analysis in the End of the World - Terrestrial Wildlife Resources Biological Assessment, Biological Evaluation, & Specialist report (2021)." Since the silviculturist is changing the wildlife biologist's conclusions in three reports based partially on faulty information (as the Court noted and as we discuss below in regards to the old-growth inventory), the FS is now obligated to accept and evaluate comments on all wildlife.

The Court also declared that the EA failed to comply with the forestwide 10% old-growth standard. This constitutes new information concerning population viability on the NPNF. 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 Appendix N states, "Current information indicates that, in order to maintain a viable population of old-growth-dependent species, it is necessary to maintain 10 percent of the total forested acres as old growth…" In addition, 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.

The DEIS fails to demonstrate that the NPNF now meets its 10% old-growth minimum standard, thus ignoring this significant new information.

The Forest Plan defines old-growth management indicator species (MIS):

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

POPULATION VIABILITY

Our LMP Objection discusses this topic in various sections discussing wildlife and fish species. And see FOC et al comments on the draft LMP/draft EIS, which includes a section entitled "Viability."

GOSHAWK

Our LMP Objection expresses our concerns in a section titled "Bird Species Diversity" and in the incorporated FOC et al draft LMP/draft EIS comments in a section entitled "Northern Goshawk."

The NPCNF's Longleaf project Wildlife Report states, "In 2023, American Ornithological Society separated Northern Goshawk (*Accipiter gentilis*) and American Goshawk (*Accipiter atricapillus*) based on DNA, morphological, and vocal differences (Chesser 2023). American goshawk is the species found on the Forest (Billerman 2022)." The EOTW DEIS doesn't explain the distinction, nor consider its implications for the goshawk's status as MIS.

PILEATED WOODPECKER

Our incorporated LMP Objection expresses our concerns in sections titled "Bird Species Diversity" and "Old Growth and Old-Growth Ecosystems." Also see the incorporated FOC et al draft LMP/draft EIS comments in a section entitled "Pileated Woodpecker."

BLACK-BACKED WOODPECKER

Our incorporated LMP Objection expresses our concerns in a section titled "Bird Species Diversity" and in portions where fire ecology is discussed. Also see the incorporated FOC et al draft LMP/draft EIS comments in a section entitled "Black-Backed Woodpecker."

FISHER

See our LMP Objection, which discusses issues of FS habitat management in the Fisher section.

Krohner (2020) highlights the critical importance of the NPNF for the management indicator species, fisher:

> Spatial occupancy analyses identified two core areas with higher predicted occupancy estimations: a large area across the Nez-Perce Clearwater National Forest, and a smaller area in the Cabinet Mountain Range crossing the northern end of the shared border of Idaho and Montana. Our results provide empirical evidence supporting previous inference that these areas serve as core habitat for fishers within the northern Rockies (Sauder, unpublished). The prevalence of native haplotype observations in the Nez Perce-Clearwater National Forest (Appendix IV) may indicate that this core area has been of conservation importance for some time. Genetic research by Vinkey et al. (2006) and Schwartz (2007) established that the Nez Perce-Clearwater is where fishers survived their minimum population numbers, while our results from both spatial and non-spatial analyses demonstrate that fishers currently occupy this area to a greater extent. However, our results also demonstrate an absence of fisher detections in large areas across the landscape, even within predicted fisher habitat, which suggests the need for continued monitoring to address drivers of fisher distribution and reassess currently defined suitable fisher habitat. Identifying core habitat allows us to make effective use of conservation dollars, and avoid futile attempts to maintain fisher presence in areas where they are not able to persist long-term. Future conservation actions should consider prioritizing areas identified as core habitat.

In Forest Plan revision, the FS admits in its Species of Conservation Concern document that it has no recent data for the fisher. The FS cannot assume that fisher populations are viable based on old data while the impacts of logging and trapping have been accumulating in the interim.

In a section entitled "Important statements from research" Kootenai National Forest (2004) identifies components of complexity as important for the Sensitive species, fisher.

- Jones, 1991: "…fishers did not use non-forested habitats." "It is crucial that preferred resting habitat patches be linked together by closed-canopy forest travel corridors."
- Ruggiero et al. 1994: "...**physical structure of the forest** and prey associated with forest structures are the **critical features that explain fisher habitat use**, not specific forest types.
- Thomas, 1995: "**Most habitats preferred by fishers have been described as structurally complex, with multiple canopy layers and abundant ground-level structure (in the form of logs, other downed wood, under-story shrubs, etc**.). Powell and Zielinski (1994) listed three **functions of structural complexity**, which may be important for fishers: high diversity of prey populations, high vulnerability of prey items, and increased availability of dens and rest sites. Structure also substantially influences

> snow accumulation and density, which have been shown to be important variables in fisher habitat use (Raine 1983, Leonard 1980, Powell and Zielinski 1994)."

Such complexity can be seen in the photographs included in "120802MWardEmsgProjDevelopmentDiscussioWithJOppenheimer.pdf".

Allen et al. (2021) found that fishers in their study scavenged more in the winter than in the summer, and hypothesize this is due to the season making them energetically stressed. This increases cumulative effects from trapping, particularly where baiting is allowed.

Cumulative impacts of climate change are not analyzed for the fisher. See McKelvey and Buotte 2018.

The FS cites no forestwide analysis comparing current conditions with habitat metrics required to insure fisher viability.

The FS's analyses for other wildlife show similar flaws, including the lack of a genuine cumulative effects analysis.

CANADA LYNX

Our LMP Objection further expresses our concerns in a section on Canada lynx. We also incorporate the documentation of AWR's participation in the NRLMD public process within these comments.

The project would result in unauthorized **take** as defined by Section 9 of the ESA, in violation of the Endangered Species Act (ESA).

The DEIS does not include an analysis comparing the historic range of lynx habitat components with current conditions.

The FS incorporates the Northern Rockies Lynx Management Direction (NRLMD) into the Forest Plan. U.S. Fish and Wildlife Service, 2017a notes repeatedly that the effectiveness of the NRLMD has never been officially evaluated, including references that effectiveness is "uncertain," or that effectiveness is "likely" or "assumed" or "most certainly" benefiting lynx conservation (e.g. at pp. 3, 21, 22, 36, 37, 57, 137, 155, 158). The USFWS concludes that the NRLMD "is likely" to continue to support conservation and restoration of lynx, while at 231 notes that "uncertainty" remains as to it effectiveness. (Id). While the 2023 SSA Addendum claims that the NRLMD has been demonstrated to be effective in conserving lynx, the scientific basis of this determination was not cited.

In addition, the population trend of lynx has not been effectively monitored (e.g., U.S. Fish and Wildlife Service, 2017a at 3, 18, 21, 36, 107, 140, 143).

Measuring the effectiveness of the Forest Plan on lynx population trends is essentially impossible as the NRLMD has no measurable habitat standards, in violation of NEPA, NFMA, and the ESA.

The NRLMD has only two habitat standards for lynx. One is Standard VEG S1, which requires that within Lynx Analysis Units (LAUs), only 30% of "mapped lynx habitat" can be in a clearcut condition (updated to "early stand initiation stage" instead of "stand initiation stage") that has not regenerated and developed into winter snowshoe hare habitat (usually trees extending above the winter snows)(NRLMD ROD at Attachment 3), a period that is estimated to take 20 - 40 years. This 30% restriction does not include any forest habitat within a LAU that is not mapped as lynx habitat. This 30% restriction does not include any natural openings within a LAU. This percentage of non-lynx habitat can be considerable within LAUs. In effect, the total amount of openings allowed in a LAU is greater than 30%, as it will include clearcuts in forests identified as non-lynx habitat, plus all natural openings. Since there is no actual limit on openings within a lynx home range as per the NRLMD, the effect of the 30% standard cannot be measured because this would not include all openings within a LAU.

The NRLMD has one other habitat standard, which is Standard ALL S1 requiring vegetation management actions to "maintain" habitat connectivity across an entire LAU, including all non-lynx habitat. There are no actual definitions included in this standard in the NRLMD FEIS/ROD as to what constitutes maintaining connectivity. To date, we have not observed any actual definitions or measurements as to how vegetation projects affect connectivity within occupied lynx habitat within USFS Regions 1 and 4, or as applied by the USFWS in consultations on vegetation treatments in lynx habitat. Standard ALL S1 is always claimed in Regions 1 and 4 to be maintained in spite of planned and existing vegetation treatments, due to the lack of any definitions of what connectivity entails. There is an actual scientific definition of "maintained" lynx habitat connectivity within lynx habitat. Connectivity would consist of roughly 70% of a home range, by adding the 50% mature forest habitat and 20% advanced regeneration forests reported for lynx breeding habitat in Unit 3 (Holbrook et al. 2019; Kosterman et al. 2018). Both habitats, as measured in these research publications would provide travel cover for lynx due to densities of forest structure. This 70% habitat connectivity for lynx based on the current best science is surprisingly close to the habitat connectivity recommendations provided 35 years ago by Brittell et al. (1989 at Table 2); this document recommended 30% foraging habitat, 30% travel habitat, and 6% denning habitat, which would provide 68% connectivity within a lynx home range.

Page 181 of the NPCNF LMP (revision) Biological Assessment (BA) states:

> New lynx analysis unit boundaries were developed in 2014 as part of the Forest Plan Revision Process, and in consultation with the Regional Office (NRLMD Standard LAU S1) to better align with the updated habitat model. The proposal would reduce the number of lynx analysis units from 106 currently to 79 (37 in occupied habitat, 39 in unoccupied habitat, and 3 which overlap occupied/unoccupied habitat). Under previous lynx analysis unit boundaries, one lynx analysis unit exceeded 30 percent currently/temporarily unsuitable habitat and an additional nine lynx analysis units were above 20 percent while several did not contain any lynx habitat. Under the new lynx analysis unit boundaries two

of the lynx analysis units are above 30 percent temporarily unsuitable and potential lynx habitat is at or above 20 percent temporarily unsuitable. The majority of these lynx analysis units are either partially or wholly within MA1 or MA2 with minimal overlap into MA3. Also, under the new lynx analysis unit boundaries there are no "empty" lynx analysis units.

Removing lynx analysis units (LAUs) without soliciting public comment is a violation of NEPA and NFMA.

The Draft Recovery Plan at Table 2, page 14, identifies the "estimated" lynx population size in Unit 3 as between 200 - 300 animals, based on expert opinion or published estimates of carrying capacity. In 2009, Dr. John Squires provided a lynx population estimate in Unit 3 in a recorded interview as approximately 300 animals (McMillion 2009). This same maximum number estimated today, 15 years later. So since the NRLMD was adopted in 2007, no increase in lynx populations in Unit 3 is "estimated".

With a lack of monitoring of the effectiveness of the NRLMD to conserve and restore lynx, the current best science clearly demonstrates this management direction will not conserve and restore lynx populations in violation of NEPA, NFMA and the ESA.

The 2007 NRLMD was based on the Lynx Conservation and Assessment (LCAS 2000), which was in a small part, based on Brittell et al. (1989). The reference to use of Brittell et al. (1989) "in part" is because only the 30% opening standard in mapped lynx habitat of the NRLMD was based on Brittell et al. (1989). This was noted in the NRLMD ROD at 9 and 16, and in the NRLMD FEIS at page 72. We could not find anywhere in the LCAS (2000) where the 30% clearcut standard was attributed to Brittell et al. (1989); the basis for this recommendation in the LCAS was never clear as to how it was based on the current best science.

While the Brittell et al. (1989) guidelines for lynx habitat management included a host of recommendations, only its reference to 30% openings was incorporated into the LCAS (2000) and 2007 NRLMD. Other conservation recommendations never used from Brittell et al. (1989) include:

- management of lynx habitat within every 640 acres (page 99)
- including natural openings within a 30% opening threshold (page 33)
- maintaining lodgepole pine stands instead of converting to other more commercially valuable stands (page 92, 101)
- keeping openings under 600-1200 feet wide, with optimum opening width of 300 feet (page 102)
- keeping roads to a minimum (page 33)
- limiting clearcuts to 20 - 40 acres (page 101)
- managing forest stands as 40-acre units (page 99)
- emphasizing lodgepole pine (75% of landscape) as a key lynx habitat characteristic (page 97)
- developing monitoring procedures to address the impact of forest activities and these habitat recommendations on lynx conservation (page 95).

As noted by Brittell et al. (1989) they were providing recommendations for lynx conservation that required monitoring to ensure validity. The current best science clearly indicates that the 30% clearcut standard in the NRLMD is invalid and has likely allowed vast habitat losses within occupied lynx habitat.

Our incorporated LMP Objection also discusses twelve other significant flaws of the 2007 NRLMD in regards to conservation and recovery of the threatened Canada lynx.

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.

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 Peg. Reg. at 8617.

Lynx winter habitat in older, multi-storied forests, is critical for lynx preservation. (Squires et al. 2010.) The also reported that lynx winter habitat should be "abundant and spatially well-distributed across the landscape" (Squires et al. 2010; Squires 2009) and in heavily managed landscapes, retention and recruitment of lynx habitat should be a priority.

Winter is the most constraining 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.) Openings, whether small in uneven-aged management, or large with clearcutting, remove lynx winter travel habitat on those affected acres, since lynx avoid openings in the winter. (Squires et al. 2010.) Existing openings such as clearcuts not yet recovered are likely to be avoided by lynx in the winter. (Squires et al. 2010; Squires et al. 2006a) 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.

Prey availability for lynx is highest in the summer. (Squires et al., 2013.)

The Lynx Conservation Assessment and Strategy (LCAS 2000) noted 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.

Kosterman, 2014 finds 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.

Other recent science also undermines the FS's assumption of the adequacy of the Forest Plan/NRLMD. The FS 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 fully contradict Forest Plan assumptions that clearcuts/regeneration can be considered useful lynx habitat as early as 20 years post-logging.

And the FS erroneously assumes clearcutting/regeneration logging have basically the same temporal effects as stand-replacing fire as far as lynx re-occupancy. Also conflicting with Forest Plan/NRLMD assumptions is a study by Vanbianchi et al., 2017, who found, "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."

Kosterman, 2014, Vanbianchi et al., 2017 and Holbrook, et al., 2018 each demonstrate that the Lynx Amendment standards are not adequate for lynx viability and recovery, as the FS assumes.

Squires et al. (2013) noted that long-term population recovery of lynx, as well as other species such as the grizzly bear, require maintenance of short and long-distance connectivity. The importance of maintaining lynx linkage zones for landscape connectivity should be maintained to allow for movement and dispersal of lynx. Lynx avoid forest openings at small scales, however effects on connectivity from project-created or cumulative openings were not analyzed in terms of this smaller landscape scale. And connectivity between project area LAUs and adjacent LAUs was not analyzed or disclosed.

The FS fails to consider how much lynx habitat is affected by snowmobiles and other recreational activities. As USDA Forest Service, 2017g states, "The temporal occurrence of forest uses such … winter (skiing and snowmobiling) … may result in a temporary displacement of lynx use of that area…"

Because the FS does not consider the best available science and for the reasons stated herein, the FS is unable to demonstrate it is managing consistent with NFMA, the Forest Plan and the Endangered Species Act. The inadequacy of cumulative effects analysis violates NEPA.

ELK

See our incorporated FOC et al draft LMP/draft EIS comments in a section entitled "Elk".

The science is clear that motorized access via trail, road, or oversnow adversely impact elk habitat. Servheen, et al., 1997 indicate that motorized trails increase elk vulnerability and reduce habitat effectiveness, and provide scientific management recommendations.

The DEIS fails to provide a meaningful analysis of the cumulative impacts of recreational activities on elk. Wintertime is an especially critical time for elk, and stress from avoiding motorized activities takes its toll on elk and populations.

Scientific information recognizes the importance of thermal cover, including Lyon et al, 1985. Christensen et al., 1993 also emphasize "maintenance of security, landscape management of coniferous cover, and monitoring elk use…" This USFS Region 1 document also states, "management of winter range to improve thermal cover and prevent harassment may be as important as anything done to change forage quantity or quality."

And Black et al. (1976) provide definitions of elk cover, including "Thermal cover is defined as a stand of coniferous trees 12 m (40 ft) or more tall, with average crown exceeding 70 percent. Such stands were most heavily used for thermal cover by radio-collared elk on a summer range study area in eastern Oregon (R.J. Pedersen, Oregon Department of Fish and Wildlife—personal communication)." Black et al. (1976) also state:

> Optimum size for thermal cover on summer and spring-fall range is 12 to 24 ha (30 to 60 acres). Areas less than 12 ha (30 acres) are below the size required to provide necessary internal stand conditions and to accommodate the herd behavior of elk.

> …Cover requirements on winter ranges must be considered separately and more carefully. Animals distributed over thousands of square miles in spring, summer and fall are forced by increasing snow depths at higher elevations to concentrate into much restricted, lower-elevation areas in mid- to late-winter. Winter range, because of its scarcity and intensity of use, is more sensitive to land management decisions.

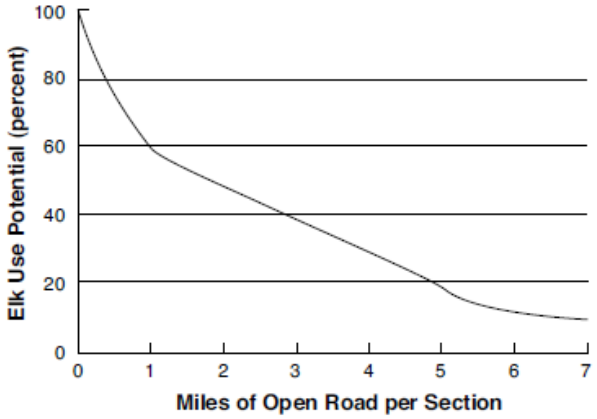
Regarding Black et al. (1976) conclusions, Thomas et al., 1988a state, "We concur. New research on elk use of habitat on summer and winter ranges has become available, however (Leckenby 1984). Land-use planning requirements indicate that a model of elk winter-range habitat effectiveness is required."

Thomas et al., 1988a also state:

> Thomas and others (1979, p. 104-127) defined two types of cover: thermal and hiding. Thermal cover was "any stand of coniferous trees 12 meters (40 ft) or more tall, with an average canopy closure exceeding 70 percent" (p. 114). Disproportionate use of such cover by elk was thought to be related to thermoregulation. Whether such thermoregulatory activity occurs or is significant has been argued (Geist 1982,Peek and others 1982). In the context of the model presented here, arguing about why elk show preference for such stands is pointless. They do exhibit a preference (Leckenby 1984; see Thomas 1979 for a review). As this habitat model is based on expressed preferences of elk, we continue to use that criterion as a tested habitat attribute. We cannot demonstrate that the observed preference is an expression of need, but we predict energy exchange advantages of such cover to elk (Parker and Robbins 1984). We consider it prudent to assume that preferred kinds of cover provide an advantage to the elk over nonpreferred or less preferred options.

Christensen, et al. (1993) is a Region One publication on elk habitat effectiveness. Meeting a minimum of 70% translates to about 0.75 miles/sq. mi. in key elk habitat, as shown in their graph:

5. Levels of habitat effectiveness:



Also, Ranglack, et al. 2017 investigated habitat selection during archery and rifle hunting seasons.

The FS chose the fisher as a management indicator species (MIS) and a plan standard is to "[m]onitor population levels of all Management Indicator Species on the Forest...Population levels will be monitored and evaluated as described in the Forest Plan Monitoring Requirements (Chapter V of the Forest Plan)." The Forest Plan requires this monitoring every 3-5 years. The FS last published a monitoring report for the Nez Perce National Forest in 2004, and previous to then reviewed fisher data in the monitoring report in 2002. In the 2002 monitoring report, the FS summarized fisher information that was not based on any sampling the agency did or verified. If the FS is not required to produce population monitoring for an entire species on a project-by-project basis over the course of the plan, surely it must account for population trends at the end of the forest-plan period after these projects have been implemented and when the agency decides to revise the plan. Otherwise, when would population trends ever be monitored? But, even now, as forest plan revision is nearing completion, the FS admits in its Species of Conservation Concern document that it has no recent data for the fisher. The FS cannot assume that fisher populations are viable based on old data while the impacts of logging and trapping have been cumulatively adding up in the interim.

Starting with the relatively low numbers that the Nez Perce 2002 Monitoring report recognizes, cumulative impacts from trapping have been accumulating. Trapping is allowed on the Nez Perce-Clearwater National Forest. In response to an information request from Western Watersheds Project, Idaho Department of Fish and Game (IDFG) reported that traps set for wolves had caught 56 fisher (20 of which died in the traps) since 2012. *See* IDFG Non-target wolf trapping LICYEAR2013-2019 spreadsheet. The year that the FS drafted the assessment, in the 2013-2014 season, IDFG reported that 22 fisher were trapped that season, 10 of which died in traps. While the trappers reporting these numbers indicated the balance were released, we don't know if trapping contributed to mortality shortly thereafter. Also, these are just the numbers reported, so we don't know if there were more unreported, either because trappers chose not to or did not check their traps. While we don't know where this trapping occurred, the FS has recognized that the NPCNF contains a lot of fisher habitat, so it follows that at least some of these numbers were likely from this Forest. Also, it is very reasonably foreseeable that trapping is going to increase for several reasons. For one, Idaho Fish and Game Commission extended the wolf trapping season, so active traps will exist longer on the landscape, and these season modifications impact parts of both the Nez Perce and Clearwater National Forests. *See* Idaho Fish and Game Commission (2020), compare with IDFG hunting units map (2020)—both accompanying this letter. The second reason is that trapping depends on access. As discussed above, roads create access for trappers, and in every alternative, logging levels are increasing, and to increase those logging levels the Forest Service will build roads, both temporary and permanent.

Habitat loss has cumulatively impacted fisher as well. The FS has increased logging on this Forest, with some of the highest amounts of timber sold over the last 20 years occurring in recent years. Many of these projects have eliminated and fragmented fisher habitat, with each individual project claiming that it might impact fisher, but would not impact the species as a whole. Those projects, forestwide, have added up, and the FS must now account for them.

The FS apparently has no idea how much fisher habitat has been eliminated with projects over the last few decades. With this letter we include time lapse imaging which demonstrate the

cumulative impacts of logging in recent years on old-growth associated species such as the fisher and others, focusing especially on the Hungry Ridge, Doc Denny, and End Of The World project areas. All the areas which show effects of heavy logging in the time span of the time lapse are still many decades away from providing suitable habitat for old-growth associated species.

Allen et al. (2021) found that fishers in their study scavenged more in the winter than in the summer, and hypothesize this is due to the season making them energetically stressed. This increases cumulative effects from trapping, particularly where baiting is allowed.

GRIZZLY BEAR

New scientific information is available concerning grizzly bear denning habitat and demographic connectivity in and around the Bitterroot Ecosystem/recovery zone. Bader and Sieracki (2022) "predicted 21,091 km^2 of suitable denning habitats" in the BE and connection areas, noting:

> Terrain features, distance to roads, and land cover best explained suitable denning habitats in northern Idaho and western Montana. The results support the demographic model for population connectivity, and independent of other factors there is suitable denning habitat for hundreds of Grizzly Bears in the Bitterroot analysis area. We suggest additions to the Bitterroot Grizzly Bear Recovery Area, and that more effective motorized-access management be applied to demographic connectivity areas.

The U.S. Fish and Wildlife Service (USFWS) 2022 Species Status Assessment for the Grizzly Bear (*Ursus arctos horribilis*) in the Lower-48 States finds that the grizzly bear population in the lower 48 states is likely to become in danger of extinction within the foreseeable future throughout all of its range, and that "viability for the grizzly bear in the lower-48 States as a whole only increases under …future scenarios, which rely on increases in conservation efforts such that the [Bitterroot Ecosystem] and North Cascades support resilient populations." In other words, true recovery of the Threatened grizzly population cannot happen without recovery of a robust population in the Bitterroot Ecosystem.

On March 15, 2023 a federal court in Montana ordered the USFWS to re-analyze the recovery of grizzly bears in the Bitterroot Ecosystem of Western Montana and Central Idaho. The Court recognized non-discretionary legally binding commitments made in the 2000 Record of Decision and Final Rule, plus the USFWS's failure to manage accordingly. The Judge recognized that "as recently as October 2022, grizzly bears have been seen in the Bitterroot Ecosystem." The Judge's order requires the USFWS to supplement its 2000 Final EIS and come up with a new decision.

FOC submitted a July 17, 2020 request to the Forest Service under the Freedom of Information Act (FOIA), seeking documents relating to all known grizzly bear sightings or grizzly presence on the Nez Perce-Clearwater National Forests subsequent to October 30, 2013. For your convenience we are including all the documents we received in response to that FOIA, along with this letter.

Since there is solid documentation of recent and ongoing grizzly bear occupancy, grizzly bear residency should be considered permanently established. Formal consultation on the forest plan

is out of date. Updated consultation with the USFWS for the grizzly bear is needed on the EOTW project and forest plan.

Documents provided in response to the FOIA indicate a grizzly bear was confirmed in the White Bird area in 2019 and again in 2020, which means it likely denned in the vicinity. It was confirmed in the EOTTW project area. Grizzly bear 927 was confirmed to have spent a good portion of 2019 in the Clearwater National Forest in the vicinity of the upper Lochsa River watershed and Lolo Pass.

Other 2019 occurrences of grizzly bears on the NPCNF, from tracks or photos, include near Big Cedar (less than 20 miles east of Stites, Idaho), the "Newsome Red River" bear from September 2019, and a second grizzly bear in the Upper Lochsa.

The DEIS doesn't include any discussion or analysis for the Threatened grizzly bear. The EA stated, "Resources that were not impacted and therefore not further analyzed include: grizzly bears…" and it included no analysis whatsoever for the grizzly bear.

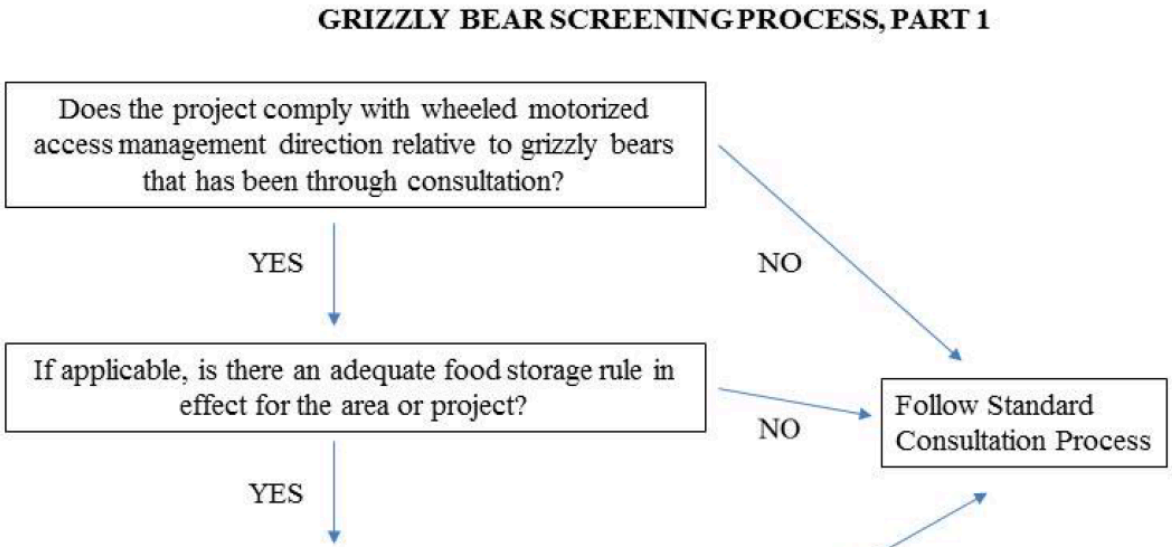
The HR Revised FEIS (9/2020) includes a section on the grizzly bear. Among other things it includes "Updated information on grizzly bear…". Its Table 3-49 states:

> In the past, not known or suspected to be present in the project area due to lack of suitable habitat. Recently, in 2019, two grizzly bears were confirmed on the Forest. Both bears were males that had dispersed from the Cabinet Mountains of northwest Montana/northern Idaho. There is no potential for effects from this project. Despite recent observations, the USFWS does not consider grizzly bears likely to be present on the Nez Perce-Clearwater National Forests. As a result, grizzly bears will not be considered further in this report. Details in project record.

The US Fish & Wildlife Service's April 20, 2020 Hungry Ridge concurrence letter for other species states:

> The Forest also determined that the Project tiers to the Programmatic Biological Assessment for Activities that are Not Likely to Adversely Affect Canada Lynx, Grizzly Bear and Designated Canada Lynx Critical Habitat (USFS 2014; Service reference: 06E11000-2015-I-0019) …there are no grizzly bears (Ursus arctos horribilis) …within the Project action area. The Service acknowledges the Forest's use of these programmatics…

That 2014 programmatic Biological Assessment includes a grizzly bear screening process, and below is part of a diagram from therein:



The DEIS makes no mention of any food storage rule or order. The FS is failing to act in accordance with best available science and common, standard management procedures to limit risk to grizzly bears in and around the project area and NPCNF. The FS should be following the "standard consultation process" which would start by acknowledging the timber sale is likely to impact the grizzly bear, since even simple food storage orders are not in effect.

Furthermore, the FS has failed to finalize its decision for the Designated Routes and Areas for Motor Vehicle Use (DRAMVU) project, applicable to the Nez Perce NF. FOC submitted comments and an objection, and the Regional Office responded with a letter acknowledging the inadequacy of the FEIS. For your convenience, those documents are being provided along with this letter. Those documents also include a critique of the FS's noncompliance with the Travel Management Rule Subpart A, which requires the FS to conduct a science-based analysis for identifying the minimum road system needed to ecologically sustainably manage the NPCNF and within expected budgets.

Furthermore, we note the FS has failed to regulate black bear baiting in the NPCNF, allowing the State of Idaho to be the sole oversight agency of this practice on the NPCNF. In 2007, a grizzly bear was shot and killed at a black bear baiting station in the Kelly Creek watershed in the Clearwater National Forest. On the IPNF (St. Joe RD) neighboring the NPCNF to the north, that same thing happened this year with full participation by IDFG. FS management is obviously preventing the grizzly population from recovering in the Bitterroot Ecosystem recovery area (BE). All of this triggers a duty for the FS to re-consult and find a way to reduce or eliminate this take of grizzlies under the ESA.

It's well known that young female grizzly bears tend to establish home territories in close proximity to their mother's. Also, grizzly bears have a strong tendency to avoid highly roaded landscapes, which largely separate the BE from known female grizzly home ranges in other Recovery Areas. In contrast to the BE and the NPCNF, habitat for bears in other Recovery Areas is delineated by forest plans into Bear Management Units (BMUs) where total and open road densities are limited in order to reduce human caused bear mortality and increase habitat security.

So what would it take for the Forest Service to institute BMUs and road density standards? In a document received under the FOIA, the FS explains: "Bear Management Units have not been developed for the BE however the Recovery Plan identifies delineation of BMUs as a future task once home range size and habitat use data are available (USFWS 1996). Such data in currently unavailable for the BE because of the lack of resident grizzly bears." Also, "the definition of a population of grizzly bears (i.e. two or more reproductive females or one female reproducing during two separate years) in the Bitterroot Environmental Impact Statement (EIS) (Service 2000, pp. 3-14–15)."

In other words, female grizzly bears would have to migrate into the BE across perilous, roaded landscapes, find a mate, have cubs, and wait for the federal agencies to acknowledge their existence, determine home range size and gather habitat use data—just to earn habitat protections provided in other Recovery Areas.

The agency's questioning of whether grizzly bears, recently confirmed in and around the Clearwater and Nez Perce National Forest, are "residents" is a distraction. Grizzly bear habitat quality is potentially outstanding, but only if strong steps are taken to remove or minimize the human impediments to natural recovery. Recovery of the grizzly requires its population to grow and its range expand, especially in anticipation of the impending risk of climate change. The grizzly bear must not be forced to leap high arbitrary agency-established hurdles to receive adequate habitat protections.

Mattson (2021) is a draft report investigating grizzly bear recovery in the BE and NPCNF. At pp. 56 - 59 (7.c. Habitat Security on the Nez Perce-Clearwater National Forests) Mattson discusses road densities and core security in the BMUs he has proposed for the NPCNF. His analysis reveals a high road density and lack of habitat security in the EOTW project area vicinity, essentially an ESA "take" situation for the grizzly bear.

The impacts on grizzly bears from the EOTW timber sale project would include several years of disturbance and displacement due to human presence, road construction and use, motorized use and other mechanized equipment. These activities and the mere existence of roads would result in grizzly bear avoidance of otherwise suitable habitat.

Proctor et al. (2017) is relevant to judging the trade-off between proposed "treatments" and habitat security for grizzlies, especially the hazards associated with road access.

We also refer you to our discussion on the grizzly bear in our comments on the NPCNF Draft Forest Plan and EIS (pp. 193-209).

A document placed by the FS on the EOTW website in February 2021 states:

> On 12/18/2020 Forest Service and U.S. Fish and Wildlife Service Level I staff met via video conference to discuss how the Forest considered grizzly bear for the End of the World project in making the determination of No Effect to grizzly bear. Notes of the meeting are included in the project record.

However, nothing in the EOTW project record as depicted on the EOTW website as of this date shows any consultation occurred between the FS and the U.S. Fish and Wildlife Service (USFWS). Nor has there been any consultation concerning Hungry Ridge. For both projects the FS has concluded, "no effect" which means not even informal concurrence with such a determination was sought from the USFWS. Another EOTW document states, "While the USFWS does not provide Letters of Concurrence with 'No Effect' determinations the USFWS does acknowledge the Forests determination of 'No Effect'." We see nothing explaining what "acknowledges" means. While FOC can acknowledge the FS has made a "no effect" determination, we believe such a determination is arbitrary and capricious. The "no effect" determination belongs solely to the FS.

The DEIS doesn't adequately analyze and disclose cumulative impacts on surrounding land of other ownerships due to their unknown duration, location, and intensity.

Reducing roads and therefore their impacts beyond what the FS seems willing would not only benefit grizzly bears, but also most other natural aspects of the ecosystem, as USDA Forest Service 2009d (Access Amendment Draft SEIS for the Cabinet-Yaak Recovery Area) indicates:

- Alternative D Modified would convert the most roads and consequently would provide the highest degree of habitat security and a lower mortality risk to the **Canada lynx**. (P. 70.)
- Alternative D Modified would provide a higher degree of habitat security (for **gray wolves**) than Alternative E Updated… (P. 74.)
- Alternative D Modified … could contribute to a cumulative increase in habitat security for **black-backed woodpeckers** (and **pileated woodpeckers**) because timber sales or other ground disturbing or vegetation management activities would be less likely to occur in Core Areas. Newly dead trees that support wood boring beetle populations would be less likely to be removed during vegetation management activities or by woodcutters. Alternative D Modified could provide slightly more secure habitat than Alternative E Updated. (P. 84, 112.)
- Alternative D Modified … could contribute to a cumulative increase in habitat security because timber sales or other ground disturbing or vegetation management activities would be less likely to occur in Core Areas. Snags would be less likely to be removed during vegetation management activities or by woodcutters. Alternative D Modified could provide slightly more secure habitat (for **Townsend's big-eared bats, flammulated owls, fringed myotis bats**) than Alternative E Updated. (Pp. 85, 86, 95.)
- Alternative D Modified and Alternative E Updated provide different levels of habitat security (for **peregrine falcon, fisher, wolverine**) based on the relative amount of wheeled motorized vehicle access. (Pp. 87, 89, 91.)
- Alternative D Modified, which closes the most miles of road in suitable habitat, would be the preferred alternative for the western toad. (P. 101.)
- Alternative D Modified closes the most miles of road in suitable habitat and would provide the greatest benefits for the **goshawk**. (P. 103.)
- Alternative D Modified, which closes the most miles of road in suitable habitat, would be the best Alternative for **elk**. (P. 104.)

- Alternative E Updated would provide some security and reduced vulnerability (for **moose**), but not as much as Alternative D Modified. (P. 104.)
- Although Alternative D Modified and Alternative E Updated would benefit **mountain goats**, Alternative D Modified would improve security and reduce the risk of displacement more than Alternative E Updated. (P. 109.)
- Alternative D Modified would improve security (for **pine marten**) more than Alternative E Updated. (P. 110.)

We include with this letter the documents, "Brebner Flat reply brief filed 10.13.20", "ECOS Conservation Online System-grizzly bear" and "Species Profile for Grizzly bear (Ursus arctos horribilis)" which also help to explain why the FS's "no effect" determination is contrary to law. The fact that the grizzly bear may occur in the project area is not properly acknowledged or considered in either FEIS or in any project analysis document.

In summary, the FS essentially ignores the grizzly bear, fails to take a hard look at the EOTW project's impacts on the grizzly, fails to disclose and consider all potential grizzly sightings and scientific information discussed above, and fails to consider and impose suitable mitigation measures—from reducing road construction and logging, to requiring personnel to take bear country training and carry bear spray, to monitoring and reporting bear sightings. The FS also has not conducted ESA consultation with the USFWS. We urge you to address these deficiencies before making a final decision.

WOLVERINE

As part of listing the wolverine under the ESA, the USFWS issued a request for new information (Federal Register Vol. 87, No. 225, November 23, 2022) to update the Species Status Assessment (SSA) for the North American Wolverine leading to a final determination to list this species under the Endangered Species Act (ESA). We incorporate our submission to the USFWS in response to the USFWS solicitation, as comments on this DEIS.

See our LMP Objection, which further expresses our concerns in a Wolverine section. The impacts on habitat represented by the EOTW timber sale constitute "take" of this Threatened species. We also incorporate the 12/21/2022 FOC et al. comments on the U.S. Fish and Wildlife Service request for new information to update the Species Status Assessment for the North American Wolverine, and 2024 comments on the proposed interim rule 4(d) for the wolverine written by Native Ecosystems Council et al., Western Environmental Law Center et al., Friends of the Wild Swan and Swan View Coalition.

SUPERSIZED CLEARCUTS ON THE NPCNF

Bilodeau and Juel (2021) investigated how often the FS invoked "exceptions" to the NFMA 40-acre limit to clearcuts and other "regeneration" logging on national forest lands in the bioregion. From 2013 until March of 2021, the Northern Region approved 93,056 acres of these supersized clearcuts, covering an area of land about twice the size of the District of Columbia. If the acres were arranged in a contiguous square, a person with an average walking speed of three miles per hour would have to walk 16 hours just to traverse its perimeter. That acreage only represents

supersized clearcuts; because many of the same projects planned openings under 40 acres, the landscape impacts from clearcutting and related logging would be much greater. Managers of the Idaho Panhandle National Forests and Nez Perce-Clearwater National Forests in Idaho requested over half of this acreage, at 33,625 and 23,095 aggregate acres, respectively.

The report also notes that no region of the national forest system outside of the Northern Region approves exceptions to engage in supersized clearcutting.

There has never been any NEPA analysis analyzing and disclosing the landscape level cumulative impacts of these massive clearcutting approvals—not at the Northern Region level, and not at the level of the NPCNF. This has implications for highly significant impacts on wildlife that evolved without clearcuts, which is all of them, and especially for species that require large areas of contiguous forest cover such as grizzly bears, wolverines, elk, and fisher.

MOTORIZED ACCESS AND TRAVEL MANAGEMENT

See our LMP Objection, which further expresses our concerns in a section titled "LMP does not adequately constrain road activities or minimize road network".

16 U.S. Code §1608 states:

> **(a) Congressional declaration of policy; time for development; method of financing; financing of forest development roads**
> The Congress declares that the installation of a proper system of transportation to service the National Forest System, as is provided for in sections 532 to 538 of this title, shall be carried forward in time to meet anticipated needs on an economical and environmentally sound basis, and the method chosen for financing the construction and maintenance of the transportation system should be such as to enhance local, regional, and national benefits: Provided, That limitations on the level of obligations for construction of forest roads by timber purchasers shall be established in annual appropriation Acts.

The DEIS is not consistent with that statute.

Citing the Forest Plan, the DEIS states, "Roads through or adjacent to old growth have the potential to cause human disturbance and displace wildlife species in the vicinity of the area due to the noise causing loss of snags to firewood cutters, windthrow, and micro-climate changes." At this point, the FS cannot demonstrate compliance with the Travel Management Rule Subpart B. The agency has delayed the creation of a travel plan until after Forest Plan revision is complete, apparently because it is unable or unwilling to comply with the current Forest Plan, best available science, and requirements to minimize conflicts with other resources under the travel management rule and executive orders. Our Attachment D map strongly indicates an unsustainable road network on the NPNF.

GLOBAL CLIMATE CRISIS

Our LMP Objection section entitled "GLOBAL WARMING/CLIMATE CHANGE" elaborates upon what we state below.

We also incorporate Friends of the Clearwater (2023), a comment letter to the USDA in response to the FS's advance notice of proposed rulemaking on managing forests for climate resilience [88 Fed. Reg. 24497-24503, RIN 0596-AD59 (April 21, 2023)].

Although FOC has been pushing the FS to recognize the scale of the climate crisis and find appropriate responses, the agency just more deeply augurs its head into the sand.

In "Mature and Old-Growth Forests: Definition, Identification, and Initial Inventory on Lands Managed by the Forest Service and Bureau of Land Management Fulfillment of Executive Order 14072, Section 2(b)" we read:

> This **initial inventory report** is national in scale and presents estimates of old-growth and mature forests across all lands managed by the Forest Service and BLM. In preparing this report, published scientific literature was reviewed and scientists were consulted to understand the current work in this area and to get technical assistance in providing what was needed to respond to Executive Order 14072. **Some cited references (e.g., "in preparation" notations) have not yet undergone scientific peer review and are therefore subject to change.**

(Emphases added.) Neither the 2023 Biden administration reports nor EO 14072 itself recognize the threat of logging to old growth and mature forests, and consequently the adverse climate effects. The fallacies this represents are discussed in letters these comments incorporate.

At this point, achievement of the lofty goals for EO 14072 remains remote. Of huge concern to the global community, this includes prioritizing the role of forests as natural climate solutions. Instead we see continued exploitation of publicly owned forests to serve the prevailing capitalist consumptive values chronically threatening the entire biosphere and our collective future.

Climate change 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 FS fails to acknowledge the legal and regulatory framework that should guide its analysis of climate impacts, including the recently reinstated CEQ GHG guidance titled, "NEPA Guidance on Consideration of Greenhouse Gas Emissions" (Feb. 19, 2021). In light of the guidance's reinstatement, the FS must apply CEQ's 2016 NEPA climate guidance (or provide a non-arbitrary basis for declining to do so). The guidance contains specific directions concerning how agencies should analyze climate impacts from site-specific forest management projects (using the example of "a prescribed burn") that the agency must consider.

The EOTW project will have direct, indirect, and cumulative impacts on climate change because the vegetation treatments will impact the ecosystem's ability to store carbon. Naturally functioning forests are currently acting as carbon sinks, meaning they are storing more carbon than they emit. We cite scientific evidence indicating that the proposed action will worsen carbon emissions by removing trees that are currently holding and sequestering carbon.

In a March 20, 2023 Press Release introducing the SYNTHESIS REPORT OF THE IPCC SIXTH ASSESSMENT REPORT (AR6), the Intergovernmental Panel on Climate Change (IPCC) states, "This Synthesis Report underscores the urgency of taking more ambitious action and shows that, if we act now, we can still secure a liveable sustainable future for all." It goes on:

> In 2018, IPCC highlighted the unprecedented scale of the challenge required to keep warming to 1.5°C. Five years later, that challenge has become even greater due to a continued increase in greenhouse gas emissions. The pace and scale of what has been done so far, and current plans, are insufficient to tackle climate change.
>
> More than a century of burning fossil fuels as well as unequal and unsustainable energy and land use has led to global warming of 1.1°C above pre-industrial levels. This has resulted in more frequent and more intense extreme weather events that have caused increasingly dangerous impacts on nature and people in every region of the world.
>
> Every increment of warming results in rapidly escalating hazards. More intense heatwaves, heavier rainfall and other weather extremes further increase risks for human health and ecosystems. In every region, people are dying from extreme heat. Climate-driven food and water insecurity is expected to increase with increased warming. When the risks combine with other adverse events, such as pandemics or conflicts, they become even more difficult to manage.

A *Missoulian* article on the release of that report quotes United Nations Secretary- General Antonio Guterres: "Humanity is on thin ice — and that ice is melting fast. …Our world needs climate action on all fronts —everything, everywhere, all at once." That article quotes from the report, "The choices and actions implemented in this decade will have impacts for thousands of years" calling climate change "a threat to human well-being and planetary health." It quotes report co-author and water scientist Aditi Mukherji: "We are not on the right track but it's not too late. Our intention is really a message of hope, and not that of doomsday."

IPCC, 2022a states, "The rise in weather and climate extremes has led to some irreversible impacts as natural and human systems are pushed beyond their ability to adapt." Also see news accounts "AP-Report warns of looming climate catastrophe", "BBC-IPCC report warns of 'irreversible' impacts of global warming" and "AP-UN 'house on fire' report".

Executive Order 13990 of January 20, 2021 (Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis) sets the policy of the Biden Administration to "…reduce greenhouse gas emissions; to bolster resilience to the impacts of climate change…". Executive Order (EO) 13990 Section 5 (Accounting for the Benefits of Reducing Climate Pollution) at (a) states, "It is essential that agencies capture the full costs of greenhouse gas

emissions as accurately as possible, including by taking global damages into account. Doing so facilitates sound decision-making, recognizes the breadth of climate impacts, and supports the international leadership of the United States on climate issues."

Executive Order 14008 of January 27, 2021 (Tackling the Climate Crisis at Home and Abroad) begins, "The United States and the world face a profound climate crisis. We have a narrow moment to pursue action at home and abroad in order to avoid the most catastrophic impacts of that crisis and to seize the opportunity that tackling climate change presents." Further, President Biden's Executive Order 14027 on the Establishment of the Climate Change Support Office (May 7, 2021) calls it a "**global** climate crisis" (emphasis added).

President Biden's April 22, 2022 Executive Order 14072 calls on the Secretaries of Agriculture and the Interior, within one year, to "define, identify, and complete an **inventory of old-growth and mature forests on Federal lands**, accounting for regional and ecological variations, as appropriate, and making the inventory publicly available." (Emphasis added.) EO 14072 recognizes, "Forests provide clean air and water, sustain the plant and animal life fundamental to combating **the global climate and biodiversity crises**, and hold special importance to Tribal Nations." (Emphasis added.) The Fact Sheet accompanying that E.O. recognizes:

> America's forests are a key climate solution, absorbing carbon dioxide equivalent to more than10% of U.S. annual greenhouse gas emissions. Federal lands are home to many of the nation's mature and old-growth forests, which serve as critical carbon sinks, cherished landscapes, and unique habitats.

The Executive Order will "Safeguard mature and old-growth forests on federal lands, as part of a science-based approach to reduce wildfire risk" and "**Enlist nature to address the climate crisis with comprehensive efforts to deploy nature-based solutions** that reduce emissions and build resilience." (Id., emphasis added.)

On April 18, 2023 Deputy Chief, Christopher B. French issued a memo to Regional Foresters entitled "Mature Old Growth Guidance: Infrastructure and Investment Jobs Act and Executive Order 14072". It states:

> In response to E.O. 14072, we recently completed the mature and old-growth (MOG) inventory that is built on the existing old-growth definitions developed by each region over the past 30 years. The inventory methods categorize MOG using approximately 200 combinations of forest type, productivity level and biophysical setting. **We will shortly issue guidance on using this information**. Specific Forest Plan content should guide operations to maintain or contribute toward the restoration of the structure and composition of classified old-growth stands.

(Emphasis added.) Part of any reasonable interpretation of "inventory" as applied to forests would be—is any particular place in a forest **inside** the mature and old-growth inventory, or is it **not**? At this point, the Biden Administration has not produced an inventory that could answer such a question, despite the claims and suggestions that it has. No spatially specific or ecological

definition of old growth was adopted, which would have incorporated old growth and mature forests' relationships to wildlife, water, and many other natural values.

DellaSala, et al. (2023) argue:

> …for stepped-up MOG protections by building on the exemplary Tongass National Forest in Alaska where roadless area protections containing MOG, previously removed under the Trump administration, were recently reinstated by the Biden administration while also supporting an economic transition out of old-growth logging and into previously logged but reforested sites. Nationwide MOG protections would establish U.S. leadership on the Paris Climate Agreement (natural sinks and reservoirs) and the Glasgow Forest Pledge to end deforestation and forest degradation. It would demonstrate progress toward 30 x 30 and present a global model for effective forest and climate response.

One value the 1989 Chief's Position Statement on National Forest Old Growth Values (Green et al., 1992) did *not* anticipate is forests' contributions toward a stable climate. Given the dire climate crisis in which we find ourselves, and in order to serve all other values, the FS must analyze and disclose the carbon sequestration potential of the landscapes and ecosystems within which old growth is found.

Law and Moomaw, 2023 state: "Forests are critically important for slowing climate change. They remove huge quantities of carbon dioxide from the atmosphere – 30% of all fossil fuel emissions annually – and store carbon in trees and soils. Old and mature forests are especially important: They handle droughts, storms and wildfires better than young trees, and they store more carbon."

Law et al. (2022), in a paper entitled "Creating Strategic Reserves to Protect Forest Carbon and Reduce Biodiversity Losses in the United States" assert that "many of the current and proposed forest management actions in the United States are not consistent with climate goals, and that preserving 30 to 50% of lands for their carbon, biodiversity and water is feasible, effective, and necessary for achieving them."

In a January 12, 2023 News Release, scientists (Birdsey et al., 2023) point out that "Mature Federal Forests Play an Outsized Role in the Nation's Climate Strategy." They state:

> A new study published in the peer-reviewed journal Forests and Global Change presents the nation's first assessment of carbon stored in larger trees and mature forests on 11 national forests from the West Coast states to the Appalachian Mountains. This study is a companion to prior work to define, inventory and assess the nation's older forests published in a special feature on "natural forests for a safe climate" in the same journal. Both studies are in response to President Biden's Executive Order to inventory mature and old-growth forests for conservation purposes and the global concern about the unprecedented decline of older trees.

At a time when species are going extinct faster than any period in human history, the survival of species and persistence of healthy ecosystems requires science-based decisions. A new analysis

by NatureServe addresses five essential questions about biodiversity–the variety of life on Earth–that need to be answered if we are going to effectively conserve nature. In the first report of its kind, NatureServe, 2023 reveals an alarming conclusion: **34% of plants** and **40% of animals** are at risk of extinction, and **41% of ecosystems** are at risk of range-wide collapse. The analyses presented in the report inform how to effectively and efficiently use our financial resources to make the best conservation decisions.

Recent science supports the need to look beyond historical references to inform proposed actions, in the light of the profound changes expected under a warming climate: "(I)n a time of pervasive and intensifying change, the implicit assumption that the future will reflect the past is a questionable basis for land management (Falk 2017)." (Coop et al., 2020.) While it is useful to understand how vegetative conditions have departed from those in the past, the FS cannot rely on them to define management actions, or reasonably expect the action alternatives to result in restoring ecological processes. The agency needs to shift its management approach to incorporate the likelihood that no matter what vegetation treatments it implements, there are going to be future forest wildfire-triggered conversions to other vegetation types. As such, the FS cannot rely on the success of resistance strategies, as Coop et al., 2020 explains:

> Contemporary forest management policies, mandates, and science generally fall within the paradigm of resisting conversion, through on-the-ground tactics such as fuel reduction or tree planting. Given anticipated disturbance trajectories and climate change, science syntheses and critical evaluations of such resistance approaches are needed because of their increasing relevance in mitigating future wildfire severity (Stephens et al. 2013, Prichard et al. 2017) and managing for carbon storage (Hurteau et al. 2019b). Managers seeking to wisely invest resources and strategically resist change need to understand the efficacy and durability of these resistance strategies in a changing climate. Managers also require new scientific knowledge to inform alternative approaches including accepting or directing conversion, developing a portfolio of new approaches and conducting experimental adaptation, and to even allow and learn from adaptation failures.

In 2022 over 90 scientists working at the intersection of ecosystems and climate change sent a letter to Canada's Prime Minister Justin Trudeau, "Regarding the Protection of Canada's Primary Forests." They state:

> When primary forests, whether in Canada or elsewhere, are logged they release significant amounts of carbon dioxide, exacerbating climate change. Because primary forest ecosystems store more carbon than secondary forests, replacing primary forests with younger stands, as Canada is doing, ultimately reduces the forest ecosystem's overall carbon stocks, contributing to atmospheric greenhouse gas levels.
>
> Even if a clearcut forest eventually regrows, it can take over a decade to return to being a net absorber of carbon, and the overall carbon debt in carbon stocks that were removed from older forests can take centuries to repay, a luxury we simply no longer have. Recent studies also indicate that soil disturbance associated with logging results in large emissions of methane (CH4), a powerful greenhouse gas second only to CO2 in its climate forcing effects.

In a scientific finding contradicting typical FS logging justifications, Harmon et al. (2022), showed the vast majority of carbon stored in trees before two large wildfires in California's Sierra Nevada mountain range remained there after the fires.

The Forest Plan defines areas as suitable for timber production where there is reasonable assurance that such lands can be adequately restocked. Given the changing ecological conditions due to the climate emergency, the likely decreased effectiveness of resistance strategies described by Coop et al, 2020 and the increased risk of vegetative conversion, (especially within areas of regeneration harvest), the FS must provide reasonable assurances that lands proposed for timber production can in fact be adequately restocked, which includes the anticipated time frame. Mere assurances that logged areas will be replanted are not sufficient as climate crisis impacts increase.

Further, equally important to acknowledging the limitations of resistance strategies is the fact that other pertinent scientific findings show warming and drying trends are having a major impact on forests, even without wildfire or insect infestation. See, e.g., Parmesan, 2006; Breshears et al. 2005; Allen et al. 2010, 2015; Anderegg et al. 2012; Williams et al. 2013; Overpeck 2013; Funk et al. 2014; Millar and Stephenson 2015; Gauthier et al. 2015; Ault et al. 2016 ("business-as-usual emissions of greenhouse gases will drive regional warming and drying, regardless of large precipitation uncertainties"); Vose et al. 2016 ("In essence, a survivable drought of the past can become an intolerable drought under a warming climate").

The FS must reevaluate its normal assumptions about its proposed vegetation manipulations in regards to restocking success and species composition. Significant controversy exists as to the need for such manipulations given the improper use and reliance on historic conditions. In fact, there is a high likelihood based on the aforementioned studies that some areas will not regenerate and will instead result in conversion to different vegetative groups. NEPA mandates that the Supplemental EIS address this controversy and the science contradicting agency assumptions.

The CEQ 2016 guidance on considering greenhouse gas emissions and effects of climate change in NEPA reviews has been re-implemented as national direction. *See* 86 Fed Reg. 10252 (Feb. 19, 2021). It is new information because this directive didn't exist when we filed our objection in 2020. The 2016 guidance acknowledges, "changes in our climate caused by elevated concentrations of greenhouse gases in the atmosphere are reasonably anticipated to endanger the public health and public welfare of current and future generations." (P. 8.) This guidance directs federal agencies to consider the extent to which a proposed action would contribute to climate change. The CEQ guidance indicates the sort of analysis conclusion the agency arrives at for EOTW is inappropriate:

> Climate change results from the incremental addition of GHG emissions from millions of individual sources, which collectively have a large impact on a global scale. CEQ recognizes that the totality of climate change impacts is not attributable to any single action, but are exacerbated by a series of actions including actions taken pursuant to decisions of the Federal Government. Therefore, a statement that emissions from a proposed Federal action represent only a small fraction of global emissions is essentially a statement about

> the nature of the climate change challenge, and is not an appropriate basis for deciding whether or to what extent to consider climate change impacts under NEPA. Moreover, these comparisons are also not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations because this approach does not reveal anything beyond the nature of the climate change challenge itself: the fact that diverse individual sources of emissions each make a relatively small addition to global atmospheric GHG concentrations that collectively have a large impact.

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

The EPA (in USDA Forest Service, 2016d at pp. 818-19) has also rejected that same kind of analysis because cumulative effects would always dilute individual timber sale effects.

So the FS must quantify greenhouse gas emissions. For example, Talberth, 2023 analyzes and estimates carbon emissions from alternatives of the NPCNF draft revised Forest Plan/DEIS. Other quantitative tools for this analysis include USDA 2014. Below we cite much scientific evidence that the FS ignores, contradicts, and/or fails to reconcile.

McKinley et al., 2011, state:

- …most of the aboveground carbon stocks are retained after fire in dead tree biomass, because fire typically only consumes the leaves and small twigs, the litter layer or duff, and some dead trees and logs.

- Generally, harvesting forests with high biomass and planting a new forest will reduce overall carbon stocks more than if the forest were retained, even counting the carbon storage in harvested wood products (Harmon et al. 1996, Harmon et al. 2009). Thinning increases the size and vigor of individual trees, but generally reduces net carbon storage rates and carbon storage at the stand level (Schonau and Coetzee 1989, Dore et al. 2010).

- Methane release from anaerobic decomposition of wood and paper in landfills reduces the benefit of storing carbon because methane has about 25 times more global warming potential than CO2. For some paper, the global warming potential of methane release exceeds its carbon storage potential,

- There are two views regarding the science on carbon savings through fuel treatments. Some studies have shown that thinned stands have much higher tree survival and lower carbon losses in a crown fire (Hurteau et al. 2008) or have used modeling to estimate lower carbon losses from thinned stands if they were to burn (Finkral and Evans 2008, Hurteau and North 2009, Stephens et al. 2009). However, other stand-level studies have not shown a carbon benefit from fuel treatments (Reinhardt et al. 2010), and evidence from landscape-level modeling suggests that fuel treatments in most forests will decrease

> carbon (Harmon et al. 2009, Mitchell et al. 2009) even if the thinned trees are used for biomass energy. Because the occurrence of fires cannot be predicted at the stand level, treating forest stands without accounting for the probability of stand-replacing fire could result in lower carbon stocks than in untreated stands (Hanson et al. 2009, Mitchell et al. 2009). More research is urgently needed to resolve these different conclusions because thinning to reduce fuel is a widespread forest management practice in the United States (Battaglia et al. 2010).

The End of the World Project Carbon Effects report written by Environmental Coordinator Zoanne Anderson dated June 28, 2024 "…incorporates qualitative and quantitative information on carbon stocks, fluxes, and drivers from the Nez Perce-Clearwater Forest unit-level Carbon White Paper (Hoang, et al. June 20, 2019; updated 09/04/2020)…." In citing that as best available science, the FS takes the position that timber sales do not significantly adversely affect the carbon balance of the atmosphere (which of course ignores the cumulative effects of its nationwide logging program) and that the Forestwide scale is the proper level of cumulative effects (which is how cumulative effects of its massive clearcutting regime might be expected to be analyzed and disclosed). Yet Hoang et al. (2020) fail to actually provide the analysis at the appropriate scale or otherwise support claims it makes of carbon net neutrality. They promote myths such as one promoting wood products as an acceptable substitute for the loss of stored carbon from logging, and another that managed forests store carbon more effectively:

> Management activities include timber harvests, thinning, and fuel reduction treatments that remove carbon from the forest and transfer a portion to wood products. Carbon can then be stored in commodities (e.g., paper, lumber) for a variable duration ranging from days to many decades or even centuries. In the absence of commercial thinning, harvest, and fuel reduction treatments, forests will thin naturally from mortality-inducing disturbances or aging, resulting in dead trees decaying and emitting carbon to the atmosphere.

Elsewhere in this section of our comments we refute such mythology. Also of note, Hoang et al. (2020) fail to quantify management effects on the NPCNF in any useful or meaningful way. They downplay livestock effects and ignore logging transport emissions, those emitted by authorized motorized recreation, as well as other activities associated with forest management. And as a Region 1 document not from the agency's Research Branch, any critical analysis of agency logging policies as pertaining to climate change would be edited out. Its conclusions would not survive independent scientific peer review.

Without performing their own analysis Hoang et al. (2020) take from "results of the Baseline Report (U.S. Department of Agriculture, 2015)" whereby "carbon stocks in the Nez Perce-Clearwater increased from 238.29 teragrams of carbon (Tg C) in 1990 to 279.43 Tg C in 2013, a 17.3 percent increase in carbon stocks over this period." There is no explanation given as to why that time period is being represented as the meaningful trend.

However, they also admit:

> The uncertainties contained in the models, samples, and measurements can exceed 30 percent of the mean at the scale of a national forest, sometimes making it difficult to infer if or how carbon stocks are changing. Confidence intervals were not calculated for combined

> forests, so the 95 percent confidence interval error bars are not displayed…

In other words, take with a grain of salt the report's claims that carbon stocks are increasing. There isn't even an estimate, for comparison purposes, of carbon stocks over time for a situation where the Forests weren't being massively clearcut and subject to ongoing carbon intensive (emission) management.

Hoang et al. (2020) also say:

> Wood products can be used in place of other more emission intensive materials, like steel or concrete, and wood-based energy can displace fossil fuel energy, resulting in a substitution effect (Gustavsson et al., 2006; Lippke et al., 2011). Much of the harvested carbon that is initially transferred out of the forest can also be recovered with time as the affected area regrows.

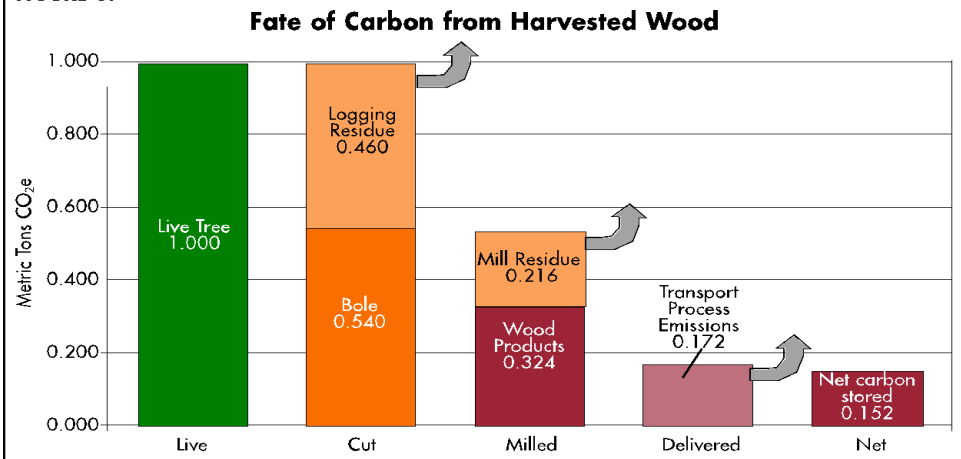
Hoang et al. (2020) don't quantify this "substitution effect," which is unsurprising since that terminology is only meant to distract from the fact that deleterious climate effects accrue from massive clearcutting, other logging, road building, livestock grazing, and other components of the whole suite of management activities carried out on the NPCNF.

Hoang et al. (2020) don't address quantified results from other analyses such as those in Ingerson (2007), revealing less than one-fifth of the carbon in trees removed from forests through logging ends up in a wood product like dimensional lumber. The remainder ends up in the atmosphere almost immediately, mostly burned for dirty energy in biomass facilities or as hog fuel at lumber mills (e.g., branches, tree tops, bark, round parts, mill residues), or is quantitatively nullified by carbon emissions from transporting logs and wood products. The FS ignores what it cannot refute, especially where other scientists disagree with its logging agenda.

Returning to the End of the World Project Carbon Effects report prepared by Environmental Coordinator Zoanne Anderson (June 28, 2024) we find statements indicative of an agency willing to spout bald-faced lies to justify logging. This includes: "In all alternatives besides the no-action alternative, the proposed project will produce short-term carbon emissions, however the Forest would sequester the amount of carbon emitted by the harvesting alternatives **almost immediately.** Long-term carbon impacts are likely to be **unaffected or decreasing**." (Emphases added.) Anderson cites nothing to support this "almost immediately" claim because it's a lie and there's no science behind it. And the document's own admissions contradict the "unaffected or decreasing" statement. There is no genuine temporal, quantitative analysis of carbon emission vs. carbon sequestration of the areas logged, let alone a necessary wider, more comprehensive consideration of the CO_2 emitted by logging, milling, and other activities associated with logging, transporting, and processing wood.

In a single, simple figure, Ingerson, 2007 displays the rationale and information the FS completely ignores:

FIGURE 8.



Data from Smith et al. 2006 and Gower et al. 2006.

Comparing the above figure's first green polygon representing a live, standing tree to the final maroon polygon representing the carbon stored after logging and associated transportation and milling activities informs the true story. Other scientific information we cite herein and in our incorporated LMP comments and objections add further support.

Logging, road construction and grazing activities are likely to amplify the effects of climate change by making the land more susceptible to heat waves, droughts, water shortages, wildfires, wind damage, landslides, floods, warming waters, harmful algae blooms, insects, disease, exotic species, and biodiversity loss. (Talberth, 2023)

The federal courts are increasing their rejection of FS distortions and misrepresentations on climate impacts. In a recent federal court decision (*Center for Biological Diversity et al v. U.S. Forest Service*; CV 22-114-M-DWM) regarding the Black Ram timber sale on the Kootenai National Forest, Judge Molloy recognizes:

> Ultimately, "[greenhouse gas] reduction must happen quickly" and removing carbon from forests in the form of logging, even if the trees are going to grow back, will take decades to centuries to re-sequester. FS-038329. Put more simply, logging causes immediate carbon losses, while re-sequestration happens slowly over time, **time that the planet may not have**. FS-020739 (I[t] is recognized that global climate research indicates the world's climate is warming and that most of the observed 20th century increase in global average temperatures is very likely due to increased human-caused greenhouse gas emissions.").
>
> …NEPA requires more than a statement of platitudes, it requires appraisal to the public of the actual impacts of an individual project. …(T)he USFS has the responsibility to give the public an accurate picture of what impacts a project may have, no matter how "infinitesimal" they believe they may be.

(Emphasis added.) 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)." As alarming as that might sound, a

more recent report from the Intergovernmental Panel on Climate Change makes that 2007 report seem optimistic. *See* IPCC Special Report, 2014.

There is extreme scientific concern over the imminent effects of climate change on the earth's ecosystems and civilization itself. A 2018 report issued by the Intergovernmental Panel on Climate Change states 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. The report 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 IPCC 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 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.

New science indicates the logging of old growth proposed for the EOTW timber sale project would exacerbate climate change. Mildrexler, et al., 2020 state:

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

- We examined the proportion of large-diameter trees on National Forest lands east of the Cascade Mountains crest in Oregon and Washington, their contribution to overall aboveground carbon (AGC) storage, and the potential reduction in carbon stocks resulting from widespread harvest. We analyzed forest inventory data collected on 3,335 plots and found that large trees play a major role in the accumulated carbon stock of these forests. Tree AGC (kg) increases sharply with tree diameter at breast height (DBH; cm) among five dominant tree species. Large trees accounted for 2.0 to 3.7% of all stems (DBH ≥ 1" or 2.54 cm) among five tree species; but held 33 to 46% of the total AGC

stored by each species. Pooled across the five dominant species, large trees accounted for 3% of the 636,520 trees occurring on the inventory plots but stored 42% of the total AGC. A recently proposed large-scale vegetation management project that involved widespread harvest of large trees, mostly grand fir, would have removed ~44% of the AGC stored in these large-diameter trees, and released a large amount of carbon dioxide into the atmosphere.

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

Old growth also helps to mitigate the effects of climate change on wildlife habitat. Frey et al., 2016 find: "Vegetation characteristics associated with older forest stands appeared to confer a strong, thermally insulating effect. Older forests with tall canopies, high biomass, and vertical complexity provided cooler microclimates compared with simplified stands. This resulted in differences as large as 2.5°C between plantation sites and old-growth sites, a temperature range equivalent to predicted global temperature increases over the next 50 years." They hypothesize older, more complex forests may help to "buffer organisms from the impacts of regional warming and/or slow the rate at which organisms must adapt to a changing climate…"

Given the urgency of preventing additional greenhouse gas emissions to the atmosphere and continuing carbon sequestration to protect the climate system, it would be best to protect large trees for their carbon stores, and also for their co-benefits of habitat for biodiversity, resilience to drought and fire, and microclimate buffering under future climate extremes.

Law and Moomaw (2021) state: "Keeping trees in the ground where they are already growing is an effective low-tech way to slow climate change."

The Draft EIS for the NPCNF's revised forest plan admits, "The current 1987 Forest Plans do not address climate change." That same Draft EIS includes the following definitions:

> Carbon Pool: an area that contains an accumulation of carbon or carbon-bearing compounds or having the potential to accumulate such substances. May include live and dead material, soil material, and harvested wood products.
>
> Carbon Stock: the amount or quantity contained in the inventory of a carbon pool.

Also, "Forests store large amounts of carbon in their live and dead wood and soil and are an important carbon sink, removing more carbon from the atmosphere than they are emitting (Pan, 2011)." (Id.) Yet the FS ignores scientific information strongly implicating logging as increasing net carbon emissions to the atmosphere for many decades. Scientists believe forests, especially old growth, play a critical role in sequestering carbon and also moderate the effects of climate change.

It's not like there's any real wiggle room for increasing global carbon emissions, as indicated above, and in other scientific articles we are providing along with this letter (and have previously submitted).

Forests are carbon sinks—they store carbon in both the soils and the vegetation. Carbon sinks are important for mitigating the impacts of climate change. The U.S. has many forests owned by the public and managed by the Forest Service. Harvesting wood "represents the majority of [carbon] losses from US forest...." Harris et al., 2016. Additionally, Achat et al., 2015 has estimated that intensive biomass harvests could constitute an important source of carbon transfer from forests to the atmosphere. Pacific Northwest forests hold live tree biomass equivalent or larger than tropical forests (Law and Waring, 2015). "Alterations in forest management can contribute to increasing the land sink and decreasing emissions by keeping carbon in high biomass forests, extending harvest cycles, reforestation, and afforestation." Law et al., 2018. The FS omits an honest carbon accounting of the carbon outputs of this project.

Millar et al. 2007 state:

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

For your convenience we are including the "Letter Regarding Use of Forests for Bioenergy" dated February 11, 2021 addressed to President Biden and other world leaders, signed by hundreds of scientists and economists. Among other points, they state:

> As numerous studies have shown, this burning of wood will increase warming for decades to centuries. That is true even when the wood replaces coal, oil or natural gas.
>
> The reasons are fundamental. Forests store carbon—approximately half the weight of dry wood is carbon. When wood is harvested and burned, much and often more than half of the live wood in trees harvested is typically lost in harvesting and processing before it can supply energy, adding carbon to the atmosphere without replacing fossil fuels. Burning wood is also carbon-inefficient, so the wood burned for energy emits more carbon up smokestacks than using fossil fuels. Overall, for each kilowatt hour of heat or electricity produced, using wood initially is likely to add two to three times as much carbon to the air as using fossil fuels.

Stockmann, et al., 2014 indicate the emissions of carbon from decay of harvested wood products exceeds forest accumulation attributed to forest regrowth following logging only:

> Since 1996, emissions from HWP[2] at solid waste disposal sites exceeded additions from harvesting, resulting in a decline in the total amount of carbon stored in the HWP pool. The Northern Region's HWP pool is now in a period of negative net annual stock change because the decay of products harvested between 1906 and 2012 exceeds additions of carbon to the HWP pool through harvest.

Our comments on the Draft Forest Plan and Draft EIS (incorporated herein) also discuss climate change impacts on the NPCNF, and the effects of land management on greenhouse gas emissions.

To sum up, the FS has failed to properly analyze and consider how climate change is affecting the project area, how the forests in the project area contribute to global carbon sequestration, and how the proposed project activities create additional harm to the atmosphere from significant emissions of greenhouse gases. We urge you to address these issues before making a final decision on EOTW.

WATER QUALITY AND FISHERIES

See our LMP Objection, which further expresses our concerns in a section titled "Aquatic Species Diversity and Viability, Water Quality, Aquatic and Riparian Habitat."

The DEIS downplays potential of landslides. This is one reason the FS assumption that INFISH buffers will prevent sediment from reaching streams is unreasonable. (*See* McClelland et al., 1997.) The DEIS doesn't disclose the extent of routes or roads currently or potentially sited on landtypes where the highly erosive events McClelland et al., 1997 documented.

USDA Forest Service, 2016b (NPCNF's Johnson Bar Fire Salvage Final EIS) states:

> The state-of-the-science hillslope and road erosion model most commonly used in western land management applications is the Water Erosion Prediction Project (WEPP) Hillslope Profile and Watershed Model (Elliot et al. 2000). The Forest Service Road module of the WEPP model was used to predict sediment transport from roads to stream channels. Input data used to run this model were collected in the field at points where roads drain to streams during runoff. Another WEPP module (Disturbed WEPP) was used to predict erosion from treatment unit hillslopes. The WEPP-based Erosion Risk Management Tool (ERMiT) (Robichaud et al. 2007) was used to estimate post-fire erosion from treatment areas with and without project-related erosion mitigation measures. The ERMiT interface was developed in order to improve WEPP predictions of post-fire erosion and sedimentation, as well as the effects of post-fire mitigation measures at reducing erosion. Input data required for the ERMiT interface include hillslope, soil, cover, and management parameters.

[2] HWP = harvested wood products.

> The physical basis and performance of the WEPP models is discussed in the model documentation (Elliot et al. 2000, Elliot 2004, Robichaud et al. 2007), as well as several peer-reviewed papers (Elliot 2004, Laflen et al. 2004, Larsen and MacDonald 2007**). In general, erosion prediction models have difficulty predicting sediment output with precision from a road, hillslope, or watershed at time scales useful to land managers.** This is due mainly to a high degree of variability in site characteristics and climate. An average erosion/sediment delivery rate prediction can encompass this variability to some degree, but is more useful when combined with a probability that erosion would occur.

Notably, for the Hungry Ridge and End Of The World projects the FS modeled future sediment delivery and cobble embeddedness in each watershed to compare the water quality and fish habitat effects of different alternatives. In those analyses the FS admitted its modeling results are of limited application. First, the modeling can evaluate only short-term changes in cobble embeddedness, and "cannot be used to predict changes in cobble embeddedness that may occur as the result of long-term declines in sediment yield" (Hungry Ridge FEIS Appx E; End Of The World Biological Assessment). Second, its modeling is not reliable for predicting actual results (measureable amounts of cobble embeddedness and sediment delivery).

Further, there is no discussion of WEPP modeling effects of project activities inside the areas to be logged and/or burned.

The FS also fails to provide any estimates of sediment metrics due to management activities on lands of other ownership in the watershed analysis areas.

The Forest Plan (Fish and Wildlife Standard #19) requires: "Restore presently degraded fish habitat to meet the fish/water quality objectives established in this Forest Plan (see Appendix A of the Forest Plan)." Also, the Forest Plan (Fish and Wildlife Standard #21) requires: "Meet established fishery/water quality objectives for all prescription watersheds as shown in Appendix A." To comply with these binding standards, logging is prohibited in any watershed that currently fails to meet its Fishery Objective or its Sediment Yield Guideline, unless the Forest Service demonstrates a "positive, upward trend," as explained in the FS's Appendix A Guide.

The EOTW 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%." Also, "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." (Id.) Also, "Minor increases in sediment delivery to streams from culvert removals, replacements and crossing hardening are expected…" (Id.). And "Direct sediment effects to steelhead and their critical habitat would occur during culvert replacements in Fish and Jungle Creeks (5 culverts)." (Id.) Yet the EA arbitrary and contrarily declares, "no direct or indirect effects to streams from timber harvest, permanent or temporary road construction, road reconditioning or prescribed fire are expected."

The EA goes on: "All action alternatives comply with the Forest Plan Water Quality Objectives. FISHSED modeling indicates changes over 10% in cobble embeddedness and winter rearing in

five prescription watersheds… Predicted cobble embeddedness remains within desired conditions (<20%) for 3 of these five watersheds. Actual changes in embeddedness are not expected because harvest acres would be less than modeled acres, and because of sediment reductions associated with road decommissioning and road improvement activities."

The FS has not disclosed the existing trend in each degraded watershed and acknowledges direct impacts as cited above, and any expected future upward trend is highly speculative.

The Appendix A Guide directs the FS use a "convergence of evidence" rather than speculation about future improvements. The FS must consider the "key" factors of stream power and flushing rates, and any data and modeling which suggest a downward trend.

1. Failure to Evaluate Existing Trend & Ignoring Existing Trend Data

The Forest Plan Appendix A Guide directs the FS first to assess the existing trend, and secondly to assess the future trend, depending on whether the existing trend at step one was found to be downward, static, or improving. Moreover, the Appendix A Guide specifically states: "In all cases, discussions of upward trend in project NEPA documents will include" eleven listed items, including a "determination of existing trend, based on the process described above."

The FS has failed to determine existing trend for any degraded watersheds. Without assessing the existing trend at step one, the FS could not appropriately assess the future trend at step two, as instructed by the Appendix A Guide. For this reason alone, the EOTW analyses are arbitrary and capricious.

Furthermore, the EA does not include an analysis of cobble embeddedness over time. The FS never disclosed or considered this information in its upward trend analyses.

While stream conditions and cobble embeddedness can fluctuate year to year, cobble embeddedness data account for this variability—they are averaged values based on multiple years of data involving multiple measurements each year.

The FS failed to consider an important factor and reached a conclusion not supported by the facts, rendering its analyses arbitrary and capricious.

2. Ignoring Modeling Predicting Downward Future Trends & Failing to Factor in Stream Power and Flushing Rates.

The analyses also failed to address what the Appendix A Guide describes as "key" factors to understanding future cobble embeddedness: stream power and flushing rates.

Long-term reductions in sediment input will not necessarily reduce cobble embeddedness regardless of stream power and flushing rates. Sediment inputs—even if reduced—might still be too much sediment for a stream to handle, depending on its sediment flushing rates and power. The Appendix A Guide explains, "the key is that new sediment inputs remain below the flushing rates considering stream power and the fish/water quality objective of the stream." (Emphasis

added.) The FS cannot focus only on sediment, because knowing flushing rates is the key to knowing whether any sediment reductions will lead to reductions in cobble embeddedness too.

The real problem is cobble embeddedness. As the Appendix A Guide explains: "Upward trend means that stream conditions determined through analysis to be below the Forest Plan objective will move toward the objective over time." To demonstrate that these streams will move toward the Fishery Objective over time, the FS must show cobble embeddedness will improve.

Again, the FS itself considers flushing rates and stream power to be the "key" to how sediment will affect stream conditions like cobble embeddedness. But the agency ignored these factors and just assumed long-term improvements in sediment yield will lead to an upward trend in cobble embeddedness. Without considering flushing rates and stream power, there is no way to know whether or how short-term worsening of cobble embeddedness and sediment followed by long-term reductions in sediment will affect cobble embeddedness in the long run.

The FS maintains that, so long as it tacks on some restoration aspects to projects, it can authorize logging and road incursions in degraded watersheds by claiming there will be an upward trend—no matter how steeply downward a watershed is trending, and without even considering the "key" factor of flushing rates. The Forest Plan requires more than speculation.

The FS has not demonstrated an upward trend as required by the Forest Plan, so the EOTW project's admitted impacts violate NFMA, NEPA, and the APA.

WHITEBARK PINE

On December 15, 2022 the USFWS published a rule in the Federal Register listing the whitebark pine as a "threatened" species under the Endangered Species Act. This is new information subsequent to the EOTW EA. The FS must undergo proper consultation procedures under the ESA.

OLD GROWTH

These comments incorporate Friends of the Clearwater (2022), Friends of the Clearwater (2024) and Wild Heritage, 2024 (the latter which appends comments by a over 200 scientists), and Nongovernmental Organizations, 2024.

The July 2, 2024 EOTW Updated Old Growth Analysis document (UOGA) summarizes acres of direct EOTW project impacts:

> A variety of intermediate treatment methods are proposed in Forest Plan Old Growth (FPOG) and Replacement Old Growth (ROG)…
> • In Forest Plan Old Growth (FPOG): Alternative B proposes no regeneration Treatment in FPOG and 1,075 acres of intermediate harvest.
> • In Replacement Old Growth (ROG): Alternative B proposed no regeneration harvest in ROG and approximately 163 acres of intermediate harvest.

> The proposed action and alternative B propose prescribed burning on approximately **393** acres of FPOG and **544** acres of ROG of Forest Plan, Appendix N old growth types, respectively across the OGAAs (Table 3; Figure 3).

1. Old-Growth Ecosystems

The Forest Plan Final EIS at III-35 points out the importance of old growth:

> Habitat diversity is a measure of the variety, distribution, and structure of plant communities as the progress through various stages. Each stage supports different wildlife species. **One of the most critical elements of diversity in a managed forest is old growth. If sufficient old growth is retained, all other vegetative stages from grassland through mature forest will be represented in a managed forest.**

(Emphasis added.) This statement makes it clear: despite the narrow scope the FS intends for the DEIS, the ecological implications of changes to the abundance and location of old growth from the EA to the DEIS are much wider. Stands of trees meeting old-growth criteria are a part of **old-growth ecosystems** as recognized in the above quote from the Forest Plan Final EIS, as stated in the FS's Green et al, and as discussed in Juel (2021) including the scientific sources cited therein. In its extremely narrow scope the DEIS violates NEPA because changes in what the FS considers to be old growth, where it is located, and how much exists on the NPNF and in the EOTW project area have implications for NEPA analyses for practically all other ecosystem components and processes (Juel, 2021 and the scientific sources cited therein).

The FS has exhibited cluelessness about old growth on the NPNF apparently since the Forest Plan was adopted. In 2012, twenty years after the Northern Region's publication of the controversial Green et al old-growth criteria, the FS hired a consultant in an attempt to figure out the meaning of the direction for old growth found in the 1987 Forest Plan and Forest Plan FEIS. (*See* Jahn, 2012[3]). Whereas we don't agree with all of the consultant's interpretations and conclusions, that the Jahn (2012) document even exists is a testament to agency muddled thinking on old-growth policy.

2. EOTW project area old growth

The EOTW UOGA lists "Changes Between the EA and Draft EIS":

- Updated acreage of Forest Plan Old Growth (FPOG) and Replacement Old Growth (ROG) stands based on new surveys.
- Updated maps to display proposed treatment type, road construction, and old growth habitats and Management Area 20.
- Updated effects analysis on old growth habitats and Management Area 20.
- Updated Consistency with Forest Plan and Environmental Laws.
- This analysis replaces the Final EA, Summary-old growth section.

[3] The document, "121204JHudsonEmsgPhilJahnOldGrowthIntentIn1987NPForestPlan.pdf" from the Clear Creek project files provides context on the development of the FS's Jahn, 2012 paper.

• This analysis replaces the old growth analysis in the End of the World - Terrestrial Wildlife Resources Biological Assessment, Biological Evaluation, & Specialist report (2021).

Still, the EOTW DEIS and UOGA do not reconcile significant changes in the amount of Forest Plan Old Growth (FPOG)[4] from the EA to the DEIS. For example, a project document ("42-66_OldGrowthTable.pdf") from the EA's original analysis displays the following table:

Table 2: Acreages of Treatment within Old Growth

Prescription	Suitable Treated under No Action Alternative (% Suitable Habitat)	FPOG, NIDOG, Replacement OG Treated under Action Alternative (% Suitable Habitat)	FPOG, NIDOG, Replacement OG Treated under Alternative B (% Suitable Habitat)
w/Reserves	0 (0)	4 (.5)	4 (.5)
Seed Tree	0 (0)	1 (<1)	1 (<1)
Shelterwood	0 (0)	0 (0)	0 (0)
TOTAL REGENERATION	**0 (0)**	**5 (1)**	**5 (1)**
Commercial Thinning	0 (0)	42 (5)	42 (5)
Variable Density Thinning	0 (0)	188 (25)	188 (25)
Overstory Reduction	0 (0)	0 (0)	0 (0)
Understory Reduction	0 (0)	0 (0)	0 (0)
TOTAL INTERMEDIATE	**0 (0)**	**230 (30)**	**230 (30)**
Pre-commercial Thinning	0 (0)	0 (0)	0 (0)
TOTAL PCT	0 (0)	**0 (0)**	**0 (0)**
Landscape Burning	0 (0)	122 (16)	111 (15)
Mechanical Treatment	0 (0)	0 (0)	0 (0)
TOTAL LANDSCAPE FIRE	0 (0)	**122 (16)**	**111 (15)**
Rd 221 Shaded Fuel Break[1]	0 (0)	5 (1)	5 (1)
Campground Hazard Tree/Meadow Restoration	0 (0)	13 (2)	13 (2)
TOTAL OTHER	0 (0)	**18 (3)**	**18 (3)**
TOTAL ALL TREATMENTS	0 (0)	**375 (49)**	**364 (48)**

[1]Portions of Rd 221 Fuel Break which does not overlap with other harvest units.

[4] Forest Plan Old Growth, or "FPOG" is the FS's label for forest stands that are alleged to meet Forest Plan Appendix N old-growth criteria.

The above table reveals the FS first represented under the EA that Alternative B would log a total 364 acres of forest that meets the FPOG and/or North Idaho Old Growth/Green et al. (NIOG) criteria; OR is Replacement Old Growth (ROG). Now, the EOTW UOGA says Alternative B logs 1,075 acres of FPOG alone and 163 acres of ROG. The DEIS does not explain this huge discrepancy other than mentioning, vaguely, "Updated acreage … based on new surveys."

In other words, the FS was set to carelessly and callously log hundreds of acres of old growth under the EA without taking a hard look at old-growth conditions in more than 700 acres of units. And now we're to believe the FS is being forthright with this DEIS?[5] So what should make us believe the latest process is legitimate—not just the FS making a pretense of complying with the Forest Plan? Has the FS finally thoroughly evaluated all forest stands in the project area, comparing them to the proper old-growth criteria?

The EOTW UOGA describes the procedures used to newly identify old growth:

> A workflow was created to analyze stand exam data which allows us to compare the data to the Nez Perce Forest Plan old growth (FPOG) standards in Appendix N and determine what stands meet forest plan old growth standards. A copy of the workflow can be found in the project record. The workflow uses Field Sampled Vegetation (FSVEG) stand exam data, ArcMap capabilities, historical project data, and arial detection surveys to identify stands that meet the Forest Plan old growth standards.

It also does not appear that the FS did what Forest Plan Appendix N requires in regards to identifying **blocks** of old growth. That is, if part of a block is determined to meet old-growth criteria but other portions only meet replacement criteria, the FS must not count the block as old growth in terms of meeting the 5% OGAA standard (nor the Forestwide 10% standard) unless more than 50% of it adequately meets old-growth criteria.

Finally, the Forest plan requires the FS to protect at least 5% "designated" replacement old growth (ROG). That means whatever ROG is identified to meet Forest Plan standards must both be clearly designated as "replacement" old growth and maintained in a durable, publicly available inventory along with the rest of the old growth.

Since the DEIS only considers a subset of Appendix N requirements, as we discuss below, it does not demonstrate Forest Plan compliance.

We assert that FIA data is not appropriate nor accurate enough to be utilized for inventorying old growth at the OGAA level or forestwide. In response to the Biden Administration's call to complete a nationwide inventory of mature and old growth forests on national forest lands and lands managed by the Bureau of Land Management, the FS created the "Forest Service Climate Risk Viewer" for "Mature and Old-Growth Forests." We have reproduced the text from that

[5] This of course begs the question: What other issues is the FS refusing to reanalyze under this narrowly focused DEIS, which—similar to the EA's analysis of old growth—were carelessly, callously, and sloppily considered without the "hard look" NEPA requires?

website in our incorporated document titled "Forest Service Climate Risk Viewer." Therein the FS states, "The mature and old-growth map depicts the estimates of old-growth and mature forest on Forest Service land within each fireshed polygon. Firesheds were chosen because the roughly 250,000-acre size of each fireshed is the appropriate scale for statistical inference using FIA plots" (emphasis added.) What this means is 250,000 acres is roughly the minimum needed to contain enough FIA plots for making statistically meaningful percentage estimates. Contrast that with the much smaller size of Nez Perce National Forest OGAAs, and it's easy to understand why any percentages derived from FIA data for OGAAs would be inaccurate and inappropriate for use in demonstrating compliance with the 5% Forest Plan OGAA Standard.

3. Forestwide amount of old growth on the Nez Perce National Forest

Forest Plan Table II-3 established "Data Requirements and Accomplishment Schedule" which was "needed to improve the Forest's data base, to revise current data base inventories to new standards, and to incorporate new data base requirements that have recently been identified." It directed the FS to "Inventory, Survey and Delineate" old-growth habitat by 1990. By completing that inventory, the FS would also have been able to show compliance with the Forest Plan 10% old growth forestwide standard. However the Court declared that the EOTW project is not in compliance with the Forest Plan 10% old growth forestwide standard, essentially recognizing the FS has unnecessarily delayed completing the inventory for 30 years.

Now, because the Court declared that the EOTW project was not in compliance with the Forest Plan 10% old growth forestwide standard, the EOTW UOGA attempts to address that deficiency:

> ***Forest wide:*** The most recent Forest Inventory and Analysis (FIA) data (Reyes and Morgan 2022) indicate that approximately 22.5 percent of the Nez Perce National Forest meets the Forest Plan definition of old growth (minimum of 15 trees per acre greater than 21 inches diameter breast height (dbh)) (90 percent confidence interval: 19.7 – 25.4 percent). The data also shows approximately 14.7 percent of the Nez Perce National Forest meets the Forest Plan definition of old growth (minimum of 15 trees per acre greater than 21 inches dbh, and vertical structure) (90 percent confidence interval: 12.4 – 17.0 percent). Based on this information, the Nez Perce National Forest is above the Forest Plan minimum standard of 10 percent old growth forest wide.

This states that 22.5% of the NPCNF meets **one** of the Appendix N criteria (minimum of 15 trees per acre greater than 21" dbh). It also states that 14.7% of the NPCNF meets that plus one additional Appendix N criteria, adding on "vertical structure"[6]. We notice that the UOGA doesn't state that any percentage meets Appendix N FPOG criteria, presumably because the FS knows the other criteria cannot simply be ignored.

Please reconcile the DEIS/Reyes and Morgan (2022) estimate of 22.5% with this statement from the June 26, 2024 Wildlife Specialist Report: "…recent FIA data indicates that, at 13.7% (11.4-

[6] Reyes and Morgan (2022) explain "vertical structure" means "Where there are 15 or more trees per acre that are 21 inches in DBH or larger, and the additional criteria of a two-story (2), three-story (3) or continuous (C) vertical structure"

16.2% @ 90% CI), the Forest currently exceeds the Forest plan standard of 10% Old Growth." The DEIS doesn't explain why the same data source yields this vast discrepancy. There is an obvious lack of transparency here.

We also point out that Reyes and Morgan (2022) used a limited subset of the FPOG/Appendix N criteria. The DEIS does not reconcile that variance. We are left wondering what criteria the UOGA and DEIS actually used in making either OGAA or forestwide old-growth designations, as a minimum effort. Please disclose the full range of Forest Plan Appendix N old-growth criteria that are available in the data sets both for that/those used for the EOTW OGAA analysis and also for the Reyes and Morgan (2022) analysis.

A document, "120911JHudsonCLaneEmsgOldGrowthFIAPlots.pdf" from Clear Creek project files is an email message:

> From: Hudson, Joe B -FS
> To: Lane, Cynthia -FS
> Cc: Hill, Lois R -FS
> Subject: old growth - FIA plots
> Date: Tuesday, September 11, 2012 2:10:06 PM
>
> Cindy, One of the tasks we had identified for the old growth issue was **asking Renatta to run percentages of OG using Nez Forest Plan OG criteria using 150 years as age**. Not sure if we need Phil Jahn's product before doing this or not. My thinking is that since this is a Forest level project it is probably appropriate for the request to Renatta to make the run should come from yourself. You agree?
>
> Joe B. Hudson
> District Ranger

(Emphasis added.) We discuss below the importance of considering age of the trees in stands being evaluated in consideration for old growth designation.

Our comments on the original Hungry Ridge Draft EIS asked how many FIA plot survey locations in Nez Perce National Forest and HR Project Area actually meet either North Idaho old growth (Green et al.) or Forest Plan old-growth criteria. The FS replied, "The exact locations of FIA plots are not disclosed to the Forest." Since FIA data are what Reyes and Morgan (2022) utilized in their analysis, it's clear that the FS cannot cross-validate Reyes and Morgan (2022) conclusions by inspecting the sites they presumed to be indicative of old-growth conditions. The FIA "inventory" of NPNF old growth is akin to an anonymous poll or survey. Not even the Forest Supervisor is privy to FIA plot locations on the Forest. With EOTW, the FS is using the FIA for purposes it cannot properly serve.

FOC's Objection to the original Hungry Ridge draft ROD and Final EIS included:

> …the Forest Service cannot rely on FIA inventory to prove that it is meeting its old growth requirements. 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.

Furthermore, neither the EOTW DEIS, UOGA, nor Reyes and Morgan address the following Forest Plan Appendix N direction:

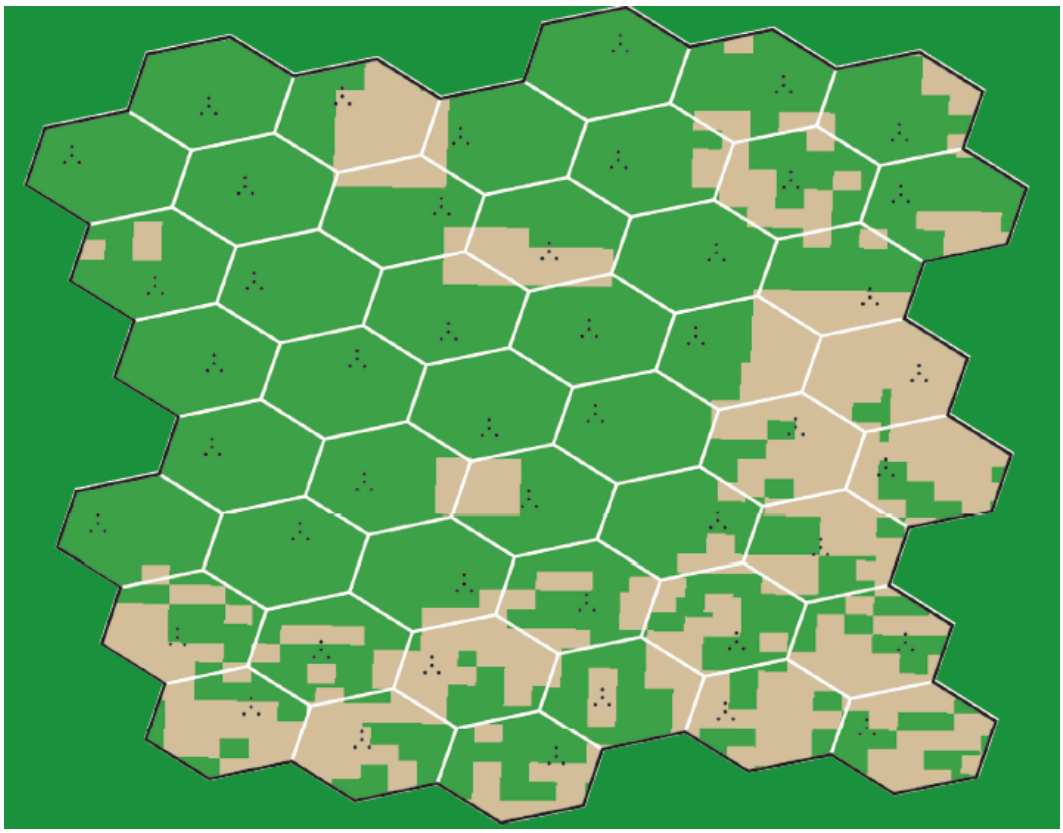
> Where available, stands should be at least 300 acres. Next best would be a core block of 150 acres with the remaining blocks of no less than 50 acres and no more than 1/2 mile away. If existing old-growth blocks are less than 100 acres, the stands between the old-growth blocks should be designated 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.

Those procedures are important for a consideration the DEIS chooses to ignore: how the changed old-growth designations might alter the suitability of habitat for old-growth associated wildlife species in the project area, as well as the forestwide viability of these species.

On the following page is the diagram depicted on the cover of Bechtold and Patterson, 2005, which helps to explain the idea of random FIA plot location. The grid depicted by white hexagons was first fixed on the landscape. The location of one sampling site per hexagon (the "plot"—represented by four dots in a triangle configuration) was subsequently chosen randomly and this plot's location is what's kept confidential. That same plot is periodically resampled by the FIA program, typically once every ten years. (Id.)

At most, each FIA plot samples a maximum of one acre—far smaller than the old-growth criteria of the Forest Plan—and thus estimates based on FIA sampling cannot indicate the capability to

meet biological needs of old-growth associated wildlife. Moreover, the location of plots is kept confidential for good reason. Intentional differential management of FIA plot locations within national forests would skew data, making it non-representative of forest conditions. So the project decisionmaker does not know the location of sampled stands within a national forest. And again—the FIA data cannot yield the extent (acreage) of any particular old-growth stand.



Gray et al. (2023) further explain the limitations of using FIA data:

> Strategic inventories like FIA are designed to estimate means and totals of desired attributes for relatively large areas with an associated measure of uncertainty. Unlike targeted sampling, the full variation in forest composition and structure is measured in order to produce unbiased estimates. The measurements can also be used to classify forests, which is routinely done to describe forest type or tree density of individual FIA plots. However, **the classifications are based on the plot sample, and may not accurately reflect the mean attributes of the overall stands in which they occur, which could cover 10 or more ha.** In addition, the fixed plot footprint straddles stand and land-use boundaries, so the area sample for a stand may be substantially less than the full plot. **Classifications that are based on plot measurements are affected by bias (one form of error) that decreases with increasing plot size and increasing density of the attribute being estimated** (Azuma and Monleon, 2011). For example, **a FIA-sized plot would not detect a large tree in a stand with 20 large trees per ha ~ 25% of the time**, while a plot of twice the area would not detect a large tree in the same stand 5% of the time (Williams et al., 2001). **Williams et al. (2001) recommend that classifications that depend on**

> **large areas or rare elements be avoided using inventory plots. The small size of the FIA plot and the dispersed subplot design also precludes the ability to characterize horizontal spatial heterogeneity (e.g., gaps and non-gaps).**

(Emphases added.) Jamie Barbour, assistant director for adaptive management at the Forest Service's Monitoring and Analysis Team, which oversaw the implementation of the mature and old-growth inventory, says "We didn't want to create the impression that we knew exactly where these clumps of old forest were because that would have ramifications that might not be very useful," adding that the agency wanted only "to present an idea of where large accumulations of older forests were." (*See* "Why no one knows exactly how much old-growth forest we have left".) Also, "Barbour says **high-resolution mapping of mature and old-growth forests should ideally happen at the local level**." (Id., emphasis added.)

FIA statistics thus have no correlation to forest plan minimum old-growth amounts or stand sizes, nor to wildlife species' spatial habitat needs. Creating mapping of existing old growth is not possible using FIA data. The location of existing old-growth stands cannot be specified using FIA. There has been no systematic scientific study conducted to correlate any FIA estimate with the results from field data of old-growth habitat. Estimates of old-growth percentages based on FIA data cannot be validated or verified by independent field investigation. Independent peer review—a hallmark of the scientific method—is not possible. Therefore these "black box" estimates based on FIA sampling is improper for NEPA analysis. If the FS could refute any of these statements, to date in responses to comment and objections in numerous contexts they haven't done so.

Nearly every area of the roaded Forest has been logged over the 37-year life of the 1987 Nez Perce Forest Plan. Friends of the Clearwater created a map of the Nez Perce National Forest, included as Attachment D, depicting the extent of recent logging project areas. The areas marked out with grayish green are either federally designated Wilderness or Idaho Inventoried Roadless Areas, where little or no logging should have happened. Overtop that FOC overlaid two more sets of geographic information. The orange polygons cover project areas for all logging projects the Forest Service is currently considering or has approved in the last 10 years. (The project names are provided in black letters.) Most of these logging project polygons are sourced from geographic information files provided by the FS. Since we did not have the shapefiles for Clear Creek, Limber Elk, and Red Seigel Projects we drew in these approximate project areas, also in orange, based on maps (not the GIS files) the FS has released to the public.

Clearly evident from this map, in the past decade the FS has proposed projects with boundaries that cover most of the forest where logging is permissible (outside of Wilderness and Roadless). We did overlay one project outside of this time period; the 2008 Red Pines Project. But other than Red Pines, the map doesn't show logging projects earlier than 2013. One can get a sense of projects earlier than 2013 because of the Forest System Roads.

On the map, pink lines represent Forest System Roads. It is reasonable to conclude that most of the existing road network was created to facilitate logging projects.

We would be reasonable to expect the FS to have a fairly complete forest-wide inventory of old growth merely because nearly every area of the Forest outside Wilderness or Roadless has been logged over the life of the 1987 Nez Perce Forest Plan. Our assumption is reasonable because compliance with the Forest Plan involves verifying the old growth within each of the project boundaries.

In sum, the FS should be able to produce a forest-wide inventory from previously generated project area inventories, not merely a questionable estimate based on FIA data. The question is, why is that inventory not included as part of the DEIS procedure to comply with its forestwide 10% old-growth standard?

4. Old-growth criteria and failure to apply best available science

The EOTW Updated Old Growth Analysis (UOGA) states: "North Idaho old growth (NIOG) definition (Green et al. 1992) was not considered when assessing old growth." The Hungry Ridge FEIS states, "Potential impacts to lands meeting the North Idaho old growth (NIOG) definition (Green et al. 1992) were **included as best available science**." (Emphasis added.) More recently, the Hungry Ridge DSEIS states, "The analyses documented in the Draft SEIS are based on the thorough application of **the science currently available** to the project Interdisciplinary Team." (Emphasis added.) Notably, that DSEIS does not say the FS is applying best available science in regards to old growth. So it has become significant new information that the FS does not consider its latest EOTW analysis (the DEIS and UOGA) to be based upon best available scientific information. The FS does not explain how this is consistent with NEPA's requirement for analyses be conducted with scientific integrity.

Moreover, the NPNF still believes that the Green et al. document is still best available science in regards to old growth, as demonstrated by its February 2023 Record of Decision for the Clear Creek Integrated Restoration project. The February 2015 Clear Creek Final EIS Appendix D states, "The Green et al. definitions are regarded as the "best available science" for the classification of old growth at the site-specific level." And the September 2015 Clear Creek Final EIS Appendix D discusses how Green et al. is to be implemented as best available science:

> Using Green et al. 1992, errata corrected 02/05, 12/07, 10/08, 12/11 the following criteria would be used to define old growth:
>
> Each old growth type is determined by minimum criteria including minimum age class of large trees, minimum number of trees per acre with a particular diameter at breast height (DBH), with minimum basal area. Associated stand characteristics include:
>
> 1) Variation in diameter
> 2) Percent dead or broken top
> 3) Probability of down woody debris
> 4) Percent Decay
> 5) Number of canopy layers
> 6) Snags greater than or equal to 9 inches in diameter

The September 2015 Clear Creek Final EIS Appendix D goes on to present this table:

Table D-2. Old Growth Characteristics1

Minimum Criteria	Minimum Age of Large Trees (Years)	150
	Minimum Number of Trees Per Acre (TPA)	3-10
	Minimum Diameter at Breast Height (DBH) [6]	13-21
	Minimum Basal Area (Square Feet Per Acre) [5]	40-80
Associated Characteristics	Diameter at Breast Height Variation[3]	M-H[7]
	Percent Dead/Broken Top	0-36
	Probability of Down Woody[3]	L-H[7]
	Percent Decay[2]	0-41
	Number of Canopy Layers[4]	1-3
	Snags Greater Than or Equal to 9 Inches DBH[2]	0-42

[1]Green et al., 1992 Varies by Habitat Type -See Green et al. 1992 Old Growth Chart for Complete Description
[2]These values are not minimum criteria. They are the range of means for trees greater than or equal to 9 inches DBH across plots within forests, forest types, or habitat type groups.
[3]These are not minimum criteria. They are Low, Moderate, and High probabilities of abundant large down woody material or variation in diameters based on stand condition expected to occur most frequently.
[4]This is not a minimum criteria. The number of canopy layers can vary within an old growth type with age, relative abundance of different species, and successional stage.
[5]In Old Growth Type 4B, 120 square feet of basal area applies to habitat type groups F, G, and G1, and 80 square feet of basal area applies to habitat type groups H and I. In whitebark pine forest type, 60 square feet of basal area applies to habitat type groups I and J, and 40 square feet of basal area applies to habitat type group K.
[6]In Old Growth Type 7, the 25" minimum DBH only applies to cedar trees. Old trees of other species are evaluated with a minimum DBH appropriate for that species on these habitat types (21" for Douglas fir, grand fir, lodgepole pine, western hemlock, white pine, ponderosa pine; and 17" for subalpine fir, and mountain hemlock). (Green et al, 1992, Errata 2011)
[7]L = Low, M = Medium, H = High.

The September 2015 Clear Creek Final EIS Appendix D continues:

> The primary reason for managing for old growth is to maintain viable populations of old growth dependent species. Our reasoning for maintaining old growth has not changed in the amended old growth description.
>
> The proposed site specific Forest Plan amendment for old growth is consistent with the previous forest plan amendment on old growth. The previous old growth amendment directed old growth designations to be in riparian areas. Green et al. 1992, errata corrected 02/05, 12/07, 10/08, 12/11 indicates that most of the old growth is in lower elevations. The wet riparian habitat conservation areas (RHCA's) are likely to have survived the fires of 1938 and developed into old growth. The Nez Perce Forest Plan indicates that the Forest wide goal is to manage riparian areas to support 80 percent of maximum populations of snag dependent species and all other areas to support 60 percent of maximum populations of snag dependent species.
>
> The Nez Perce National Forests minimum requirements for amount and distribution of old growth has not changed. However, old growth categories are clarified and defined. Currently the Nez Perce National Forest manages for old growth in Management Area 20 (MA 20), verified old growth and recruitment old growth. We have substituted the Green et al. 1992, errata corrected 02/05, 12/07, 10/08, 12/11 requirements for old growth but the process to designate and distribute old growth remains the same. The process for assigning recruitment old growth stands also remains the same. It is important to recognize and understand that some watersheds may not have any verified old growth because natural disturbance agents like severe wildfire have removed old growth from the landscape.

Because of natural events like the fires of 1910 and 1938, recruitment old growth may be quite young and may take many years before functioning as old growth.

The site specific old growth amendment does not require verifying old growth because verification has already been done in the project area.

Adopting the definitions for old growth found in Green et al. (1992) that define successional stages, stratification by habitat types, and other site conditions would help refine our interpretation of the old growth characteristics described in Appendix N of the Forest Plan. (Emphasis added.)

Additionally, adoption of this amendment would ensure consistent terminology and analysis. Old growth determination is done through data collection in accordance with Region One stand exam protocols that correlate to the definitions found in Green et al (1992).

Following direction to use best available science, the Nez Perce National Forest has updated Forest direction for old growth and snag management. Old Growth Forest Types of the Northern Region by Green, Joy, Sirucek, Hann, Zack and Naumann is the current and best science available for defining old growth. Green et al. 1992, errata corrected 02/05, 12/07, 10/08, 12/11 is based on habitat types to determine old growth conditions. Greens research is based on field data called stand exams with over 20,000 samples. (Emphasis added.)

Although Green et al. 1992, errata corrected 02/05, 12/07, 10/08, 12/11 criteria for old growth is more complex, **the criteria is also more relevant, more precise and within the capability of the specific Nez Perce National Forest habitat types.** Each habitat type is assigned to a habitat type group which corresponds to an old growth type. Green et al. 1992, errata corrected 02/05, 12/07, 10/08, 12/11 defines old growth within the ecological conditions with specific criteria that are within the capability of the habitat type. Green et al. 1992, errata corrected 02/05, 12/07, 10/08, 12/11 old growth description is based on successional processes in which stands develop into late seral single storied stands or late seral multi storied stands or the stage where climax tree species dominates the stand. (Emphasis added.)

The rationale the FS uses for amending the Forest Plan to adopt Green et al old-growth criteria for Clear Creek logically apply forestwide. There's nothing special about the Clear Creek project area nor its old growth that justify amending the forest plan in that case alone.

Friends of the Clearwater invites an open discussion about how Green et al might be applied as best available science concerning old growth. To date the FS has chosen to be nonresponsive and arbitrary in its actions rather than attempting to identify what consensus may be reached between its experts, independent scientists, and conservation interests.

We understand how the Green et al distinctions between various habitat types opens up the possibility of recognizing and protecting a wide diversity of old-growth conditions on the NPNF

which might not as easily be recognized by the Forest Plan Appendix N criteria, which might also result in better addressing wildlife habitat needs. We also see that Green et al recognize that age of large trees is an important feature of old-growth forest and habitat—in fact a minimum criteria—which is not clearly emphasized in Forest Plan Appendix N. But in order to find agreement with the public and to manage genuinely consistent with best available science the FS must halt its abuses of Green et al as the interested public has repeatedly requested. Furthermore, the solution is not to throw out the baby with the bathwater as the DEIS is doing, both in terms of turning its back on the diversity of habitat types featured in Green et al and ignoring age criteria both Green et al and the Forest Plan EIS recognize.

5. Abusing Green et al by conflating its old-growth screening criteria with a minimum requirement for old-growth.

This is the controversy the previous section alludes to. This was the topic of a public comment on the Clear Creek project. From the Clear Creek Final Supplemental Impact Statement (FSEIS) at pp. 323-324:

> Your old growth analysis as outlined in the FEIS, your response to public comment and your desire to incorporate the guidelines as a Forest Plan amendment all suggest complete reliance on numbers. For example, the wording in the proposed amendment (FEIS - Appendix D) calls the numbers "definitions" rather than screening criteria. You have used the numbers to calculate overall Forest level of old growth from 2007 Forest Inventory Data (FEIS 3-103) and rely on stand exam numbers as method to "field verify" old growth stands (FEIS 3-104). You suggest that 288 acres of improvement harvest and 2 miles of internal road construction "will not change old growth status per Green et al. (1992 as amended)" - (Draft Record of Decision - page 38). This is presumably due to the fact that the minimum tree numbers as identified by Green et al. (1992) will still remain following logging. The desire to adopt the Green et al. (1992) screening criteria as the definition for old growth in Clear Creek appears to be related to the fact that only 10 trees per acre >21 inches were utilized for the screening criteria in habitats common to the project area. The existing Forest Plan has six criteria for identifying old growth one of which states: "At least 15 trees per acre > 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." This would call into question the 2007 Forest Wide Inventory since current Forest Plan Definitions were not utilized.

In response, the Clear Creek FSEIS at p. 323 stated: “Please see FEIS Volume 2 (September 2015), Appendix L, response 21/15 (pg. L-12).” From a reading of that “response 21/15” it is clear the FS avoids addressing criticism of the way it applies Green et al.

Juel, 2021 further discusses this topic:

> Green et al., 1992 recognizes a fairly common “old growth type” in the North Idaho Zone where one often finds large, old Douglas-fir, grand fir, western larch, western white pine, Engelmann spruce, subalpine fir, and western hemlock trees on cool, moist environments. (*Id*.) Such old growth is relatively dense: “There are an average of 27 trees per acre 21

inches DBH or more. The range of means across forests and forest types is from 12 to 53." (*Id*.)

However, Green et al., 1992 sets the "minimum number" of trees per acre 21 inches DBH at only ten. (*Id.*). Which means, under the above Idaho Panhandle Forest Plan standard, the "average" stand could experience logging 17 of its 27 largest, oldest trees and still qualify as old growth.

So why does Green et al., 1992 specify such a small minimum number of large, old trees—so far below the recognized average, and even less than the bottom limit of the recognized range? The answer lies in how those authors intended the criteria to be used: "The number of trees over a given age and size (diameter at breast height) were used as **minimum screening criteria** for old growth. …The **minimum screening criteria** can be used to identify stands that **may meet** the old growth type descriptions. " (*Id*., emphases added.) Green et al., 1992 further explain:

> The minimum criteria in the "tables of old growth type characteristics" are meant to be used as a screening device to select stands that maybe suitable for management as old growth, and the associated characteristics are meant to be used as a guideline to evaluate initially selected stands. They are also meant to serve as a common set of terms for old growth inventories. Most stands that meet minimum criteria will be suitable old growth, but there will also be some stands that meet minimum criteria that will not be suitable old growth, and some old growth may be overlooked**. Do not accept or reject a stand as old growth based on the numbers alone; use the numbers as a guide.**

(*Id.*, emphasis in the original.) So the abuse of the Green et al., 1992 minimum large tree screening criteria results in logging of large, old trees from old growth. And even if the existing stand in the above example possesses only the bare minimum large, old trees, managers could still log smaller and/or younger trees in the old-growth stand without disqualifying it, because numbers of such trees are not a part of the minimum criteria.

Likewise, the Green et al. 1992 minimum total basal area was set well below the recognized range, again presumably for its utilization as a screening device. For the same old growth type discussed above, the "average basal area is 210 ft^2 per acre. The range is 160 to 270 ft^2". Yet the minimum is either 80 or 120 ft^2 depending upon type sub-categorization.[7] Basal area is a measure of stand density, or the square footage of an acre that is occupied by tree stems. So logging a stand with a basal area of 270 ft^2 (upper end of range) down to 80 ft^2 ("minimum") could result in the loss of medium diameter trees—another enticement for managers with timber priorities to log within old-growth stands.

In the above examples, the artificially reduced abundance of younger, smaller trees has unknown but dubious implications for the stand's potential development and habitat quality, since it is deviating from a natural trajectory.

[7] With the issuance of the Green et al. 1992 (**errata correction 2007**) the Forest Service emphasizes and clarifies that stand basal area is one of the "minimum criteria."

So this leads to the situation where the FS is justifying significant logging disturbance within old-growth stands, making unsupported statements claiming logged old growth is still old growth: "**Intermediate harvest** would be conducted in a way to **preserve old growth stand characteristics** where the two overlap." (Emphases added.)

This is also a topic of Kootenai National Forest (2004), which we incorporate into these comments. It states:

> **The publication "Old-Growth Forest Types of the Northern Region" (Green et al. 1992) is to be used as a means to initially define old growth, not as a management or prescriptive guide.** The Green et al., document is not manual or handbook direction and not formally adopted as Regional guidance. It is, however, the only peer-reviewed document of old growth definitions in the Northern Rockies and recommended for use within Regional protocols. According to Green et al., old growth "…encompasses the later stages of stand development that typically differ from earlier stages in characteristics such as tree age, tree size, number of large trees per acre and basal area. In addition, attributes such as decadence, dead trees, the number of canopy layers and canopy gaps are important but more difficult to describe because of high variability". In other words, minimum attribute characteristics of trees per acre, DBH, age, and basal area along with attributes of snags, structural layering, and downed wood minimally define old growth – not any one attribute or any minimum value of specific attributes.
>
> Pages 11 and 12 of Green et al. state the appropriate use of the document. The following are pertinent quotes from the document to aid in that interpretation:
>
> 1. No set of generated numbers can capture all the variation that may occur at any given age or stage in forest development.
> 2. Because of the great variation in old growth stand structures, no set of numbers can be relied upon to correctly classify every stand.
> 3. Do not accept or reject a stand as old growth based on the numbers alone; use the numbers as a guide.
> 4. The minimum criteria are used to determine if a stand is potentially old growth. Where these values are clearly exceeded, a stand will usually be old growth. The associated structural characteristics may be useful in decision making in marginal cases, or in comparing relative resource values when making old growth evaluations.
> 5. The basic concept is that old growth should represent "the late stages of stand development …distinguished by old trees and related structural attributes."
> 6. A stand's landscape position may be as important, or more important as any stand old growth attribute. The landscape is dynamic. We need to do more than draw lines to manage this dynamic system. Consider the size of old growth blocks (large blocks have special importance), their juxtaposition and connectivity with other old growth stands, their topographic position, their shapes, their edge, and their stand structure compared to neighboring stands. Stands are elements in dynamic landscapes. We need to have representatives of the full range of natural variation, and manage the landscape mosaic as a whole in order to maintain healthy and diverse systems.

> **The Green et al. document is an aid intended to define, evaluate, and monitor old growth – not to be used as a prescriptive, management guide with minimum attribute values as thresholds. This will not achieve the objective of maintaining old growth.**
>
> Another memo from the Forest Supervisor (May 14, 2003) states, "When minimums are used, they are intended to illustrate the beginning of what could be identified as old growth—or late seral, successional development for a specific habitat group within a specific zone—not what is recommended".

(Emphases in the original.) Although we disagree with a statement in that document ("no one is advocating a 'hands off' policy toward old growth"), its nascent hypothesizing that managing in old-growth stands and replacement old growth might be appropriate, and its interpretation of science, that doesn't nullify the point we are making here on the intended purposes of Green et al and how it is being abused on the NPNF.

An important fact missing from the DEIS is that the management paradigm upon which the original, current, 1987 Forest Plan is based doesn't insert itself into the natural processes that create and sustain old growth. Within that paradigm, in contemplating management actions the FS is to insure that the specified percentages of existing old growth are retained in OGAAs and forestwide to meet the overarching Forest Plan old-growth Standard: "Provide management for minimum viable populations of old-growth and snag- dependent species by **adhering to the standards stated in Appendix N**" (emphasis added). There is no direction in the Forest Plan to log old growth anywhere for the purposes of somehow improving it, or that logging can still maintain it. Jahn, 2012 addresses this in his section entitled "Protecting Old Growth Habitat In Excess of Minimums Prescribed In the NPNF Plan." On the last three pages of KNF Forest Plan Old Growth Appendix 17, the FS rejects the notion that logging is consistent with preserving old growth. But as seen from the cites in our previous paragraph, the text of the EOTW UOGA, and as found in the draft revised forest plan for the Nez Perce-Clearwater National Forests (NPCNF), the FS is promoting the idea that active management should be the defining relationship between the agency and old growth. We are incorporating FOC's various comments on the forest plan revision process, one of which includes scientific criticism the old growth active management paradigm (*see* our April 20, 2020 comments on the Draft Revised Forest Plan for the NPCNF at pp. 134 - 156). In an attempt to sugar coat the habitat destruction logging and road building cause, the FS pretends it can outperform the natural processes that are the only known way old growth has ever come to existence in these forest ecosystems. Such hubris does not belong in a context of managing public resources.

<u>6. Age criteria must be applied to be consistent with best available science concerning old growth</u>

As we discuss above, the UOGA and DEIS is essentially saying that old growth need not contain very old trees. The FS is entirely omitting age criteria, apparently to inflate its old-growth inventory. This is contrary to best available science and conflicts with the NPNF's own policies including Green et al, and as stated in current and previous NPNF NEPA documents.

Green et al clearly uses age of large trees as one of its minimum, nondiscretionary minimum

criteria. Jahn (2021), the document commissioned by the FS we put into context above, is also clear on this point. Some of his sources are the Forest Plan and Forest Plan FEIS. Jahn (2012) refers to the NPNF 1987 Forest Plan EIS:

> EIS at II-89:
> In order to maintain minimum viable populations of old-growth-dependent species, an estimated 5 percent of the forested acres within prescription watersheds and 10 percent of the total forested acres will be managed as old-growth habitat in all alternatives except one. It is uncertain what percentage of forest communities that are 160 years old or older is suitable old-growth habitat. Nevertheless, the amount of old-growth and older age classes is used as an indicator of the total amount of old-growth habitat available in each alternative.
>
> Editor's Note: The above reference to "150 years or older" for overmature sawtimber (old growth habitat) is believed to be a possible misprint or typographical error. All other references to old growth and the overmature age class of timber, in the NPNF Plan documents and supporting old growth literature, at the time, cite the age of 160 years.

The Forest Plan FEIS at IV-53 states:

> Given these requirements, and assuming that tree communities that are 160 years old or older provide suitable habitat for old-growth-dependent species, all alternatives will provide the amount and kind of habitat necessary to maintain minimum viable populations of old-growth-dependent species for the first 5 decades (Table IV-17).

And the NPNF's current Clear Creek NEPA documents and project file documents recognize that old trees are essential components of old growth. The Clear Creek FEIS Appendix D adopted by FSEIS and 2023 ROD states:

> The original old growth amendment did not state that the minimum age for old growth is 150 years old. However, on page III-56 of the forest plan describing Management Area 20 – Old Growth, old growth is described as being over mature and 150 years old or older.

111006LHillMWardEmsgOGRefsInNPFP.pdf from Clear Creek project files is an email message:

> From: Hill, Lois
> Sent: Thursday, October 06, 2011
> To: Ward, Michael
>
> The age references for old growth are not described in the NPFP as standards, and we shouldn't assume that they are. **They do, however, give a strong indication of the age range assumptions the planners made when they wrote their FP.**

(Emphasis added.) 120802MWardEmsgProjDevelopmentDiscussioWithJOppenheimer.pdf is from the Clear Creek project files. It includes email messages, wherein the FS is having the

dialogue about age criteria vs. no age criteria and FPOG/NIOG:

> From: Ward, Michael
> Sent: Thursday, October 13, 2011 4:38 PM
> To: joppenheimer@idahoconservation.org
> Subject: RE: Has the storm passed?
>
> Old trees, big tree are cool. Most of the DF/GF are valueless. We don't want to cut them down. We want to protect real cool biological O/G. We have a lot of Biological O/G
> We want to treat the mid seral
> We're heavy in mid seral
> Much of the mid seral is over 21"
> According to FP it could be considered O/G which is rediculous.
>
> From: Michael P Ward <michaelward@fs.fed.us>
> Date: Thu, 13 Oct 2011 22:28:11 +0000
> To: Jonathan Oppenheimer joppenheimer@idahoconservation.org
> Subject: RE: Has the storm passed?
>
> Got a message from Robyn about the O/G stuff...haven't spoke with her yet.
> Regardless, here's where we are: (message from Joe)
> Talked to Marty. Basically we will use both. . . kinda. . . We will show that we meet the Forest Plan Standard using Forest Plan definition (no age). The FP standard is 5% at the watershed level. This step is basically a check off (mapping exercise) that yes, we will meet FP standards of not entering 5% of stands meeting FP definition.
>
> Once we document that we meet the Forest plan standard and state that we are not going to enter the 5% required under FP, then we bring in best available science (Green et. al.) and use Green et. al. thru alternative development, effects analysis etc. KEY: We will conduct effects analysis using Green et. al.
>
> Confused? No worries. Fort Matt's purpose in the field, and wildlife, we will use Green et. al. definition, i.e., we should be free to treat those acres that don't meet Green et. al. definition, even though they meet FP definition. Basically we could treat all acres minus the 5% meeting Green et. al. that we designate as OG, however that will probably be a discussion the collaborative will need to have.
>
> Marty is willing to come to a team meeting and explain. Maybe we should invite him to the field trip in Oct. I forgot to ask if it would require a FP amendment but I don't think so since we willl be meeting FP standard regardless.

We note that last FS email is addressed to a staff member of a conservation group who was formerly engaging in a collaborative process. Apparently the FS is willing to discuss these matters in the context of collaboration but NOT within the NEPA comment-response context.

Another set of email messages is a document from Clear Creek project files, in the context of the Jahn process (120829CLaneEmsgOLInterpWhitePaperStatementOfWork.pdf):

> From: Hill, Lois R -FS
> Sent: Wednesday, August 29, 2012 6:10 AM
> To: Lane, Cynthia -FS
> Cc: Hudson, Joe B -FS; Ward, Michael P -FS; Bienkowski, Matthew W -FS; Roberts, Michelle M -FS; Hill, Lois R -FS
> Subject: FW: Urgent...Old Growth Statement of work and Justification
>
> I agree with Joe's comments.
>
> The crosswalk between Green et al. and Forest Plan Appendix N should clearly address the six criteria described on page N-1.
>
> Also, when researching the planning record for the Forest Plan EIS, the focus should be on the assumptions that the planners made and where they drew their definitions from.
>
> Thanks for getting on top of this so quickly, Cindy.
> --Lois

We also take note of a project file document from recently issued NPNF Decision Notice (for its Green Horse timber sale project). 17-025210826GreenHorseVegetationResource.pdf states: "…old growth (defined as 160+ years, Jahn 2012)."

Under Management Area 20, the Forest Plan states: "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." (Emphasis added.) Clearly the Forest Plan recognizes that old trees are essential habitat for old-growth associated wildlife: "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." (Id.) Also, "Goals" for MA 20 include one to "Provide 'suitable' habitat (existing and replacement) for old-growth-dependent wildlife species." (Id.)

A June, 2014 document "1.0 Terrestrial & Aquatic Ecosystems and Watersheds" was written as part of the NPCNF's Assessment, a component of forest plan revision. It states, "The different stages of succession are often referred to as seral stages and can be described as follows: …Old Growth is a subset of the late-seral communities. Not only are these dominated by larger, older trees, but they have dead and down material present. Old growth in different forest types looks differently. Green et al. (1992) described old growth characteristics for the Northern Rockies."

Also, the draft Revised Forest Plan includes Glossary definitions:

> 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. In the context of the Nez Perce-Clearwater ecosystem the definitions for old growth are those provided within the document titled "Old Growth Forest Types of the Northern Region (Green et al. 1992, and errata 12/11).

Old Growth Associated Species: the group of wildlife species that is associated with old-growth forest plant communities on the Nez Perce-Clearwater.

Old Growth Habitat: A community of forest vegetation characterized by a diverse stand structure and composition along with a significant showing of decadence. The stand structure will typically have multistoried crown heights and variable crown densities. There is a variety of tree sizes and ages ranging from small groups of seedlings and saplings to trees of large diameters exhibiting a wide range of defect and breakage both live and dead, standing and down. **The time it takes for a forest stand to develop into an old-growth habitat condition depends on many local variables such as forest type, habitat type, and climate.** Natural chance events involving forces of nature such as weather, insect, disease, fire, and the actions of man also affects the rate of development of old-growth stand conditions. Old-growth habitat may or may not meet the definition for old growth forest.

(Emphases added.) As the 2012 Planning Rule[8] indicates, the Assessment is intended to help define what the FS believes is best available science.

Until stands of forest trees approach the 160-year breakpoint the Forest Plan FEIS recognizes, they are less likely to have developed the structural diversity (snags, logs on the ground, decadence, canopy layers and canopy closure) needed to support wildlife species' habitat needs. That is the rationale for including those criteria found in Forest Plan Appendix N as part of the standards.

So for example in a section entitled "Important statements from research" Kootenai National Forest (2004) identifies components of complexity as important for the Sensitive species, fisher, which happens to be an NPNF Management Indicator Species.

Such complexity can be seen in the photographs included in "120802_MWardEmsg_ProjDevelopmentDiscussioWithJOppenheimer.pdf".

- Jones, 1991: "…fishers did not use non-forested habitats." "It is crucial that preferred resting habitat patches be linked together by closed-canopy forest travel corridors."
- Ruggiero et al. 1994: "...**physical structure of the forest** and prey associated with forest structures are the **critical features that explain fisher habitat use**, not specific forest types.

[8] 36 CFR § 219.3 Role of science in planning. "The responsible official shall document how the best available scientific information was used to inform the assessment…" 36 CFR § 219.6 Assessment. (a)(3) "Document the assessment in a report available to the public. …Document in the report how the best available scientific information was used to inform the assessment."

- Thomas, 1995: "**Most habitats preferred by fishers have been described as structurally complex, with multiple canopy layers and abundant ground-level structure (in the form of logs, other downed wood, under-story shrubs, etc**.). Powell and Zielinski (1994) listed three **functions of structural complexity**, which may be important for fishers: high diversity of prey populations, high vulnerability of prey items, and increased availability of dens and rest sites. Structure also substantially influences snow accumulation and density, which have been shown to be important variables in fisher habitat use (Raine 1983, Leonard 1980, Powell and Zielinski 1994)."

(Emphases added.) Finally, Attachment A includes documents the NPNF produced for NEPA analyses of previous timber sale projects, to comply with the Forest Plan. Two pdfs (Old Growth Surveys_Selway RD 1,2) document 1992 field surveys for old growth on the Selway Ranger District. The document, entitled "OLD GROWTH SURVEY" shows that the NPNF created a standard field survey form using Forest Plan Appendix N old-growth criteria as "CRITICAL COMPONENTS" and includes a rating for "LARGE TREE AGE" with a breakpoint being 150 years. The critical importance of the age of old trees is not new to the FS, however it is being arbitrarily ignored in the EOTW DEIS/UOGA old-growth analysis process.

7. Up-to-date field survey data are necessary to identify old growth for the purposes of Forest Plan compliance

The DEIS relies on Figures 2, 3, and 4 of the UOGA, purporting to display the proposed activities in relationship and/or overlapping with old growth. In those maps there are no identifying labels on any old growth polygon with which one may use to cross-reference to any document disclosing the old-growth character of each corresponding polygon, which could also reveal how the old-growth criteria were being applied for any given polygon. We cannot tell how any given stand or contiguous group of stands, represented by the map polygons, have been chosen. And the figures are of such limited detail it would be practically impossible to locate the mapped old growth on the ground and fully understand what portions are to be logged and/or burned.

However we do see the FS's descriptions of what data they used to identify and designate old growth for this DEIS analysis. We assert that the FS used data that was not gathered in the field for the purposes of comparing the old growth criteria with the given stand under consideration, and which cannot reasonably be claimed to reveal sufficient Appendix N criteria. For example, stand exam data is generally gathered as part of "silvicultural" considerations mostly concerned with timber volume and quality. Also, we see that the FS acknowledges that the data is in some cases over 30 years old. The FS is offering the results of this quick-and-dirty analysis in its haste to facilitate logging.

Forest Plan Appendix N states, "Old-growth stands will be identified through the use of stand exam information, aerial photos, and field reconnaissance." A document "Campbell OG analysis note.pdf" in Attachment A explains how the NPNF used queries of existing database and aerial photos to identify "potential oldgrowth" in 1995. Once identified, "The …stands **would need to be field verified** to determine if they could be reallocated to oldgrowth or replacement oldgrowth following the steps outline in Appendix N of the Forest Plan." (Emphasis added.)

For the DEIS, the FS did not undertake field surveys to validate old growth tentatively identified using remote methods. Instead, the remote methods were considered sufficient, in contradiction to the Forest Plan and NEPA's requirements for scientific integrity.

The document "120906MBienkowskiEmsgOGStandsFieldReviewNotes.pdf" from Clear Creek project files is an email message:

> From: Bienkowski, Matthew W -FS
> To: Hill, Lois R -FS; Kirkeminde, Margaret -FS; Lucas, Megan D -FS; Smith, Karen A -FS; White, Tam -FS; Ward,
> Michael P -FS; Graves, Doug A -FS; Roberts, Michelle M -FS; Hudson, Joe B -FS
> Subject: Proposed NEW Focus Area for Clear Creek
> Date: Thursday, September 06, 2012 2:23:24 PM
> Attachments: 120823IDTMtgNotesmbupdate.docx

The "IDT Meeting Notes 8/23/12" attached to that email states:

> Field Reviews of Potential Old Growth Stands
> …Based on a review of aerial photos, stand exams will be done for the following stands to determine whether they meet the criteria for old growth…

We offer examples of how proper old-growth surveys have been conducted on the NPNF and elsewhere. Attachment A includes documents the NPNF produced for NEPA analyses of previous timber sale projects, to comply with the Forest Plan. One document (Old Growth Surveys_Salmon River RD.pdf) is a series of 1992 documents on field surveys for old growth on the Salmon River Ranger District. They utilize a "SCORECARD FOR OLD GROWTH HABITATS" which features Forest Plan Appendix N old-growth criteria for "West-side Mixed Conifer" and "West-side Ponderosa Pine", which is apparently an early example of the NPNF integrating the Green et al habitat types into the old-growth identification and allocation process. The surveyors also use observations to rate the quality of the old-growth habitat, making notes of the habitat components they observe which biological knowledge indicates are used by old-growth associated wildlife. In these Attachment A documents the surveyors also take notes on actual wildlife sightings while they're in the forest. Essentially, the surveyors are immersed in the experience of what it means to be in old growth, increasing their credibility as surveyors of old growth in the process.

Attachment B is a document entitled, "Kootenai N.F. – Three Rivers District Old Growth Validation Process – All Proposed Sales." It includes a section, "Instructions For Old Growth Walkthrough and Write-up" which was "developed in an effort to standardize old growth walkthrough surveys and write-ups." It also has a section listing old-growth criteria used by the Kootenai National Forest (similar to that in NPNF Forest Plan Appendix N), and includes a blank field form for use by the field surveyor. That form includes a couple lines where the surveyor is to indicate in his or her judgment why the stand meets the old-growth criteria displayed on the form.

Also, USDA Forest Service, 1987a (KNF Forest Plan Old Growth Appendix 17) reveals those FS managers' commitment to conduct field surveys:

> During the next decade, each District will work towards completing a field inventory of designated old growth stands. Specific information items will be gathered which will help in monitoring and determining habitat suitability for several indicator species and will help to rate the relative value of each stand. The key information items will be stored in some type of data base to help facilitate use of habitat suitability models for monitoring of dependent wildlife species.
>
> …It is anticipated that as old growth field verification and other stand exams continue, we will find that some designated stands are not suitable old growth habitat while others not previously designated will be found to be suitable. Records of these findings should be kept so that the Forest Plan data base can be updated.

So we know the FS has done in the past, and still can perform, proper old-growth field surveys if it wants to. But for the old growth designators of the EOTW DEIS process "old growth" is little but an abstraction. They designate with data too unreliable for making valid conclusions, building little credibility in the process.

Furthermore, the DSEIS and FEIS old-growth maps are lacking in important reference details which would help facilitate navigation so the public can survey the designated FPOG and ROG. By lacking in navigation details we mean, for example, roads, trails and streams that are relatively easy to find are not juxtaposed on the maps of old growth.

In sum, documentation of field surveys using all Appendix N criteria—not an arbitrary subset—is a necessary and integral component of the old-growth inventory process required by the Forest Plan.

8. Forest Plan old growth percentage standards are not based on best available science.

Our comments on the Hungry Ridge DEIS inquired as to what the historic levels of old growth were before industrial logging arrived on the scene: "What is the HRV for old growth forestwide?" The FS responded, "Estimating the amount of old growth that was historically present in the project area would be speculative." On this topic, our first Hungry Ridge Objection stated:

> …a more recent issue is questioning of the scientific adequacy of the forestwide 10% standard. Our comments on the DEIS asked, "Please disclose the natural historic range vs. current conditions regarding patch size, edge effect, and amount of interior forest old growth in the project area and forestwide. Please **estimate** how much old growth in the project area has been destroyed by logging. What is the HRV for old growth forestwide?" The FS responded, "Estimating the amount of old growth that was historically present in the project area would be speculative." That is bizarre—the FS has no qualms about speculating on the amounts of various other categories of forest in the project area, and basing the goals of this project on such speculation. Yet it won't speculate on the amount of

old-growth habitat historically needed to maintain viability of its old-growth Management Indicator Species and other old-growth associated wildlife? The FS may be reluctant to discuss the issue because the amount of old growth on the Forest is well below the historic range; and that fact alone shows how the FS is managing inconsistent with best available science in proposing to destroy hundreds of acres of old growth.

Our Objection to the original HR ROD states:

> We incorporate by reference FOC's April 13, 2015 objection to the draft Record of Decision for the Clear Creek Integrated Restoration Project and final Environmental Impact Statement, as providing further insight into the old-growth policy and old-growth associated wildlife on the NPNF.
>
> Ten percent old growth, the forestwide Standard, isn't even within the FS's own "Desired Distributions" for VRUs 3, 7, 10, and 17, and is at the low end for VRU 8.
>
> 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.
>
> 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 standards of maintaining approximately 10% of forests as old-growth **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.

If the FS was interested in making its old-growth standards consistent with the best available science, it would undertake an amendment process that would increase its "minimum[9]" 10% standard (and the 5% distribution standard) up to a level within the natural range of variability, resembling reference conditions. Unfortunately, it looks as though the Nez Perce National Forest had its preferred "expert" weigh in on this topic: "The Ranger has indicated he is not interested in increasing old growth, believing there is enough OG out there." (111017WildlifeClearCreekNFMAComments.docx)

In regards to our Objection statement ("…the FS has no qualms about speculating on the amounts of various other categories of forest in the project area, and basing the goals of this project on such speculation") we submit Clear Creek project file documents. One (111125_VRU_ageclass.pdf) includes a table stating the Desired Condition for various Vegetative Response Units (VRUs), which are categories roughly similar to habitat types or which roughly correspond to Green et al old growth types:

	Desired Condition					
	Age Class					
VRU	0-40	41-100	101-150	150+	Climate Modifier	Dominant Habitat Types
1	20-40	40-60	15-20	50-10	Cool Moderately Dry	Abla/xete, Pico/vagl
2	10--20	10--30	10--20	40-60	Cold and Moderately Dry	Pial, Laly
3	15-25	15-35	10--30	20-50	Moderately Warm & Dry	Pipo/phma, Psme/Phma, Abgr/phma
4	15-25	20-40	15-35	10--40	Moderately Warm & Moist	Abgr/asca, Abgr/clun
5	20-40	40-60-	15-20	5--10	Cool and Moderately Dry	Pien/phma, Abla/vaca, Pico/vaca
6	15-25	20-40	15-30	15-45	Cool and Moist	Abla/clun, Abla/mefe, Tsme/clun, Tsme/mefe
7	10--20	15-35	10--30	35-65	Moderately Cool and Moist	Thpl/clun, Thpl/asca
8	15-25	20-40	15-35	10--40	Moderately Warm & Moist	Abgr/asca, Abgr/clun
9	10--20	10--30	10--20	40-60	Cold and Moderately Dry	Pial/vasc, Abla/vasc, Pico/vasc
10	10--20	10--30	10--30	35-65	Cool and Wet	Abla/stam, Pien/smst, Tsme/stam
12	10--20	10--30	5--25	40-70	Warm and Dry	Pipo/agsp, Pipo/feid
17	10--20	15-35	10--30	25-55	Moderately Cool and Moist	Thpl/clun, Thpl/asca

That "Desired Condition" is based upon what the FS believes is the historic range or norm. That document includes the age class of 150+ and except for one or two VRUs, 10% is at the bottom end (or below) the Desired Condition for the 150+ year age class, which is a minimum criteria for old growth in Green et al. The other document (111125_VRU_dfc_matt.pdf) includes narratives with the numbers (called "Typical stand age class distribution").

This is another topic concerning old growth about which the NPNF refuses to engage in dialogue. Since the wildlife evolved prior to the era of pre-industrial logging when the abundance and distribution range of old growth was much greater than now, the FS has no scientific basis supporting its assumption that even meeting its Forest Plan old growth percentage standards will maintain viable populations as the Forest Plan requires. Along with climate concerns as discussed above in these comments, this is why facilitating the destruction of old growth of any category, as the EOTW project does, is reckless, arbitrary and capricious.

[9] http://dictionary.reference.com defines "minimum" as: "least possible."

9. Enhancing and/or improving old growth

"The action alternatives would treat stands containing old growth characteristics as defined by Forest Plan Appendix N with only intermediate treatments that would maintain the old growth characteristics." The FS says it will "maintain the old growth characteristics" without disclosing which characteristics (Appendix N criteria) it's talking about. It largely ignores much of the Appendix N criteria.

The DEIS claims: "By increasing tree spacing in the old growth and thinning out the smaller diameter, shade tolerant ingrowth, which can carry fire into the crowns of larger trees, the chance of losing these old growth areas to wildfire are reduced. Creating a more open crown for heat from natural or future prescribed ground fires to escape also reduces the chance of damage due to crown scorch." Yet the DEIS cites no scientific research—nor even the FS's own monitoring—to support such an assertion. This is merely a weak justification for logging, including of large trees, from old growth. The FS cites no evidence that is has successfully manipulated old growth, with the heavy-handed methods now proposed, consistent with best available science or non-consumptive **old-growth values**. The FS doesn't even propose anything in the way of monitoring to verify its conjectures.

Part of the problem is the application of novel "desired conditions" taken from the still unfinished revised forest plan. The FS has yet to properly address the scientific issues we raise in our Objection to the revised forest plan, discussing conflicts with best available science.

The July 2, 2024 UOGA states:

> Fire suppression activities have effectively altered the natural fire regime of this ecosystem creating our current existing conditions. Without fire, shrubs and small trees became established and created a second canopy layer not typically found in fire-maintained stands. As these seedlings matured, they provided ladder fuels into the upper canopy. Once these ladder fuels were in place, they created a situation where a regime of low intensity frequent fire could be supplanted by less frequent, but more severe fires resulting in extensive overstory mortality. Fires that once helped perpetuate the old growth forests are now a vehicle for replacing those stands.
>
> The fire regime within the analysis area has been altered due to fire suppression and forest succession. This has created stands that are dominated by shade-tolerant species like grand fir and Douglas-fir. Forest succession, fire suppression, insect and disease, and an increased risk of stand replacing wildfires pose the greatest threat to the old growth forests and the wildlife species that depend on these types of habitats. Continued forest succession and fire suppression would continue to move this area outside the historical natural range of variability.

And the July 2, 2024 Vegetation Report states:

> Desired conditions would further be met with prescribed burn treatments, which would encourage the largest, fire-resistant species to prevail as old overstory trees on the

> landscape (SFCLA, p. 94-95). By returning fire to the landscape through prescribed burning and mimicking historic fire regimes, low- and mixed-severity surface fires would thin and maintain stands rather than replacing them in wildfire events.

The DEIS also says:

> In some instances, the over-mature mesic conifer stands are falling apart as root diseases are creating openings as the young and older grand fir die and fall over."
>
> Without fire, shrubs and small trees became established and created a second canopy layer not typically found in fire-maintained stands.
>
> Fires that once helped perpetuate the old growth forests are now a vehicle for replacing those stands.

Whereas those cites from the DEIS, Vegetation Report and UOGA are a strong indictment of the NPNF Forest Plan's scheme for management of old growth, the Forest Plan Final EIS doesn't include analyses that arrive at similar conclusions. The DEIS fails to reconcile these conflicting—and sometimes contradicting—analyses.

The DEIS also states:

> Scattered across the project area are some old growth ponderosa pine dominated stands that are stressed and in competition with the shade tolerant understory. The intent of the intermediate treatments in these areas is to restore the open-canopied old growth ponderosa pine/Douglas-fir fire adapted species composition that was once prevalent in this area as a result of high frequency, low intensity fire activity. The intermediate treatments would open the canopy, retaining the large diameter tree species (ponderosa pine and Douglas-fir and larger grand fir). Younger and more shade-tolerant conifers would be removed (younger Douglas-fir and grand fir). The intermediate treatment and prescribed burning would reduce tree densities, ladder fuels, and competition for growing space. The younger competing Douglas-fir and grand fir would be thinned from the understory to reduce ladder fuels and decrease the chance of stand replacing wildfires yet retain old growth habitat and snag dependent species. This would result in a wider spacing, allowing early seral species to dominate the landscape again and lower the risk of stand replacing wildfires. The intermediate treatment of these dense, over-stocked stands would help retain and maintain habitat for many wildlife species that are dependent on the long-term sustainability of these ponderosa pine communities and old growth habitats.

As well as providing more discussion that conflicts with the Forest Plan Final EIS, the FS is also acting in bad faith by conflating the forest conditions in the project area with other regions that actually do feature "open-canopied old growth ponderosa pine" forests—which the EOTW project area does not. One might not know it—because the EOTW NEPA documents don't discuss it—but the climate of the project area is not really arid.

From the Forest Plan Final EIS:

> The Rocky Mountain region and the Nez Perce National Forest are characterized by mountain ranges separated by valley floors and foothills. Atmospheric conditions, as modified by aspect and slope, become progressively cooler and more humid in the transition from lower to higher elevations. Climatic zones range from semi-arid and relatively warm valley bottoms through a broad range of cool, moist coniferous forests to the cold, moist subalpine and alpine region characterized by bedrock escarpments, coarse rock debris, and cirque lakes and headwalls carved by alpine glaciation in the recent geologic past. This topographic variety provides a diverse mosaic of plant and animal communities and distinctive panoramas of high mountains and broad valleys.
>
> Precipitation increases with altitude. Average yearly precipitation on the Forest is 30 inches, ranging from less than 18 inches in the Salmon and Snake River country to over 60 inches in the high mountain ranges. Examples are Riggins, with about 19 inches per year; Grangeville, with about 24; Fenn Ranger Station with 40; and Elk City, with about 30.
>
> Like much of northern Idaho, the Forest enjoys a milder climate than might normally be the case given its latitude. Moderating effects of prevailing westerly winds and the influence of the Pacific Ocean combine to bring about these conditions.

The EOTW DEIS doesn't discuss the actual climate the project area features, nor disclose where it fits in with the continuum of climate conditions the Forest Plan FEIS discusses as per above.

The revised forest plan Draft EIS states:

> The dominant, historical fire regime that occurred within forested vegetation in the northern Idaho region can be characterized as a variable or mixed-severity fire regime (Brown & Smith, 2000; Zack & Morgan, 1994). This type of fire regime commonly had a moderately short fire-return interval for nonlethal or mixed severity fires with lethal crown fires occurring less often. Relative to the other two common fire regimes that are often recognized for forested vegetation—the nonlethal and stand-replacement regimes—the mixed-severity fire regimes are the most complex (James K. Agee, 2004). Individual mixed-severity fires typically leave a patchy pattern of mortality on the landscape, which creates highly diverse communities. These fires kill a large percentage of the more fire-susceptible tree species, such as hemlock, grand fir, subalpine fir, and lodgepole pine, and a smaller proportion of the fire-resistant species, including western larch, ponderosa pine, whitebark pine, and western white pine (Stephen F. Arno, Parsons, & Keane, 2000).

The EOTW DEIS doesn't deal with such nuances and instead pretends everything here is of low severity fire regime, so that the proposed logging in old growth can be justified as consistent with the existing fire regime, which it isn't. The DEIS fails to take a hard look at the climate or historic weather of the project area.

For MA 20 the DEIS states:

> As fuels increase, particularly those that create a ladder between the ground and live tree canopies, the risk of a lethal crown fire increases. A wildfire would leave behind greater numbers of snags than exist now and would also revert the area to young forest conditions. With increasing fuels due to succession, fire suppression, and insect and disease activity,

old growth habitats in the area are at risk of experiencing stand replacing fire, thus reducing the amount of late-seral, old growth habitat. Loss of snags and down logs to public firewood cutting would continue along open roads in these habitats.

There are no timber harvest activities proposed in the proposed action or alternative B in Management Area 20. The results would be very similar to the no action alternative. There are harvest treatments proposed that are adjacent to MA-20 areas that could have small effects. Adjacent treatments could cause windthrow within the untreated MA-20 areas and spread root disease if any is present in the adjacent areas being treated.

Since the Forest Plan didn't anticipate for MA 20 all the negativity for old growth the DEIS does, the FS is obligated to reconcile its new paradigm with the current Forest Plan's paradigm. The DEIS fails to do so.

"(T)he long-term benefits of thinning and prescribed fire outweigh the risks of no action." Again, this would be news to the preparers of the current NPNF Forest Plan FEIS.

With the large, landscape-level project Middle-Black in the early 2000s on the North Fork District the FS stated, "…in complying with old growth management guidelines described in Appendix H of the Forest Plan, treatment area adjustments were made to **avoid treating any** old growth stands…" (emphasis added). This was indicated in that FEIS (Id.):

All or portions of Treatment Areas Dropped	Acres	Proposed Treatment	Rationale for Dropping
2, 2A, 3, 7, 16, 19, 20, 26, 28, 31-33, 36-39, 41, 44, 55, 64, 72, 73, 75, 91, 95, 96	373	Timber Harvest or Prescribed Fire	Drop necessary old growth and recruitment old growth stands to meet Forest plan requirements.

Also, "Within harvest treatment areas and for the purpose of maintaining or improving habitat for wildlife species, **all large trees** (generally 20+ inches dbh or older than 150 years) and approximately half of the trees in other age classes **would be retained** across the landscape based on historic fire patterns." (Id., emphases added.)

In the Dead Laundry Wildlife Report, the FS discusses enhancement in terms of forest plan/NRLMD compliance: "Field verification found proposed harvest areas lacked horizontal cover in multi-story or late successional forest for snowshoe hare habitat as per STANDARD VEG 6. Old-growth enhancements **may** improve understories and thereby **potentially** improve winter snowshoe hare." (Emphases added.) If the emphasized words sound speculative, it's because they are. Additionally, those discoveries from "field verification" reveal the fact that documented field reviews are necessary for the FS to know how it is managing consistent with Forest Plan old-growth direction.

Of course, the FS's enhancement/active management paradigm also assumes that manipulated/logged old growth would contribute to other old-growth values, with nothing to back it up. The FS even lacks any awareness that perhaps those other values might be assigned

scientifically supportable metrics for measuring changes created by its management. These metrics could include associated old-growth characteristics or even occupancy by Forest Plan Management Indicator Species or other indicators of ecologically functioning old growth.

10. Old Growth and Management Area 21

For Management Area 21 ("857 acres of the Project Area" according to the July 2, 2024 Vegetation Report), the DEIS has no analysis whatsoever.

The Forest Plan at III-56 defines Management Area (MA) 21 as "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 areas are crucial for moose winter range. The DSEIS does not discuss MA21, including stands that could be inclusions in MA 20 (old growth) or other management areas. See also Forest Plan page III-58.

The DEIS fails to address old growth Pacific yew habitat at all. It fails to show compliance with all standards and provide a map of that habitat. MA 20 inclusions of MA 21 would prohibit logging. MA 21 (and inclusions of MA 21 in other management areas) has specific standards that limit logging. (Forest Plan page III-59.) The DEIS fails to demonstrate compliance with the crucial standard: "7. Maintain leave-strips between yew stands sufficient to provide travel corridors for moose." There is no direction in the DEIS to maintain leave strips.

CUMULATIVE EFFECTS

Please see our LMP Objection, which further expresses our concerns in a section titled the same.

Courts will set aside agency decisions that do not have baseline data. Take, for example, *Northern Plains Res. Council v. Surface Transp. Bd.*, 668 F.3d 1067, 1083–85 (9th Cir. 2011). In Northern Plains Resource Council, the court set aside the agency's decision for not taking NEPA's "hard look" at the impacts of its action when it deferred gathering baseline data on fish and the sage grouse until after approval of the project and for mitigation efforts. "Without establishing the baseline conditions which exist…there is simply no way to determine what effect the proposed [action] will have on the environment and, consequently, no way to comply with NEPA." *Half Moon Bay Fisherman's Mktg. Ass'n v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988). The FS has either violated NEPA by not having existing baseline data or not disclosing it in the DEIS.

It is vital that the results of past monitoring be incorporated into project analysis and planning, yet the EA and DEIS do not provide adequate analysis considering:

- 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 that includes the results from the monitoring required by the Forest Plan.

The DEIS lacks an analysis of how well past FS projects met the goals, objectives, desired conditions, etc. stated in the corresponding NEPA documents, and how well the projects conformed to forest plan standards and guidelines. Such an analysis is critical for validating the FS's current proposal. 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 must be disclosed and analyzed because if these were not accurate, and the agency is making similar decisions, then the process will lead to failure. For instance, if in previous processes 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, it is important for the public and the decisionmaker to know. If there have been problems with FS implementation in the past, it is not logical to assume that implementation will be proper this time. If prior logging, prescribed fire and other "vegetation treatments" have not been monitored appropriately, the FS lacks credibility in regards to this latest proposal.

NEPA requires that high-quality information is available to the public and that NEPA documents concentrate on issues truly significant to the action in question. One highly significant issue is cumulative effects, including fostering understanding of how past actions may have led to the current conditions.

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

And 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.

If the FS has been monitoring as we suggest, it would have information about what is a baseline of tree disease and mortality in this area of the Forest—which is highly relevant given the Purpose and Need. Tree mortality is a natural process with varying levels over time and across space. (Franklin et al. 1987.) If the agency had been monitoring as per the Forest Plan and to validate previous project assumptions and predictions, the agency would have data that informs the FS claim that logging, which involves removing trees whether healthy or not, makes the forest more "resilient" in any way.

The Clearwater Forest Plan is in total accord with what we're saying. 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.

Older FS NEPA documents support this as well; they set out project-specific monitoring. Because there has apparently been no evaluation of past monitoring, there is just no support for so many FS assumptions. The FS must disclose high-quality information to the public, use the best science, and take a hard look at the impacts of its project.

The failure to conduct the required Forest Plan implementation monitoring, evaluation and reporting, together with the failure to undertake the kind of hard look under NEPA at the project level, makes it impossible for the decisionmaker and public to grasp the cumulative impacts including this new timber sale proposal.

The DEIS fails to provide sufficient analysis of other projects in the project area or in proximity. Determining significance requires consideration of context—given there are nearby or contiguous projects in this area, the significance of this action must be analyzed within the long-term and short-term contexts of the area(s) impacted. Significance also addresses intensity, which includes whether the action, in combination with other actions, might have cumulatively significant effects.

The DEIS provides no analysis or disclosures of FS accomplishment or progress over the 37 years of Forest Plan implementation, nor of any problems it has discovered in trying to carry out all of this industrialization of this National Forest.

The DEIS cites or provides no analysis revealing the degree of the agency's achieving Forest Plan objectives or goals over the 37-year life of the Forest Plan.

The DEIS fails to discuss current conditions for key parts of the project area ecosystem. It is largely void of details on existing conditions for many resources. Pursuant to the definition of "environmental assessment," 40 C.F.R. §1508.9 dictates a Federal agency (i.e. The Forest Service) is responsible to "(1) Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact." The analysis is incomplete without reference to existing conditions. Furthermore, it is important to provide this information to grasp the full significance of any impacts of the project especially cumulative impacts. As indicated by 40 CFR §1508.7:

> *Cumulative impact* is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

It is impossible to judge any potential cumulative impacts of this project if there isn't an understanding of the existing conditions. To omit present conditions frustrates the public's right to high-quality information under NEPA and any meaningful review.

Judge Dale ordered the FS to consider the cumulative effects of EOTW along with the nearby Hungry Ridge project. Even if the FS ever demonstrates compliance with Forest Plan 5% OGAA requirements, it wouldn't satisfy NEPA and other duties to protect wildlife species like the fisher. This is of concern especially since the Forest Plan recognizes 5% as a bare minimum amount of habitat, and issues such as forestwide habitat fragmentation and habitat depletion have never been analyzed or disclosed.

Map 44 is from the South Fork Landscape Assessment, showing the level of "harvested before 1997" areas believed to be "Large Trees in 1930." This indicates a cumulative loss of old growth and/or stands of large trees not considered in the EOTW DEIS or any analysis.

Also, there are other ongoing or reasonably foreseeable projects on the NPNF with cumulative effects implications the DEIS has not addressed, especially in regards to effects on mature and old-growth forests and wildlife. This includes the Twentymile (a proposal in close proximity, Decision Notice recently signed but not included in any EOTW project analysis, which would further degrade mature and old-growth forests and habitat for wildlife such as the fisher. The FS also received approval for that project as an Emergency Action Determination project. And the District Ranger's OPPORTUNITY TO COMMENT letter for the Hungry Ridge DSEIS states:

> The Secretary of Agriculture, Tom Vilsack, has determined that the Forest Service may carry out Authorized Emergency Actions under section 40807 of the Infrastructure Investment and Jobs Act (PL 117-58) on National Forest System lands in 250 identified High Risk Firesheds. Emergency actions are taken to achieve relief from threats to public health and safety, critical infrastructure, and/or to mitigate threats to natural resources. Forests projects proposed under an emergency authority must be approved by the Secretary.
>
> The Nez Perce-Clearwater National Forests is requesting approval from the Secretary to implement the Hungry Ridge Restoration Project as an Emergency Action Determination project. The project lies within portions of three High-Risk Firesheds.

There has been no cumulative effects analysis for the implications of this "High Risk Firesheds" identification, no analysis as to what that means for Forest Plan implementation, and no consultation with the USFWS or NOAA/NMFS on the impacts of accelerated logging in these NPNF firesheds.

FOREST PLAN MANAGEMENT AREA (MA) DIRECTION

The DEIS states: "The proposed project analysis was guided by the goals, objectives, standards, guidelines, and management area direction within the Forest Plan and its subsequent amendments. … The End of the World project proposal is consistent with management area guidelines outlined by the Nez Perce National Forest Plan."

The project document "End of the World Project Forest Plan Consistency"[10] states, "Management Area direction for Management Areas 12, 16, 17, 19, 20, 21 may apply to this project." The DEIS does not demonstrate consistency with forest plan direction for all MAs that "may" occur in the project area. The "Consistency" document is a template document, with 90 pages addressing all forest plan management areas—not just those that "may apply." For Management Area 12, ("31,250 acres; 63% of Project Area" according to the July 2, 2024 Vegetation Report), the complete analysis boils down to "This standard does not apply to the project because it is outside the scope of the project, applies to different activity types than are proposed in the project, or is not related to the project activities." Except for MA 20, we cannot even tell how many acres of which Management Areas appear in the EOTW project area and where they are—let alone understand how the FS has designed the EOTW project to be consistent with MA direction. This violates NFMA.

"DESIRED CONDITIONS" ARE NOT BASED ON NEPA ANALYSES AND IMPLEMENT THE REVISED FOREST PLAN

The DEIS states, "Proposed prescribed fire would not impact dominant desired forest cover types (Ponderosa Pine, Western Larch) in this project. While it would reduce the overall number of shade-tolerant species in the short term, regeneration would be grand fir/Douglas-fir, as there is not enough early seral species within most burn units to naturally regenerate early seral species." The DEIS is using rationale found in the revised NPCNF LMP, which has not been adopted and therefore cannot be legal direction upon with a Purpose and Need can be based.

These recently concocted "desired conditions" result in cursory rationales to support timber extraction, in part by citing departures from historic conditions, nebulous and fictitious threats from natural disturbances (wildfire, insects and diseases), and increased wildfire risks due to past suppression efforts that the agency still asserts must continue into the foreseeable future (see Chief's Wildland Fire Direction, August 2, 2021). Implementing the revised forest plan "desired conditions" which underly the EOTW proposal represents a controversial perspective on forest management that may or may not be resolved by the final decision on the revised forest plan and its EIS. It is necessary for the FS to finalize the revised forest plan before implementing it, so the public can be fully informed.

The Vegetation Report also discusses "Desired Conditions: Salmon River Portion of Analysis Area", "Desired Conditions: South Fork Portion of Analysis Area", "Desired Conditions by Vegetation Response Units" and "Desired Conditions by Resource Indicators". None of these Desired Conditions, driving EOTW project Purpose and Need, were developed as part of a NEPA analysis conducted for a the properly representative landscape scale. The Vegetation Report is divorced from the current forest plan.

As Probert, 2017 explains, the FS's identification of best available science informing revision of the Forest Plans will only be made at the time the final Record of Decision is issued.

[10] 07-07_191213_EOTW_NezPerceForestPlanConsistencyUPDATED.pdf

NEPA regulations state that: "NEPA procedures must 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) (1978).

FOREST "RESILIENCE"

Our incorporated LMP Objection discusses this topic in the Introduction and in a section entitled "Consistency with NFMA and 2012 Planning Rule Requirements." Also see our incorporated FOC et al comments on the draft LMP/draft EIS, e.g., in sections entitled "Desired Conditions and Natural Range of Variation" and "Forest Plan Monitoring and Evaluation."

The FS promotes the idea that the project would "increase the resilience of the forest to insects, disease, and fire." Yet it fails to disclose an objective, measurable definition of "resilience." The FS's 2019 Sanpoil EA (Colville National Forest) defines resilience as "the ability of a forested area to survive a disturbance event, specifically wildfire and insect attack, relatively intact and without large scale tree mortality." Consistently, the FS demonizes significant disturbance events that cause tree mortality, a view that conflicts with best available science and ecological knowledge. This also conflicts with the most of the values national forests were established to protect, which don't prioritize timber extraction to the degree the DEIS does.

In discussing the No Action alternative the FS claims increasing tree density and tree succession will result in a higher susceptibility and less resistance to native insects and disease. The DEIS thus paints a picture of a looming disaster if the agency doesn't insert its logging involving heavy machinery and its associated, soil damage, increase of invasive species plus widespread reductions of canopy cover, dead tree habitat and large down wood habitat components. In its singular zeal to subsidize logs for the timber industry the FS downplays the significant adverse ecological impacts of its tree farming activities.

Furthermore, plenty of scientific information questions the efficacy of vegetation treatments in reducing the effects from what can be characterized as a natural response to changing climate conditions. See Hart, et al., 2015 (finding that although mountain pine beetle infestation and fire activity both independently increased with warming, the annual area burned in the western United States has not increased in direct response to bark beetle activity); see also Hart and Preston, 2020 (finding "[t]he overriding influence of weather and pre-outbreak fuel conditions on daily fire activity . . . suggest that efforts to reduce the risk of extreme fire activity should focus on societal adaptation to future warming and extreme weather"); see also Black, et al., 2010 (finding that thinning is not likely to alleviate future large-scale epidemics of bark beetle); see also Six, et al., 2018 (study that found during mountain pine beetle outbreaks, beetle choice may result in strong selection for trees with greater resistance to attack, and therefore retaining survivors after outbreaks—as opposed to logging them—to act as primary seed sources could act to promote adaptation); see also Six et al., 2014 (noting "[s]tudies conducted during outbreaks indicate that thinning can fail to protect stands").

The FS fails to reconcile the characteristic and positive role of decadence in its resilience narrative. For example Green et al., 1992 recognize positive attributes of old growth include:

- (A)ttributes such as decadence, dead trees …are important…
- Accumulations of large-size dead standing and fallen trees that are high relative to earlier stages.
- Decadence in the form of broken or deformed tops or bole and root decay.

Green et al., 1992 describe Defining characteristics of old growth, which include:

> 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.

The FS's "desired conditions" obsession focuses on achieving static conditions, instead of valuing the natural dynamic characteristics of ecosystems. An abundance of scientific evidence indicates desired future dynamics—not the FS's static desired conditions—align with best available science. FS 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." (Emphasis added.) Hessburg and Agee, 2003 emphasize:

> 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.) Collins and Stephens (2007) suggest direction to implement restoring the process of wildland fire using public education, which means explaining the inevitability of wildland fire, teaching about fire ecology, and assisting landowners as the nexus for acting to protect private property. Unsurprisingly, since proper education would result in more widespread

mistrust of the FS's manipulate-and-control tree farming paradigm, we don't find it in the EOTW DEIS.

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 FS ignores scientific information that strongly suggests a better alternative to the FS's management paradigm.

Static "desired conditions" are based on the notion of mimicking historic range of conditions, also known as the natural range of variability. Frissell and Bayles (1996) state:

> …The concept of range of natural variability …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.** (Emphases added.)

McClelland (undated) criticizes the aim to achieve static desired conditions, in that case retaining specific numbers of snags:

> The snags per acre approach is not a long-term answer because it **concentrates on the products 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.). (Emphases added.)

Castello et al. (1995) discuss some things that would be lost chasing static Desired Conditions:

> 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.

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 (emphasis added):

> 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.

Noss, 2001 goes on to define those basic components (emphases added):

> **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.

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. (Emphases 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). (Emphases 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." (Emphasis added.)

That last sentence provides a measure of resilience the DEIS 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."

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. There is no natural range of variability of those factors, so the FS must include an analysis that explains how they influence achieving Desired Conditions.

Ecological resilience is not the absence of natural disturbances such as wildland fire or insects, etc. Rather, it is the opposite (DellaSala and Hanson, 2015, Chapter 1, pp. 12-13). What the FS is promoting here is engineering the forest ecosystem through intrusive mechanical methods in order to eliminate, suppress or altering natural disturbances such as wildland fire and insect or disease effects, to maximize the commercial potential of natural resources. In other words, tree farming. This is the antithesis of ecological resilience and conservation of native biodiversity. 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).

Vegetation treatments based on historical reference conditions to reduce high-intensity wildfire risk on a landscape scale are undermined by the fact that land managers have shown little ability to target treatments such that fires that follow will behave as "desired." Barnett, et al, 2016; Rhodes and Baker, 2008 (finding that fuel treatments have a mean probability of 2-8% of encountering moderate- or high- severity fire during the assumed 20-year period of reduced fuels). Analysis of the likelihood of fire is crucial to estimating likely risks, costs and benefits incurred with "fuel" treatment. Results from Rhodes and Baker, 2008 indicate that "even if fuel treatments were very effective when encountering fire of any severity, treatments will rarely encounter fire, and thus are unlikely to substantially reduce effects of high-severity fire."

Other FS applications of "resilience" revolve around using what the DEIS identifies "desired conditions" of vegetation conditions as a proxy for wildlife species viability, and the population

trend monitoring specified in the Forest Plan to insure viability. The Committee of Scientists (1999) state, "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 FS's use of the term "resilience" ignores the reality of human-induced climate change and its effects on forests. Falk et al. (2019) recognize**:**

> The fact of a rapidly changing world means that resilience, especially the phases of recovery and reorganization, must be understood as an adaptive response to changing conditions, not simply a return to a past state.
>
> **Collectively, these trends point to an increasing probability of massive reorganization of forest ecosystems on a scale that has not been previously observed for thousands of years.**

(Emphasis added.) In that vein, Baker et al. (2023b) examined whether natural disturbances (wildfires, droughts, beetle outbreaks) which have shaped temperate forests for millennia, might now best restore and adapt dry forests to climate change while protecting nearby communities. They conclude, "natural disturbances, possibly aided by reinvented prescribed fire and wildland fire use, could more effectively restore and adapt dry forests to climate change within 30–40 years compared with the expansion of mechanical fuel-reduction treatments. A (nature-based solution) would allow most funding for active management of federal forests to be redirected to more fully protect and adapt nearby communities and the built environment at high risk of fires, which is an essential first step for this nature-based solution."

And the results of climate change mean: "…reorganization may be not only unavoidable but also adaptive to future conditions. **We cannot assume that all types, or even biome conversions, are adverse outcomes; there may be cases in which ecosystem adaptation will take forms that do not align with our limited perception of ecological change**." (Falk et al. 2019, emphases added.)

This limited perception of ecological change is also exhibited with the FS's failure to consider time scale while rationalizing that ongoing or potential fire, insect, and disease effects indicate a deficit in resilience of project area forests. Falk et al., (2019) state:

> "Ecological …resilience requires **taking a long view**, because **ecological time is often longer than our typical narrow temporal frame of reference**. **What may appear to be novel post-disturbance trajectories may actually be slow recovery arcs beyond our ability to estimate.** …We are more likely to judge a system that recovers rapidly to its pre-disturbance state as "resilient," whereas one that recovers more slowly—according to our criteria—may be considered less resilient. However, these judgments are not always ecologically justified; ecological succession does not necessarily proceed at a pace to which humans can relate (i.e., **decades to centuries**). …Some communities may take decades to centuries to resemble the original pre-disturbance condition. **These time scales …do not necessarily indicate a resilience failure.** (T)he trajectory of return to the

pre-disturbance community, depends on …**the climate of the post-disturbance period**.

(Id., emphases added.) The FS's use of the term "resilience" is scientifically bankrupt.

SOIL PRODUCTIVITY

See our LMP Objection, which further expresses our concerns in a section titled "Soil Ecology." Also see the incorporated FOC et al comments on the draft LMP/draft EIS, in a section entitled "Soil Ecology."

Soil chemical properties are discussed in Harvey et al., 1994:

> 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.)

Recent research reveals profound biological properties of forest soil ignored by the DEIS and soil reports: "(R)esource fluxes through ectomycorrhizal (EM) networks are sufficiently large in some cases to facilitate plant establishment and growth. Resource fluxes through EM networks may thus serve as a method for interactions and cross-scale feedbacks for development of communities, consistent with complex adaptive system theory." (Simard et al., 2015.) The FS has never considered how management-induced damage to EM networks causes site productivity reductions.

The FS fails to consider the role of mycorrhizal fungi in maintaining ecological integrity. Mycorrhizal networks play important roles in mitigating the impacts of climate disruption to forest ecosystems. They facilitate regeneration of migrant species that are better adapted to warmer climates and primed for resistance against insect attacks. (Song et al. 2015.) To achieve these benefits all of the parts and processes of highly interconnected forest ecosystems must be preserved and protected.

Mycorrhizal fungi distribute photosynthetic carbon by connecting the roots of the same or different tree species in a network allowing each to acquire and share resources. Large mature trees become the hubs of the network and younger trees the satellite nodes.

Mycorrhizal networks transmit water, carbon, macronutrients, micronutrients, biochemical signals and allelochemicals from one tree to another, usually from a sufficient tree to a tree in

need. This type of source-sink transfer has been associated with improved survivorship, growth and health of the needy recipient trees in the network.

Recognition of kin is also evident between established large hub trees and their seedlings and saplings. Hub trees shuttle their kin more micro-elements and support more robust mycorrhizal networks providing them with a competitive advantage. However, hub trees also share resources with strangers, suggesting these evolutionary mechanisms exist not just for individual species but also at the community level.

Injury to a tree from defoliation by an insect herbivore or by physically removing foliage results in the transmission of defense signals through the connecting mycorrhizal mycelium to neighboring trees. These neighbors respond with increased defense-gene expression and defense-enzyme activity, resulting in increased pest resistance.

In Douglas-fir, sudden injury to a hub tree not only increases defense enzymes of healthy neighbors but elicits a rapid transfer of photosynthate carbon to a healthy neighbor. This suggests that the exchange of biochemicals between trees elicits meaningful changes in the senders' and receivers' behavior that enables the community to achieve greater stability in the face of a changing climate. (Song et al. 2015.)

The lack of discussion of mycorrhizal networks reflects a narrow viewpoint inconsistent with the unpredictability of climate-driven change. Forest managers should use scenario building models to explore an envelope of probable futures that becomes wider the further forward one projects. (Lempert, 2002.) In this more multifaceted approach based on complex systems science, managers quantify the likelihood of each scenario and then address the ranges of uncertainties in the ecological, social, and economic dimensions. (Filotas, et al., 2014).

While much of the science demonstrating the importance of mycorrhizal networks is recent, the concepts are not new. For example, the FS's own scientists (Harvey et al., 1994) invoked the relationship between chemical properties and biological properties: "Productivity of forest and rangeland soils is based on a combination of diverse physical, chemical and biological properties." Harvey et al., 1994 further expands on this (emphases added):

> **The Soil as a Biological Entity**
> Traditionally, some have viewed soil as inert and inanimate, and soil properties have often been perceived as distinctive but relatively unchanging—except for plant nutrients—and based on mineral constituents. The organic horizons have, until recently, been largely ignored. Soil microbes have also been ignored, except for a few high-profile organisms (such as soil-borne pathogens and mycorrhizal fungi). Predictions by forest growth models have keyed almost exclusively on vegetation, gross land form, and site characteristics—the aboveground characteristics of the last rotation were assumed to be the best indicator for predicting growth, ignoring soil and related soil-borne processes. If soil potential was reduced, the assumption was that fertilizing could offset any damage. This approach has fostered a significantly overoptimistic view of the health and productivity potential for second generation forests (Gast and others 1991, Powers 1991).

Contemporary studies indicate that **soil quite literally resembles a complex living entity**, living and breathing through **a complex mix of interacting organisms-from viruses and bacteria, fungi, nematodes, and arthropods to groundhogs and badgers**. **In concert, these organisms are responsible for developing the most critical properties that underlie basic soil fertility, health, and productivity** (Amaranthus and others 1989, Harvey and others 1987, Jurgensen and others 1990, Molina and Amaranthus 1991, Perry and others 1987). **Biologically driven properties resulting from such complex interactions require time lines from a few to several hundreds of years to develop, and no quick fixes are available if extensive damages occur (Harvey and others 1987)**.

Microbial Ecology
The variety of organisms residing in forest soils are extensive; all contribute to soil development and function, some in very critical ways (Amaranthus and others 1989). Although this section concentrates on the microbes (primarily bacteria and fungi), we recognized that **several orders of insects, earthworms, and burrowing mammals make significant and sometimes critical contributions to organic matter decomposition, soil mixing, and microbe propagule movement within many forest soils** (Molina and Amaranthus 1991, Wilson 1987).

The numbers and biomass of microbes in forest soil can be staggering; for example 10 to 100 million bacteria and actinomycetes, 1000 to 100,000 fungal propagules, and several kilometers of hyphae (fungal strands) can be present in a single gram of soil (Bollen 1974). The biomass related to such numbers is also staggering. Old-growth Douglas-fir forests of the Pacific Northwest can contain 4200 kg/ha dry weight of fungal hyphae and 5400 kg/ha of ectomycorrhizal root tips alone (Fogel and others 1973). Bacterial biomass could equal or exceed fungal biomass, and **the total biomass of an inland cedar/hemlock forest should be very nearly comparable to a coastal Douglas-fir forest. Thus, microbial biomass in eastside forests could easily reach 10,000 kg/ha and are a force to consider in management methods.**

…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[11] 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.)

Thirty years ago, Harvey et al., 1994 asked the following question: “Can individuals (or groups) parasitize one another, that is to say, move nutrients or photosynthate around within a stand to

[11] Nitrogen

balance temporary shortfalls? Such movement has yet to be widely demonstrated, except in simple microcosms (Read and others 1985), but it seems likely, particularly on highly variable sites that include harsh or infertile environments (ferry and others 1989)." More recent research answers that question with a resounding **yes**. (E.g. Simard et al., 2015; Gorzelak et al., 2015).

In regards to the profound **biological properties** of forest soil, Simard et al., 2015 conclude from their research on relationships between fungi and plants (how nutrient transfers are facilitated by fungal networks) state, "resource fluxes though ectomycorrhizal (EM) networks are sufficiently large in some cases to facilitate plant establishment and growth. Resource fluxes through EM networks may thus serve as a method for interactions and cross-scale feedbacks for development of communities, consistent with complex adaptive system theory." Simard et al., 2013 state, "Disrupting network links by reducing diversity of mycorrhizal fungi… can reduce tree seedling survivorship or growth (Simard et al, 1997a; Teste et al., 2009), ultimately affecting recruitment of old-growth trees that provide habitat for cavity nesting birds and mammals and thus dispersed seed for future generations of trees." Also, Gorzelak et al., 2015:

> …found that the behavioural changes in ectomycorrhizal plants depend on environmental cues, the identity of the plant neighbour and the characteristics of the (mycorrhizal network). The hierarchical integration of this phenomenon with other biological networks at broader scales in forest ecosystems, and the consequences we have observed when it is interrupted, indicate that underground "tree talk" is a foundational process in the complex adaptive nature of forest ecosystems.

The relationships between soil fungi and plant nutrients should not be anything new to the FS. For example Amaranthus et al. (1989a) recognized "mycorrhizal fungus populations may serve as indicators of the health and vigor as indicators of the health and vigor as indicators of the health and vigor of other associated beneficial organisms. Mycorrhizae provide a biological substrate for other microbial processes."

Beiler et al., (2009) conclude the "mycorrhizal network architecture suggests an efficient and robust network, where large trees play a foundational role in facilitating conspecific regeneration and stabilizing the ecosystem."

In Simard et al., 2012, scientists focus:

> …on four themes in the recent literature: (1) the physical, physiological and molecular evidence for the existence of mycorrhizal networks, as well as the genetic characteristics and topology of networks in natural ecosystems; (2) the types, amounts and mechanisms of interplant material transfer (including carbon, nutrients, water, defence signals and allelochemicals) in autotrophic, mycoheterotrophic or partial mycoheterotrophic plants, with particular focus on carbon transfer; (3) the influence of mycorrhizal networks on plant establishment, survival and growth, and the implications for community diversity or stability in response to environmental stress; and (4) insights into emerging methods for modelling the spatial configuration and temporal dynamics of mycorrhizal networks, including the inclusion of mycorrhizal networks in conceptual models of complex adaptive systems. **We suggest that mycorrhizal networks are fundamental agents of complex**

> **adaptive systems (ecosystems) because they provide avenues for feedbacks and cross-scale interactions that lead to self-organization and emergent properties in ecosystems.** (Emphasis added.)

The dynamics of this mycorrhizal network extends well beyond an exchange of nutrients, into the essential nature and functioning of the ecosystem itself. The news blog Return to Now published an interview with ecologist Suzanne Simard ("Trees Talk to Each Other in a Language We Can Learn, Ecologist Claims") based upon her research, with explanations and interpretations such as:

> What she discovered was a vast tangled web of hair-like mushroom roots — an information super highway allowing trees to communicate important messages to other members of their species and related species, such that the forest behaves as "a single organism." …(Trees) communicate by sending mysterious chemical and hormonal signals to each other via the mycelium, to determine which trees need more carbon, nitrogen, phosphorus and carbon, and which trees have some to spare, sending the elements back and forth to each other until the entire forest is balanced. "The web is so dense there can be hundreds of kilometers of mycelium under a single foot step," Simard says."

The science magazine Nautilus featured Simard in an article, "Never Underestimate the Intelligence of Trees." Simard states:

> I've come to think that root systems and the mycorrhizal networks that link those systems are designed like neural networks, and behave like neural networks, and a neural network is the seeding of intelligence in our brains. …All networks have links and nodes. In the example of a forest, trees are nodes and fungal linkages are links. Scale-free means that there are a few large nodes and a lot of smaller ones. And that is true in forests in many different ways: You've got a few large trees and then a lot of little trees. A few large patches of old-growth forest, and then more of these smaller patches. This kind of scale-free phenomenon happens across many scales.
>
> I made these discoveries about these networks below ground, how trees can be connected by these fungal networks and communicate. But if you go back to and listen to some of the early teachings of the Coast Salish and the indigenous people along the western coast of North America, they knew that already. It's in the writings and in the oral history. The idea of the mother tree has long been there. The fungal networks, the below-ground networks that keep the whole forest healthy and alive, that's also there. That these plants interact and communicate with each other, that's all there. They used to call the trees the tree people. The strawberries were the strawberry people. Western science shut that down for a while and now we're getting back to it. … I think this work on trees, on how they connect and communicate, people understand it right away. It's wired into us to understand this. And I don't think it's going to be hard for us to relearn it.

Also see this phenomenon documented in:

- the film "Intelligent Trees"
- the TED Talk "How trees talk to each other"

- the YouTube video "Mother Tree" embedded within the Suzanne Simard "Trees Communicate" webpage
- the Jennifer Frazer article in *The Artful Amoeba*: "Dying Trees Can Send Food to Neighbors of Different Species via Wood-Wide Web"
- the Ferris Jabr article: "The Social Life of Forests"
- the *New York Times* article: "The Woman Who Looked at a Forest and Saw a Community"

More scientific research results are in Simard et al. 1997, Simard et al. 1997a, Simard, 2009, Simard et al. 2012 & Simard, 2018.

What Simard and others have found, and as published in an expanding body of scientific research, is that we can no longer view forest ecosystems as a collection of competing entities vying for limited resources, but rather as a cooperative—a community—that exhibits what may be called "Forest Wisdom," with the following core elements:

● Cooperation and Connection: Forests are complex adaptive systems that cooperate and care for trees and other life forms by creating favorable conditions, resisting stress and fostering long life. Sharing for the greater good gives cooperating networks evolutionary advantages over competing individuals.

● Mother Trees: Trees communicate through vast underground fungal networks of hubs and links, sharing nutrients and water, resisting insects and disease and nourishing their progeny until they reach the light. Mother Trees (a term coined by Dr. Simard), the most linked hub in this network, recognize and care for their young.

● Mindless Mastery: Tree intelligence is decentralized and underground. Thousands of root tips gather and assess data from the environment and respond in coordinated ways that benefit the entire forest. Forests achieve a "mindless mastery" through cooperation allowing them to respond in optimal ways to environmental challenges.

● Nature's Phoenix: Forests arise renewed like the mythological phoenix from patches of high-intensity fire to create snag forests as diverse as old-growth. Forests also successfully regenerate in heterogeneous and ecologically beneficial ways following large high-intensity fires.

Understanding Forest Wisdom means changing our perception of how forests function and abandoning the FS's entire "healthy forests" framework. The forests of the NPCNF are not sick, they do not need any chainsaw medicine. In fact, forests are cooperative systems that are essential for helping mitigate global climate disruption and addressing the biodiversity crisis we currently face.

The FS fails to recognize and consider the role of shared mycorrhizal networks and disclose how project activities will affect their function. Researchers are seeking answers to such questions. Sterkenberg, et al. (2019) investigated the abundance and diversity of ectomycorrhizal (ECM) fungi following varying levels of logging, ranging from clearcutting to 100% retention (control treatment). They explain that ECM fungi "represent a large part of the biodiversity in boreal forests. They depend on carbohydrates from their host trees and are vital for forest production, as uptake of nutrients and water by the trees is mediated by the ECM symbiosis. ECM fungal mycelium forms a basis for soil food webs." The researchers conclude:

> Our results confirm the value of retaining trees in forest management as a measure to maintain ECM fungal biodiversity. There was a clear and positive relationship between the amount of retention trees and ECM fungal species richness as well as the relative abundance of ECM fungi in the total fungal community. Frequent ECM fungi are likely to withstand logging with at least 30% of the trees retained, but at reduced mycelial abundance in the soil. Although **clear-cutting cause ECM fungal communities to be strongly impoverished even with FSC requirements of tree retention met**, the most common species survive harvest. Higher levels of tree retention, that is, in continuous cover forestry, may counteract local extinctions also of less frequent species and thus support efforts to manage for sustained high ECM fungal diversity. **Several rare species, and species predominantly confined to old natural forests, appear to rarely re-establish after clear-cutting** and are hence red-listed. For the survival of these species, **protection of forests with high conservation values and forest management directed towards conservation needs are unequivocally needed**. (Emphases added.)

From Kiers and Sheldrake, 2021:

> Globally, the total length of fungal mycelium in the top 10cm of soil is more than 450 quadrillion km: about half the width of our galaxy. These symbiotic networks comprise an ancient life-support system that easily qualifies as one of the wonders of the living world.
>
> Through fungal activity, carbon floods into the soil, where it supports intricate food webs – about 25% of all of the planet's species live underground. Much of it remains in the soil, making underground ecosystems the stable store of 75% of all terrestrial carbon. But climate change strategies, conservation agendas and restoration efforts overlook fungi and focus overwhelmingly on aboveground ecosystems. This is a problem: the destruction of underground fungal networks accelerates both climate change and biodiversity loss and interrupts vital global nutrient cycles.
>
> Fungi lie at the base of the food webs that support much of life on Earth. About 500m years ago, fungi facilitated the movement of aquatic plants on to land, fungal mycelium serving as plant root systems for tens of millions of years until plants could evolve their own. This association transformed the planet and its atmosphere – the evolution of plant-fungal partnerships coincided with a 90% reduction in the level of atmospheric carbon dioxide. Today, most plants depend on mycorrhizal fungi – from the Greek words for fungus (mykes) and root (rhiza) – which weave themselves through roots, provide plants with crucial nutrients, defend them from disease and link them in shared networks sometimes referred to as the "woodwide web". These fungi are a more fundamental part of planthood than leaves, wood, fruit, flowers or even roots.
>
> We are destroying the planet's fungal networks at an alarming rate. Based on current trends, more than 90% of the Earth's soil will be degraded by 2050. … Logging wreaks havoc below ground, decreasing the abundance of mycorrhizal fungi by as much as 95%, and the diversity of fungal communities by as much as 75%. A large study published in 2018 suggested that the "alarming deterioration" of the health of trees across Europe was caused

> by a disruption of their mycorrhizal relationships, brought about by nitrogen pollution from fossil fuel combustion and agricultural fertiliser.
>
> Mycorrhizal fungal networks make up between a third and a half of the living mass of soils and are a major global carbon sink.
>
> Mycorrhizal fungi are keystone organisms that support planetary biodiversity; when we disrupt them, we jeopardise the health and resilience of the organisms on which we depend. Fungal networks form a sticky living seam that holds soil together; remove the fungi, and the round washes away. Mycorrhizal networks increase the volume of water that the soil can absorb, reducing the quantity of nutrients leached out of the soil by rainfall by as much as 50%. They make plants less susceptible to drought and more resistant to salinity and heavy metals . They even boost the ability of plants to fight off attacks from pests by stimulating the production of defensive chemicals. The current focus on aboveground biodiversity neglects more than half of the most biodiverse underground ecosystems, because areas with the highest biodiversity aboveground are not always those with the highest soil biodiversity.

Also see: "An Ancient Library of Solutions: The Effort to Save the Mycorrhizal Fungi Vital to Life on Earth."

The FS fails to acknowledge the critical role mycorrhizal fungi networks play in sustaining forests, and provide protections for mycorrhizal networks in programmatic planning and project planning for roads, logging, prescribed burns, recreation and livestock grazing. This is necessary to meet the purposes of NEPA and the biodiversity mandates of NFMA.

The scientists involved in research on ectomycorrhizal networks have discovered connectedness, communication, and cooperation between trees, traditionally viewed as separate competing organisms. Such connectedness is usually studied within single organisms, such as the interconnections in humans among neurons, sensory organs, glands, muscles, other organs, etc. necessary for individual survival. The tree farming mentality reflected in the DEIS fails to consider the ecosystem impacts from industrial management activities on this mycorrhizal network—or even acknowledge they exist. This management paradigm will inevitably destroy what it refuses to see.

The DEIS neglects to disclose the entire scope and scale of the human-caused detrimentally compacted soils in the project area. It fails to explain why—despite commitments to the contrary in past NEPA documents and in the Forest Plan—such problems persist. It doesn't quantify the areal extent of such conditions post-project, in part because the FS doesn't disclose their extent outside of project activity areas, and in part because the intensity of FS soil surveys in activity areas is poorly explained. The DEIS also fails to disclose the extent of management caused irreversibly reduced soil productivity on volcanic ash cap soils, which is important because, as the FS admits, such compaction effects on such soils are "irreversible". It even fails to analyze and disclose the long-term implications from this irreversibly lowered soil productivity for the "vegetation resources" (trees for logging) the agency values above all else.

The FS does not cite the results of any data collection studies that verify DSD once found to be in excess of regional standards recovers in any predictable or reasonable time frame, or similarly improves by following BMPs or design criteria.

The R-1 SQS and DEIS do not adequately account for long-term losses in site or land productivity due to noxious weed infestations caused by management actions. The Sheep Creek Salvage FEIS (USDA Forest Service, 2005a) states at p. 173:

> Noxious weed presence may lead to physical and biological changes in soil. Organic matter distribution and nutrient flux may change dramatically with noxious weed invasion. Spotted knapweed (*Centaurea biebersteinii D.C.*) impacts phosphorus levels at sites (LeJeune and Seastedt, 2001) and can hinder growth of other species with allelopathic mechanism. Specific to spotted knapweed, these traits can ultimately limit native species' ability to compete and can have direct impacts on species diversity (Tyser and Key 1988, Ridenour and Callaway 2001).

USDA Forest Service, 2016a states, "Soil erosion or weed infestations are adverse indirect effects that can occur as a result any the above direct impacts. In both instances, serious land degradation can occur." The Soil Standards do not set any limitations on the total area that is infested by invasive plants in a project area at any given time, nor do they require disclosure of the extent of such weed invasions in a project area and the impacts such losses may have cumulatively on the Forest Service's ability to adequately restock the area within five years of harvest, as required by NFMA.

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.

The FS has no idea how the productivity of the land been affected in the EOTW project area and forestwide due to noxious weed infestations, nor any trends. USDA Forest Service, 2005c states:

> Weed infestations are known to reduce productivity and that is why it is important to prevent new infestation sand to control known infestations. …Where infestations occur off the roads, we know that the **productivity of the land has been affected from the obvious vegetation changes**, and from the literature. The degree of change is not generally known. …(S)tudies show that productivity can be regained through weed control measures…

The FS does not cite the results or successes of weed control efforts. Nor is there any data considered regarding trends of invasive species, causes, and cumulative effects.

In focusing only on its flawed DSD proxy, the FS avoids quantifying losses in **soil productivity**, potentially leading to serious long-term reduction in growth of vegetation of all types, with resulting cascading impacts in food chains and ecosystem function.

SCIENTIFIC INTEGRITY

See our LMP Objection, which expresses our concerns in a section titled the same. And see our comments on the draft LMP/draft EIS, in a section entitled "NEPA - Scientific Integrity."

The Nez Perce Forest Plan includes a requirement for 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."

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CONCLUSION

In 2006 the Ninth Circuit U.S. Court of Appeals opinion observed in *Earth Island Institute v. United States Forest Service [*442 F.3d 1147 (2006)]:

> We have noticed a disturbing trend in the [Forest Service's] recent timber-harvesting and timber-sale activities…It has not escaped our notice that the [Forest Service] has a substantial financial interest in the harvesting of timber in the National Forest. We regret to say that in this case, like the others just cited, the [Forest Service] appears to have been more interested in harvesting timber than in complying with our environmental laws."

We urge the FS to reconsider the EOTW timber sale decision as represented in the Draft EIS, solicit and accept additional public comment, and update the EIS to properly consider the information presented in these comments. Also please see our EOTW Objection, which provides much discussion and rationale the FS has not responded to so far, along with reasonable remedies. You will shortly be receiving via U.S. mail a data disk that contains this letter along with other documents it incorporates/cites.

The EOTW Draft EIS does not comply with NEPA, NFMA, the ESA and other laws and policy. The FS is ignoring significant new information. The EOTW project should be cancelled or at least drastically reduced in accord with the best available science and new information, which strongly suggesting an alternative management approach.

Sincerely,

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