Friends of the Clearwater
Keeping Idaho's Clearwater Basin Wild

June 7, 2024

Transmitted via online project portal at:
https://cara.fs2c.usda.gov/Public//CommentInput?Project=57504

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

Re: Section 16 Project Objection

Objection Reviewing Officer:

Pursuant to 36 CFR Part 218, Friends of the Clearwater (FOC) and Alliance for the Wild Rockies (AWR) file this objection to the April 2024 Section 16 Project Environmental Assessment (EA) and Draft Decision Notice (DN). This timber sale is proposed for the Lochsa-Powell Ranger District of the Clearwater National Forest, a portion of the administratively combined Nez Perce-Clearwater National Forests (NPCNF). The Responsible Official is District Ranger Brandon Knapton.

Pursuant to Part 218, FOC is lead objector. Contact person is Jeff Juel, FOC Forest Policy Director jeffjuel@wildrockies.org (509-688-5956).

Objectors 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 this objection. We also fully incorporate our comments on the Section 16 Project Proposed Action (PA) into this objection.

We also incorporate our comments on the North Fork Ranger District's Sourdough Sheep Proposed Action, which has topic sections corresponding to those in this Objection, and which contain citations of science fully applicable to the Section 16 project that we won't fully repeat herein.

Attachments, references, and other incorporated documents cited or mentioned in objection statements below and previous comments are included on a data disk with this objection, sent to the Forest Service Objection Reviewing Officer via U.S. mail postmarked by this date.

This Objection doesn't repeat all comments and concerns expressed in our PA comments. This doesn't mean we waive those for the objection phase or agree the FS addressed them in the EA.

Please note that quotations in this Objection are from the EA unless otherwise attributed.

INTRODUCTION

The selected alternative is described in the 2024 draft DN:

> This decision specifically authorizes implementation of the following components of the proposed action.
> - Intermediate harvest on approximately 380 acres
> - Approximately 0.6 mile of new system road construction, and approximately 0.2 miles of road construction on private land
> - Approximately 9 miles of road maintenance on National Forest system roads, and approximately 2 miles of road maintenance on private roads
> - Approximately 0.5 mile of temporary road construction that would be obliterated after use; and
> - Post-harvest legacy skid trail soil restoration activities[1]
> - Standard and additional design elements as outlined in this decision.

The EA predicts the logging would yield an estimated 4.7 MMBF. This haul of the public's trees to private timber mills would require an estimated 940 round trips of log trucks, using figures from Oester and Bowers (2009).

REMEDY REQUESTED

This Objection explains the numerous ways the EA and draft DN fall short of compliance with the National Environmental Policy Act (NEPA) the National Forest Management Act (NFMA), the 2012 Planning Rule, and other laws, regulations, and policy. The only way for the FS to properly remedy this situation is to withdraw the EA and draft DN, address the issues raised in this Objection and previous comments, and engage in a genuine NEPA process that welcomes, considers, and analyzes a full range of alternatives.

This project may significantly affect the human environment. Analysis in this EA violates NEPA by failing to take a "hard look." The FS must prepare an EIS to carefully consider the best available science, and determine the efficacy of its proposed "treatments."

NATIONAL ENVIRONMENTAL POLICY ACT

The FS's timber production bias results in a disrespect of public participation in the management of this publicly-owned national forests. That the agency sees the NPCNF as "lands under Forest Service ownership" helps explain their disdain for the real owners—the public.

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

[1] "…rehabilitation **subject to funding ability**" (emphasis added).

> 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."

The purpose and need statement does not conform the letter or the spirit of NEPA. That there is only one action alternative is one problem. NEPA requires consideration and analysis of a reasonable range of alternatives. The FS cherry-picks forest plan direction (and direction from the as yet not approved revised forest plan), emphasizing direction regarding forest vegetation. And the proposed action would make no lasting progress toward plan conditions for water quality and aquatic habitat.

One of the Forest Plan's stated goals is to: "Manage the Forest's fishery streams to achieve optimum levels of fish production by: 1) maintaining high quality habitat in existing high quality streams and, 2) rehabilitating and improving degraded streams on certain developed portions of the Forest; and then maintaining the optimum levels." A related goal is to: "Manage watersheds, soil resources, and streams to maintain high quality water that meets or exceeds State and Federal water quality standards, and to protect all beneficial uses of the water, which include fisheries, water-based recreation, and public water supplies." Finally, an objective of the plan is to: "Restore selected, presently degraded fish habitat through habitat improvement projects designed to achieve stated objectives for particular streams by 1997." Clearly, taking action to improve water quality and aquatic habitat is in alignment with the Forest Plan. The FS arbitrarily and capriciously prioritized vegetation "desired conditions" while ignoring mandates to restore water quality and fish habitat—direction deserving at least equal footing with the EA's desired conditions for forest vegetation.

The EA also does not adequately address the scientific and analytical controversies it poses, which threatens to result in significant impacts on the environment.

The EA's analysis of the No Action Alternative does not comply with NEPA. For example, merely listing the names, dates, and acreages of past timber sale projects/analyses falls far short of examining and disclosing the cumulative effects of those actions. There is hardly any cause-and-effect consideration of past actions in the EA.

The EA contradicts Forest Plan/FEIS recognition of the important role natural processes such as fire, insects and root disease organisms play in causing tree mortality and therefore the creation and maintenance of important habitat characteristic for, e.g. wildlife that depend upon snags, down logs, food sources etc.

We also notice the "Forest Plan Consistency" document is extremely inadequate for demonstrating and explaining how the project is consistent with the Forest Plan and other applicable regulatory mechanisms. It often states without any analytic support that a given 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." It also ignores Forest Plan goals and other plan elements. And along with the EA it ignores direction such as that contained in the Forest Service Manual and Forest Service Handbook for which notice and comment procedures have been conducted, rendering them nondiscretionary.

The EA describes the logging as "Intermediate harvest (approximately 380 acres)":

> Treatment would result in fully stocked single-or-two-storied stands that are generally uniform across the project area with limited openings. Intermediate treatment would reduce the current stand density within the unit to improve species composition by removing grand fir, subalpine fir and other late seral species; and retaining early-seral species, where they exist (western larch, ponderosa pine, western white pine). Healthy trees of other species would remain where there are no early seral species. Average stand diameter would increase through the removal of smaller-diameter trees and growing conditions would be improved for residual trees. Trees up to 6 inches diameter at breast height (DBH) damaged during harvest operations would be slashed to maintain forest health.

Yet the EA fails to disclose anything measurable about the proposed results of the logging.[2] What is meant by "fully stocked" stands is not disclosed. The final density is not specified, with vague statements such as "Treatment would leave between 40-60% of existing basal area depending on the average basal area of the stand. Stocking levels may vary to reflect differences in carrying capacity across different sites." Retention level of trees of specific sizes and diameters is unspecified. The EA says "Current species are predominately grand fir, or grand fir-mix (grand fir, Douglas-fir, subalpine fir and spruce)…" and says the action would involve "removing grand fir, subalpine fir and other late seral species" so the FS has a low priority for retention of the vast majority of trees now present in Section 16![3] If the managers of the NPCNF want to avoid accountability for implementing "even-aged" (i.e., clearcut or similar) logging instead of "intermediate", the EA and DN are mission accomplished. A similar situation occurred with the NPCNF's Doc Denny project, where a clearcut was implemented in a location the NEPA called for lighter logging. So for example the FS vaguely says they would "retain large trees on the landscape" yet the EA does not define "large trees." We cannot fathom, from the EA and supporting specialists reports, how anyone could be tasked with writing up more detailed direction for how Section 16 would be actively managed (i.e., marking trees or even designation by description). It is a huge red flag that the entirely of the area proposed to be logging is of one unit, despite the inherent diversity of the forest across the unit. It is quite revealing that a "vegetation mapping system based upon satellite data, was the primary data source used to define existing conditions for tree species and tree size classes in the Section 16 Project analysis area" and that "Harvest treatments were proposed during project planning **based primarily on remote analysis rather than field-verified observations and data**." (Forested Vegetation Report, emphasis added.)

We also have the Forest Vegetation Report characterizing "**Shade intolerant species (mainly Douglas-fir** with some western larch and white pine)…" while the revised Forest Plan FEIS mentions "**shade tolerant species like** …**Douglas-fir**…" so clearly the FS has some internal controversies to deal with along with a lot of data to gather.

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[2] This very same concern was raised on page 2 of our comments on the PA.

[3] The EA states "…only 8% of total treatment acres (is) comprised of early-seral, shade-intolerant species" also noting "the low percentage of early seral species within the project area…"

Furthermore, the vast majority of the logging would be conducted with a "Skyline" Logging System (*see* e.g. Watershed Effects Supporting Information report, Figure 2) and anything standing along a skyline skid route must be felled for simple logistical/implementation purposes—one cannot haul a logged tree through a tree of "desired" species without felling the latter). Dealing with those logistics with skyline logging is not even consistent with the FS's vague promises.

If the FS doesn't adequately know the current conditions in Section 16, the EA cannot possibly analyze and disclose the *changes to* the current conditions/impacts of the logging, and thus fails to take a hard look, in violation of NEPA.

The EA's lack of specificity potentially also allows "regeneration" logging to an areal extent requiring Regional Forester approval, which the EA fails to address.

As we explain elsewhere it appears the FS does not have up-to-date survey data on actual forest conditions where the EA proposes logging, and therefore presents a lot of vague statements.

FOREST SERVICE IS ILLEGALLY IMPLEMENTING THE REVISED FOREST PLAN

At p. 2 of our PA comments we stated:

> The PA continues on page 4 discussing the proposal "to improve species composition by removing grand fir, subalpine fir and other late seral species; and retaining early-seral species, where they exist (western larch, ponderosa pine, western white pine)." However, **nowhere in the existing Desired Future Conditions in the forest plan are those specific vegetative goals on pages 3 and 4 mentioned.** In essence, the proposed action would require a forest plan amendment. (Emphasis added.)

The November 15, 2023 Section 16 Forested Vegetation Report states, "Broad potential vegetation types (PVTs) combine habitat types that share similar biophysical characteristics such as slope, climate and soils and are used as a basis for analyzing ecological conditions at the forestwide scale (USDA 2019)." USDA 2019 is described in the report's references section as the Draft EIS prepared for forest plan revision. The concept of PVT does not appear in the current Clearwater Forest Plan.

Table 3 of the Forested Vegetation Report Displays "Existing and Desired Conditions across the project area by PVT" and Table 5 displays "desired and exiting conditions for size class across the Section 16 Project Area by PVT." In footnotes below those tables, it acknowledges, "Desired range comes from Forest Plan Revision DEIS desired conditions for MA3 (Probert 2017)… ." The Probert document is described in the report's references section: "Preparing for Alternative Development [Forest Plan Revision] …Nez Perce-Clearwater National Forests."

These EA 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). At this point implementing revised forest plan "desired conditions" which underlies the Section 16 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. For now they remain highly controversial and uncertain, necessitating analysis under an EIS, or at the very least, finalizing of the revised forest plan so the public is fully informed prior to this Project properly being developed under the new plan. 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 SERVICE DECEIVINGLY AND DELIBERATELY WORSENS CLIMATE CHANGE, ALREADY ON AN EXTREMELY DANGEROUS TRAJECTORY

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)].

In sum, the FS further augurs its head into the sand rather than face the climate crisis or examine its role in exacerbating it. The science is well settled by now and the FS is quite aware. Agency bureaucrats are implicit in destroying the Earth's atmosphere.

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.) Nothing in those 2023 Biden administration reports nor in EO 14072 itself recognize the threat of logging to old growth and mature forests an consequently the adverse climate effects. The fallacies this represents are discussed in letters this objection incorporates.

At this point, achievement of the lofty goals for EO 14072 proclaimed by President Biden remains remote. Of huge concern to the global community, this includes prioritizing the role of forests as natural climate solutions. Instead we see the continuing targeting of publicly owned forests to serve the prevailing capitalist consumptive values that chronically threaten 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.

Further, the Section 16 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.

The 2016 CEQ 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." It directs federal agencies to consider the extent to which a proposed action such as the Section 16 timber sale would contribute to climate change. It rejects as inappropriate any notion that this timber sale is of too small a scale for such consideration:

> 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.

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 EA says:

> The carbon storage analysis for the Section 16 project incorporates by reference and tiers to the Hoang et al, 2020 Carbon Assessment for the Nez Perce – Clearwater National Forests in the Northern Region. We consider Hoang et al., (2020) a quantitative analysis using the best science and tools to understand our contribution to the carbon cycle.

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.

In this section of our Objection we refute these myths. 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:

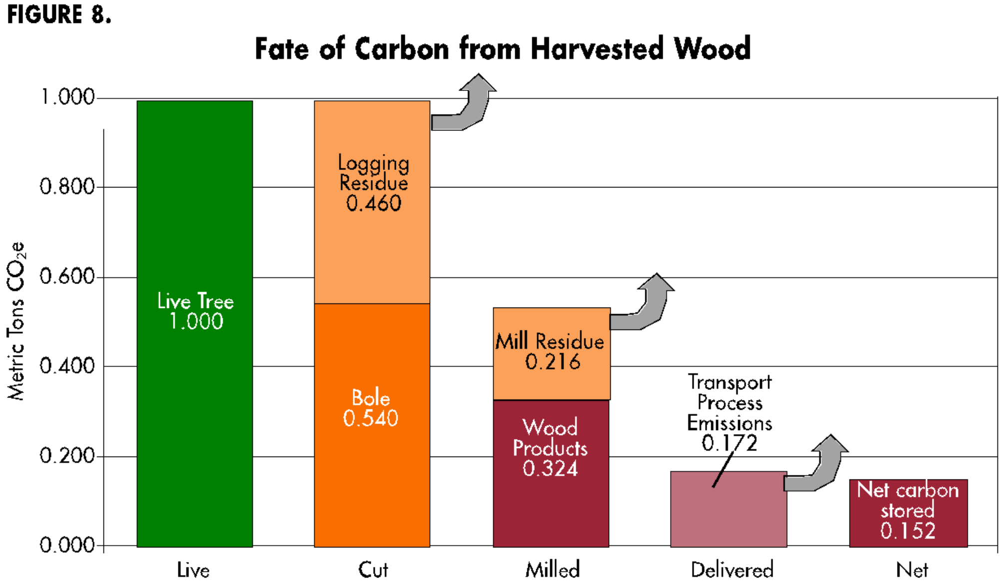
> Wood products can be used in place of other more emission intensive materials, like steel or concrete, and wood-based energy can displace fossil fuel energy, resulting in a substitution effect (Gustavsson et al., 2006; Lippke et al., 2011). Much of the harvested carbon that is initially transferred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

From Ingerson, 2007:

FIGURE 8.



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

()

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)

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.)

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 EA promotes the idea that the project would reduced potential for severe fire behavior through fuel reduction/reduction in ladder fuels and increased stand vigor which would increase resilience of forested stands…" 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 EA 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 EA 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, inter alia, 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 EA 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 <u>static conditions</u>, instead of valuing the natural dynamic characteristics of ecosystems. An abundance of scientific evidence indicates <u>desired future dynamics</u>—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 Section 16 EA.

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 EA 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 EA 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 EA’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.)

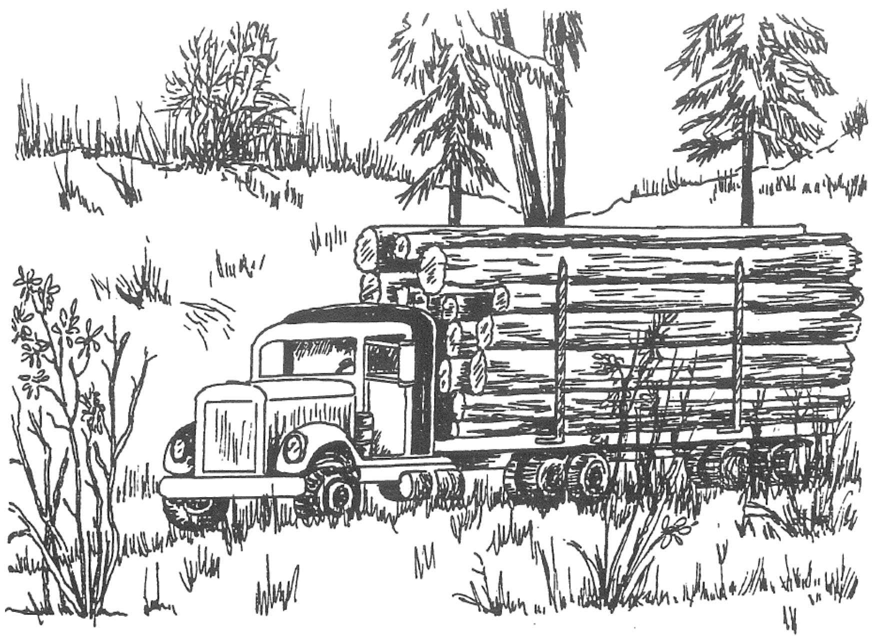
This limited perception of ecological change is also exhibited with the EA’s failure to consider time scale while rationalizing that ongoing or potential fire, insect, and disease effects indicate a deficit in resilience of project area forests. Falk et al., (2019) state:

> “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.

OLD GROWTH



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

-USDA Forest Service, 1987d

See our incorporated PA comments, which includes a section entitled "Old Growth" on page 4. Also see our LMP Objection with several portions discussing old growth, e.g., one entitled "Old Growth and Old-Growth Ecosystems."

This objection also incorporates 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.

Based information in the "11005OldGrowthStandListSec16ProjectArea" document, data is at minimum 15 years old and most of that is "Remotely inventoried." In many cases data is much older. Also, old growth "needs to be verified." In fact much "Retained Existing OG" is "Unverified." Percentages presented in that document and in the EA are therefore unreliable and potentially very inaccurate. This means the FS cannot demonstrate compliance with Forest Plan standards and cannot sufficiently analyze current habitat conditions and impacts on numerous old-growth associated wildlife species.

Consistency with Forest Plan

The EA states, "The Section 16 proposed action …does propose some intermediate treatments within some step-down stands provided that the treatment would increase the likelihood of the stand obtaining old growth structure." Aside from the fact that the FS has never, over the life of the Forest Plan, definitively shown it can "increase the likelihood of the stand obtaining old growth structure" there's also the problem, discussed above, that the EA does not sufficiently distinguished its "intermediate treatments" from logging that depletes many all old-growth habitat components.

In recognition of the importance of old growth, the Forest Plan includes nondiscretionary direction. Forest Plan Wildlife and Fish Standard 5.c. states, "Provide habitat for snag-dependent indicator species (pileated woodpecker and goshawk" in accordance with guidelines provided in Appendix H." The Clearwater NF Forest Plan Final EIS states:

> c. Old-Growth Dependent Species
> Stands of old-growth trees provide habitat for certain species of wildlife. Pileated woodpecker and the goshawk are indicator species for old-growth habitat.

The Forest Plan requires the FS to monitor population trends of Management Indicator Species (MIS) explicitly in response to 1982 NFMA Regulations at 36 CFR 219.19(6), reporting every five years. The FS's dismal performance in compliance with Forest Plan Monitoring Requirements leaves the FS in violation of the regulations stating "Population trends of the management indicator species will be monitored and relationships to habitat changes determined." This is a subsection of the regulations that define viable populations—which is to be determined in part by the required monitoring:

> § 219.19 Fish and wildlife resource.
>
> Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.

Consistent with the Regulations, Forest Plan Wildlife and Fish Standard 5.d. requires the FS to "Provide for old-growth dependent wildlife species by:

> (1) Maintaining at least 10 percent of the Forest (including Selway-Bitterroot Wilderness) in old-growth habitat.

(2) Selecting at least 5 percent of each approximate 10,000 acre watershed (timber compartment) or combination of smaller watersheds (subcompartments) within forested nonwilderness areas to manage as old-growth habitat."

Again, this is consistent with the Regulations' requirement such that "habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area." As the Forest Plan FEIS states: "Evaluation of old-growth habitat is made using at least two factors: distribution and amount. …To assure Forestwide distribution of old growth, five percent of each 10,000 acre land unit is maintained as old growth. In all alternatives this requirement may delay timber harvest in some old-growth timber until other timber stands achieve maturity to qualify as old growth."

Forest Plan Timber Standard 4.c. requires the FS to "Identify and maintain suitable old-growth stands and replacement habitats for snag and old-growth dependent wildlife species in accordance with criteria in Appendix H."

It is notable that the FS has determined in Clear Creek project NEPA documents that identifying and designating old growth using Green et al. old growth criteria is considered "best available science" as opposed to using criteria such as found in Forest Plan Appendix H.

Forest Plan Appendix H includes its "OLD-GROWTH DEFINITION":

> Old-growth Forest is defined as "a stand that is past full maturity and showing decay: the later stages of Forest succession." Stands must meet most of the following requirements to be considered old growth:
>
> 1. 15 or more live trees per acre.
> 2, One or more snags per 2 acres over 21 inches d.b.h.
> 3. Two or more canopy levels, heart rot and other signs of stand decadence.
> 4. Overstory canopy closure of 10-40 percent.
> 5. Usually with a definite shrub-sapling layer of at least 15 feet tall with a canopy closure of over 40 percent.
> 6. With understory and overstory canopy combined, exceeding 70 percent.
> 7. With significant coarse woody debris, including snags (> l0/AC over 20 feet) and downed logs (> 20 ton/AC and snag and logs) (minimum 4/AC) that are large (≥ 21 dbh) and > 50 feet long.
> 8. Live tree component of various species with wide range in sizes and age including long-lived seral dominants. More than 10 live trees/AC that are either old or have become large (> 21 dbh).

Forest Plan Appendix H includes "OLD-GROWTH HABITAT GUIDELINES":

> 1. The 10 percent minimum old growth to be maintained may be found in wilderness, research natural areas, riparian areas, travel corridors, and areas identified as unsuitable for timber as well as areas suitable for timber harvests.

2. For purpose of achieving the 5 percent of each 10,000 acre minimum standard, timber compartments will be used as a basis of measurement.

3. The minimum size of an area that can be considered old growth is 25 acres. However, to insure optimum wildlife diversity and abundance, somewhat larger stands of approximately 80 acres are the preferred minimum. (Thomas 1979.)

4. In each 10,000 acre unit of suitable habitat, a 300 acre stand should be managed as old growth for pileated woodpeckers. It is recommended that the 300 acres be contiguous, but it is acceptable to divide the 300 acres into not more than three 100 acre areas as long as the areas are within 2 square miles.

5. The 300 acre area (or the three 100 acre areas) should be at least 200 yards wide at any one point. However, the remaining 200 acres (in the minimum 5 percent distribution unit) can be of any width but in not less than 25 acre units.

6. Old-growth stands should be distributed across the major habitat types found in the Forest in proportion to their occurrence.

7. For those 10,000 acre units without any old growth because of past fires or timber harvesting, select replacement stands.

8. Fire suppression/management strategies will be based on the objective of improving or enhancing old-growth values.

9. Existing old-growth stands may be harvested when there is more than 5 percent in an old-growth unit, and the Forest total is more than 10 percent, or a replacement stand becomes available.

10. A maximum of 200 contiguous areas of wilderness old growth may be used to meet the 500 acre old growth requirement per 10,000 acre old-growth analysis area.

The EA seems to indicate the Section 16 Project falls entirely within Forest Plan Management Area (MA) E1. Forest Plan MA E1 Timber Standard 4.c. requires the FS to “Identify and maintain suitable old-growth stands and replacement habitats for snag and old-growth dependent wildlife species **in accordance with criteria in Appendix H**.” (Emphasis added.)

The “Forest Plan Consistency” document does not address “Snag Habitat Definition” or “Snag Habitat Guidelines” in Appendix H. It states that “Only snags that pose a potential hazard to personnel would be dropped” which says nothing about how many might remain because they are deemed safe. Nor does the Terrestrial Wildlife Resources Report discuss those, and notably doesn’t even contain the word “clump” to address consistency with Appendix H (e.g., “preferably manage snags in clumps … Average clump size is 5 acres …Manage for one premium 5 acre patch per 500 acres”). Furthermore, the vast majority of the logging would be conducted with a “Skyline” Logging System (*see* e.g. Watershed Effects Supporting Information report, Figure 2) and anything standing along a skyline skid route must be felled simply for logistical purposes—one cannot haul a logged tree through a snag without felling the latter). Nothing we see of the Section 16 NEPA gives us any idea as to the degree of snag loss that would happen with the logging.

Alarmingly, the Forest Vegetation Resource report states, “There is no available information on snags within the project area.” This means that old growth and replacement/step down old growth has been designated without consideration of a major defining aspect of the Appendix H definition of old growth.

Raphael and White, 1984 (cited in the Forest Plan) state, “Providing sufficient numbers of large-diameter snags on managed stands often will require retention of trees and selected stands **beyond the usual rotation or retention of existing patches of old-growth timber**.” (Emphasis added.)

Whether or not the proposal would affect effective old growth, the notion of “replacement” old growth in the Forest Plan indicates that the agency must conduct thoughtful planning and landscape designation of mature forest and other non-old growth in order to insure viable populations persist as required by law. There is no consideration taken for the long view, which is necessary for proper management for old growth as vital habitat upon which old-growth associated wildlife depend. There is nothing we can find in the EA or specialists reports that explain how the stands chosen for old-growth designation or for replacement old-growth designation was made, rationally, for the current, ongoing, and future benefit of wildlife associated with old growth. It’s not as if those designated areas are the only forest areas worthy of designation.

For example the folder entitled “Below Road 5650” includes a few short videos taken viewing the downhill side of that road in the center of the project area—an area proposed for logging. Given our observation of many large, old trees and other old-growth character, we wonder why there is nothing in the project file considering it for old-growth designation or for replacement old-growth designation.

Then there’s the portion of “Recruitment Potential OG” depicted at 01050616040021(on the map “11_007_StepDownInUnit_Sec16.pdf”) with the oddly straight north-south (non-ecological) boundary between it and the “Retained Existing OG”, a portion of which could not be logged without an undisclosed temporary access road.

The FS has not properly evaluated “forest stands” proposed for logging to check for old growth conditions or to prioritize “replacement” stands for future old growth. This is even inconsistent with the agency’s poorly timed[4] “Technical Guidance for Standardized Silvicultural Prescriptions for Managing Old-Growth Forests.” Section 16 is inconsistent with much of the methodology of even this logging-heavy direction related to the nationwide forest plan amendments EIS:

> A sequence of the following five steps is followed to complete the silvicultural prescription process for stewardship of old-growth forests:

[4] There hasn’t even been a draft EIS issued for public comment, yet this direction is “Final.” Hmmm….

1. Examination of forest stands.
2. Diagnosis of treatment needs.
3. Detailed silvicultural prescriptions (prescription of methods, techniques, and timing of silvicultural activities).
4. Monitoring of treatments over time to ensure the stand remains on trajectory to achieve the desired stand condition; and
5. Evaluation of treatment results.

<u>Non-timber values of old growth</u>

Nothing in the EA's discussion on old growth recognizes non-timber values. In 1989, Forest Service Chief Dale Robertson issued a "Position Statement on National Forest Old Growth Values" (Chief's Position Statement – see Green et al., 1992). The Chief's Position Statement included steps national forest managers were to take to reflect this range of old growth values. The direction included:

- Old growth values shall be considered in designing the dispersion of old growth. This may range from a network of old growth stands for wildlife habitat to designated areas for public visitation. In general, areas to be managed for old growth values are to be distributed over individual National Forests with attention given to minimizing the fragmentation of old growth into small isolated areas.

- Regions with support from Research shall continue to develop forest type old growth definitions, conduct old growth inventories, develop and implement silvicultural practices to maintain or establish desired old growth values, and explore the concept of ecosystem management on a landscape basis. Where appropriate, land management decisions are to maintain future options so the results from the foregoing efforts can be applied in subsequent decisions. Accordingly, field units are to be innovative in planning and carrying out their activities in managing old growth forests for their many significant values.

Green et al., 1992 states "…old growth is valuable for a whole host of resource reasons such as habitat for certain animal and plants, for aesthetics, for spiritual reasons, for environmental protection, for research purposes, for production of unique resources such as very large trees." And Hamilton, 1993 states, "Values for such items as wildlife, recreation, biological diversity, and juxtaposition of old-growth stands with other forest conditions need to be considered in relation to Forest land management planning objectives."

Old growth is very important because it provides unique habitat conditions for wildlife, plants, fungi and other life forms which are not well-represented in younger or managed forests. Old growth provides reserves of biological diversity typically depleted in intensively managed stands.

The "Open Letter to The Forest Service on the Importance of Large, Old Trees and Forests" signed in 2020 by dozens of scientists, is incorporated into this Objection.

The Kootenai National Forest 1987 Forest Plan included Appendix 17 and other direction (USDA Forest Service 1987a). We incorporate that appendix as well as USDA Forest Service 1987b which contains a list of "species …(which) find optimum habitat in the "old" successional stage…" And Kootenai National Forest (1991) states, "we've recognized its (old growth) importance for vegetative diversity and the maintenance of some wildlife species that depend on it for all or part of their habitat." (*Also see* USDA Forest Service, 1990a.) We also incorporate the Idaho Panhandle NF's forestwide old-growth planning document (USDA Forest Service, 1987d) and the IPNF Forest Plan's old-growth standards (USDA Forest Service, 1987c) because they provide biological information concerning old growth and old-growth associated wildlife species.

USDA Forest Service, 1987a states:

> Richness in habitat translates into richness in wildlife. Roughly 58 wildlife species on the Kootenai (about 20 percent of the total) find optimum breeding or feeding conditions in the "old" successional stage, while other species select old growth stands to meet specific needs (e.g., thermal cover). Of this total, five species are believed to have a strong preference for old growth and may even be dependent upon it for their long-term survival (see Appendix I[5]). While individual members or old growth associated species may be able to feed or reproduce outside of old growth stands, biologists are concerned that viable populations of these species may not be maintained without an adequate amount of old growth habitat.
>
> Wildlife richness is only a part of the story. Floral species richness is also high, particularly for arboreal lichens, saprophytes, and various forms of fungus and rots. Old growth stands are genetic reservoirs for some of these species, the value of which has probably yet to be determined.

Old-Growth Ecosystems

"NFMA requires that diversity be addressed in the Forest planning process (36 CFR 219.26) and (36 CFR 219.27[g]). Old-growth timber is a part of this diversity not only for vegetative diversity but also for wildlife diversity." (Clearwater NF Forest Plan Final EIS.) In a similar vein, the Forest Plan Final EIS for the Nez Perce NF describes the ecological importance of old growth at p. III-35:

> 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.) Stands of trees meeting old-growth criteria are a "critical element of

[5] USDA Forest Service 1987b.

diversity" comprising **old-growth ecosystems**, as recognized in the above FS quote, as stated in the FS's Green et al. (1992), and as discussed in Juel (2021) and the scientific sources cited therein.

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

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

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

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

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

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

- Our failure to study old-growth forests as ecosystems is increasingly serious in considerations of old-growth issues. Without adequate basic knowledge of the ecosystem, we risk losing track of its totality in our preoccupation with individual attributes or species. Definitional approaches to old growth based on attributes, including those that we have presented here, predispose us to such myopia. The values and services represented by old-growth ecosystems will be placed at ever greater risk if we perpetuate our current ignorance about these ecosystems. It will also increase doubts about our ability to manage for either old-growth ecosystems or individual attributes (for example, species and structures) associated with old growth. We must increase ecosystem understanding and management emphasis on holistic perspectives as we plan for replacement of old-growth forests. How can we presume to maintain or re-create what we do not understand? Some may presume that ignorance (on ecological values of old growth) is bliss, but this attitude creates high risk that we will continue to be blindsided by subsequent discoveries.

USDA Forest Service (1990) states, "Roads are generally undesirable within an old-growth habitat patch. The road corridor fragments the habitat by creating edge, and access may result in loss of snags to woodcutting."

The EA also does not properly analyze and disclose the natural historic range vs. current conditions regarding patch size, edge effect, and amount of interior forest old growth in the Clearwater NF or project area Old Growth Analysis Units. Harris, 1984 discusses connectivity and effective interior habitat of old-growth patches:

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

Harris, 1984 discusses habitat effectiveness of fragmented old growth:

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

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

> Because of our lack of knowledge about intricate old-growth ecosystem relations (see Franklin et al. 1981), and the notion that oceanic island never achieve the same level of richness as continental shelf islands, a major commitment must be made to set aside representative old-growth ecosystems. This is further justified because of the lack of sufficient acreage in the 100- to 200-year age class to serve as replacement islands in the immediate future. …(A) way to moderate both the demands for and the stresses placed upon the old-growth ecosystem, and to enhance each island's effective area is to surround each with a long-rotation management area.

USDA Forest Service, 2004a states:

> Harvest or burning in stands immediately adjacent to old growth mostly has negative effects on old growth, but may have some positive effects. Harvesting or burning adjacent to old growth can remove the edge buffer, reducing the effective size of old growth stands by altering interior habitats (Russell and Jones 2001). Weather-related effects have been found to penetrate over 165 feet into a stand; the invasion of exotic plants and penetration by predators and nest parasites may extend 1500 feet or more (Lidicker and Koenig 1996).

> On the other hand, adjacent management can accelerate regeneration and sometimes increase the diversity of future buffering canopy.
>
> The occurrence of roads can cause substantial edge effects on forested stands, sometimes more than the harvest areas they access (Reed, et al. 1996; Bate and Wisdom, in prep.). Open roads expose many important wildlife habitat features in old growth and other forested stands to losses through firewood gathering and increased fire risk.
>
> Effects of disturbance also vary at the landscape level. Conversion from one stand condition to another can be detrimental to some old growth associated species if amounts of their preferred habitat are at or near threshold levels or dominated by linear patch shapes and limited interconnectedness (Keller and Anderson 1992). Reducing the block sizes of many later-seral/structural stage patches can further fragment existing and future old growth habitat (Richards et al. 2002). Depending on landscape position and extent, harvest or fire can remove forested cover that provides habitat linkages that appear to be "key components in metapopulation functioning" for numerous species (Lidicker and Koenig 1996, Witmer et al. 1998). Harvest or underburning of some late and mid seral/structural stage stands could accelerate the eventual creation of old growth in some areas (Camp, et al. 1996). The benefit of this approach depends on the degree of risk from natural disturbances if left untreated.
>
> Effects on old growth habitat and old growth associated species relate directly to … "Landscape dynamics—Connectivity"; and … "Landscape dynamics—Seral/structural stage patch size and shapes."

The FS is failing to provide adequate protection for designated old growth, resulting in a widespread loss of vital old-growth snag component due to firewood cutting and other activities adjacent to open roads. (*See* Bate and Wisdom, 2004.)

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

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

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

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

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

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

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

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

Bollenbacher and Hahn, 2008 state:

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

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

Rose et al., 2001 is scientific information on dead wood in forest ecosystems. Snags and down dead wood are a defining element of old growth. They make several good points, citing dozens of other scientific sources. Below, the internal citations are omitted for ease of reading:

- Decaying wood has become a major conservation issue in managed forest ecosystems. Of particular interest to wildlife scientists, foresters, and managers are the roles of wood decay in the diversity and distribution of native fauna, and ecosystem processes. Numerous wildlife functions are attributed to decaying wood as a source of food, nutrients, and cover for organisms at numerous trophic levels. Principles of long-term productivity and sustainable forestry include decaying wood as a key feature of productive and resilient ecosystems. (Internal cites omitted.)
- Inputs of decaying wood are crucial to most aspects of stream processes, such as channel morphology, hydrology, and nutrient cycling.
- Wood decay in forests of the Pacific Northwest has recently become a topic of renewed interest at national and global scales, regarding the role of terrestrial carbon storage in the reduction of atmospheric CO2 (a greenhouse gas).
- New research over the past three decades has emphasized the significance of decaying wood to many fish and wildlife species, and to overall ecosystem function. The importance of decaying wood to ecosystem biodiversity, productivity, and sustainability is a keynote topic in two recent regional ecosystem assessments in Oregon and Washington. These, and other publications address both the specific roles of wood decay in ecosystem processes and functions, as well as ecological functions of wildlife species associated with wood decay.
- Interactions among wildlife, other organisms, and decaying wood substrates are essential to ecosystem processes and functions. In the process of meeting their needs, animals accomplish ecosystem work with respect to transformation of energy and cycling of nutrients in wood. For example, chipmunks and squirrels disperse mycorrhizal fungi which play key roles in nutrient cycling for tree growth; birds, bats, and shrews consume

insects that decompose wood or feed on invertebrates and microbes; beavers and woodpeckers create habitats by modifying physical structures; arthropods build and aerate soil by decomposing wood material. Relations between wood decay and wildlife have been examined in several recent analyses.

- Managed forests, on average, have lower amounts of large down wood and snags than do natural forests.
- Emphasis on concepts of long-term productivity in this chapter reflects an underlying principle that habitat functions of decaying wood are inextricably linked to ecosystem processes. Careful attention to the whole ecosystem is a prerequisite to successful management of decaying wood for wildlife.

Wood Legacies in Managed Forests

John Hayes

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

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

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

- Of the biological agents of wood decay, insects and fungi are the principal players in coniferous forest ecosystems.
- Down wood, snags, and live trees with decay serve vital roles in meeting the life history needs of wildlife species in Oregon and Washington.
- Woodpeckers, sapsuckers, and nuthatches are highly specific in their selection of tree species for nesting and roosting, and this selectivity is attributed to the presence of decay fungi.

- To be useful to most cavity excavators, live trees usually must contain wood in a Class 2 stage of decomposition. For example, strong excavators, such as Williamson's sapsuckers, pileated woodpeckers, and black-backed woodpeckers, select trees with a sound exterior sapwood shell and decaying heartwood to excavate their nest cavities.
- Hollow trees larger than 20 inches (51 cm) in diameter at breast height (dbh) are the most valuable for denning, shelter, roosting, and hunting by a wide range of animals. Hollow chambers are used as dens by black bears, as night roosts by woodpeckers, and as dens, shelter, roosts, and hunting sites by a variety of animals, including flying squirrels, wood rats, bats, American marten, northern flickers and Vaux's swift.
- Hollow trees and down wood are formed from only a few tree species that can maintain bole structural integrity as the heartwood decays. Western redcedar is especially valuable in providing hollow trees because the decay-resistant sapwood remains structurally sound for centuries. In the Interior Columbia Basin, grand fir and western larch form the best hollow trees for wildlife uses.
- Broomed trees caused by mistletoe, rust, or needlecast fungi may remain alive for decades, and have attributes distinct from decay patches in live trees. Abundant forage is produced from mistletoe shoots and fruits. Regardless of the extent of decay, broom infections provide various habitat functions to wildlife depending on how and where they form along the bole. For example, mistletoe brooms form platforms used for nesting, roosting, and resting sites by owls, hawks, and song birds; roosting by grouse; and resting cover by squirrels, porcupines, and marten.
- The abundance of cavity-using species is directly related to the presence or absence of suitable cavity trees. Habitat suitability for cavity-users is influenced by the size (diameter and height), abundance, density, distribution, species, and decay characteristics of snags. In addition, the structural condition of surrounding vegetation determines foraging opportunities.
- Stumps provide a variety of wildlife habitats. Stumps with sloughing bark (Class 2) provide sites for bat roosts, and foraging sites for flickers, and downy, hairy and pileated woodpeckers. In openings, tall stumps with advanced decay (Class 3) provide nest sites for flickers, and subsequently for blue birds and other secondary cavity-nesters associated with openings. Squirrels and chipmunks also use stumps as lookouts and platforms for cone-shredding.
- Down Woody Material (logs). Down wood affords a diversity of habitat functions for wildlife, including foraging sites, hiding and thermal cover, denning, nesting, travel corridors, and vantage points for predator avoidance. Larger down wood (diameter and length) generally has more potential uses as wildlife habitat. Large diameter logs, especially hollow ones are used by vertebrates for hiding and denning structures. Bears forage for invertebrates in logs during summer and fall. Fishers use large logs to a limited degree as den sites.
- Lynx select dense patches of downed trees for denning. Jackstrawed piles of logs form a habitat matrix offering thermal cover, hiding cover, and hunting areas for species such as marten, mink, cougar, lynx, fishers, and small mammals (Figure 8). Smaller logs benefit amphibians, reptiles, and mammals that use wood as escape cover and shelter. Small mammals use logs extensively as runways (Figure 9). California red-backed voles use Class 2-3 down logs for cover, and feed on fungi (especially truffles) and lichens growing in close association with down wood.

- The moist environment beneath loose bark, bark piles and in termite channels of logs with advanced decay provides a protected area for foraging by salamanders. The cool, moist environment of rotten wood may be required for some species of salamanders to survive heat stress during summer. Decaying wood also provides habitat for invertebrates on which salamanders and other foraging vertebrates feed (e.g., collembolans, isopods, millipedes, mites, earthworms, ants, beetles, flies, spiders and snails). The folding-door spider constructs a silk tube within the cracks and crevices of wood with advanced decay.
- Habitat structures in upper layers of the forest floor (soil, litter, duff) result from processes involving organic material (litter, decaying roots, vertebrate and invertebrate carrion, and fecal matter) and a diverse community of organisms, including bacteria, fungi, algae, protozoa, nematodes, arthropods, earthworms, amphibians, reptiles, and small mammals. The complex trophic web supported by nutrient and moisture conditions within the litter and duff layers transforms plant material into a variety of degradation products, thereby storing and releasing nutrients within the ecosystem.
- Decaying wood forms many habitat structures in riparian forests. Accumulations of large wood on stream banks provide habitat for small mammals and birds that feed on stream biota, and provide structural diversity in streamside forests.
- The role of down wood in salmon habitat has received much attention over the past two decades. Large wood is a key component of salmonid habitat both as a structural element and as cover and refugia from high flows. Large wood serves key functions in channel morphology, as well as sediment and water routing. The importance of wood to salmon habitat varies from headwater to stream mouth. As stream order increases and gradient decreases in third- to fifth-order streams, down wood is a dominant channel-forming feature. Larger wood deflects water and increases hydraulic diversity, producing a range of pool conditions that serve as habitats for juvenile salmonids in summer. Diverse channel margins are a primary aspect of rearing habitat. Flow obstructions created by large wood provide foraging areas for young salmonid fry that are not yet able to swim in fast currents, and provide refugia to juvenile salmonids at high flow. In higher order streams, flow deflections created by large wood trap sediments and nutrients, and enhance the quality of gravels for spawning. Down wood is less of a channel-forming feature along large rivers, but defines meander cutoffs and provides cover and increased invertebrate productivity for juvenile salmonids.
- Processes that sustain the long-term productivity of ecosystems have become the centerpiece of new directives in ecosystem management and sustainable forestry. Given the key role of decaying wood in long-term productivity of forest ecosystems in the Pacific Northwest, the topic should remain of keen interest to scientists and managers during the coming decade. Below, we highlight functions of decaying wood directly linked to long-term productivity, including influences on the frequency and severity of disturbances such as fire, disease, and insect outbreaks.
- Nutrient Cycling and Soil Fertility. Decaying wood has been likened to a savings account for nutrients and organic matter, and has also been described as a short-term sink, but a long-term source of nutrients in forest ecosystems.
- Nutrient cycling via foliage and fine litter has been well-described. Substantial amounts of nitrogen are returned to the soil from coarse wood inputs, yet even where annual rates of wood input are high, 4 to 15 times more nitrogen is returned to the forest floor from foliage than from large wood. This is a consequence of the higher nutrient concentrations

and shorter turnover times of leaf litter compared to wood. The relative contribution of large wood to the total nutrient pool in an ecosystem depends to a large extent, on the size of other organic pools in the system.

- The slow rate of nutrient release from decomposing wood may serve to synchronize nutrient release with nutritional demands in forests, and also to minimize nutrient losses via leaching to the ground water. In addition to nitrogen bound chemically within wood, down wood reduces nutrient losses from ecosystems by intercepting nutrients in litterfall and throughfall. Favorable temperature and moisture conditions also makes large decaying wood sites of significant nitrogen inputs via N-fixation.
- Soil is the foundation of the forest ecosystem. Large wood is a major source of humus and soil organic matter that improves soil development.
- Moisture Retention. Water stored in large decomposing wood accelerates microbial decay rates by stabilizing temperature and preventing desiccation during the summer.11, 160, 376 Moist conditions within the wood favor decay by attracting burrowing and tunneling mammals and invertebrates that improve aeration of wood, and by providing colonization substrate and moisture for mycorrhizae and other fungi. Moist .nurse logs. also provide excellent sites for seedling establishment and production of sporocarps. These processes increase retention and cycling of nutrients within ecosystems and contribute to higher biodiversity and biomass production.
- Mycorrhizae. Mycorrhiza, meaning fungus-root, is a symbiotic association of fungi with plant roots. The fungus improves nutrient and water availability to the host in exchange for energy derived from plant sugars. Mycorrhizae are necessary for the survival of numerous tree families, including pine, hemlock, spruce, true fir, Douglas-fir, larch, oak, and alder. Mycorrhizal associations are a source of nutrients to promote wood decay. By the time a log reaches more advanced stages of decomposition (Class 3) fungal colonization leads to the accumulation of nutrients in hyphae, rhizomorphs and sporocarps, especially for ectomycorrhizal fungi, where >90% of the fungal activity is associated with organic material. Ectomycorrhizal fungi decrease the ratio of carbon to nitrogen in decomposing wood, and mediate nutrient availability to plants while improving nutrient retention by forest ecosystems.
- The energy derived from falling or flowing water is the driving force behind erosion processes in Pacific Northwest forests. By covering soil surfaces and dissipating energy in flowing and splashing water, logs and other forms of coarse wood significantly reduce erosion. Large trees lying along contours reduce erosion by forming a barrier to creeping and raveling soils, especially on steep terrain. Material deposited on the upslope side of fallen logs absorbs moisture and creates favorable substrates for plants that stabilize soil and reduce runoff.
- Stand Regeneration and Ecosystem Succession. Decomposing wood serves as a superior seed bed for some plants because of accumulated nutrients and water, accelerated soil development, reduced erosion, and lower competition from mosses and herbs. In the Pacific Northwest, decaying wood influences forest succession by serving as nursery sites for shade-tolerant species such as western hemlock, the climax species in moist Douglas-fir habitat. Wood that covers the forest floor also modifies plant establishment by inhibiting plant growth, and by altering physical, microclimatic, and biological properties of the underlying soil. For example, elevated levels of nitrogen fixation in Ceanothus velutinus and red alder have been reported under old logs.

- Streams and Riparian Forests. Long-term productivity in streams and riparian areas is closely linked to nutrient inputs, to attributes of channel morphology, and to flow dynamics created by decaying wood. Small wood contributes to nutrient dynamics within streams and provides substrates to support biological activity by microorganisms, as well as invertebrates and other aquatic organisms. Much of the organic matter processed by the aquatic community originates in riparian forests and is stored as logs.
- Large wood is the principal factor determining the productivity of aquatic habitats in low- and mid-order forested streams. Large wood stabilizes small streams by dissipating energy, protecting streambanks, regulating the distribution and temporal stability of fast-water erosional areas and slow-water depositional sites, shaping channel morphology by routing sediment and water, and by providing substrate for biological activity. The influence of large wood on energy dissipation in streams influences virtually all aspects of ecological processes in aquatic environments, and is responsible for much of the habitat diversity in stream and riparian ecosystems. The stair-step gradients produced by wood in small stream basins supports higher productivity and greater habitat diversity than that found in even-gradient streams lacking wood structure.
- The input rates and average piece size of dead wood generally increase with stand age, although the amount of decaying wood can follow a U-shaped pattern if young forests inherit large amounts of decaying wood and live trees from preceding stands.346
- Insects and pathogens play a key role in maintaining diverse and productive forests by creating habitat and stimulating nutrient cycling
- Intensive forest management activities that have decreased the density of large snags in early forest successional stages (sapling/pole and small tree stages) may have had adverse impacts on the 61 associated wildlife species (Figure 12). Similarly, the lesser amount of large down wood in early forest successional stages may not provide as well for the 24 associated wildlife species. Such results suggest the continuing need for specific management guidelines to provide large standing and down dead wood in all successional stages.
- These silvicultural practices clearly altered the abundance and recruitment of large down wood and snags in managed forests of the Pacific Northwest, including:
    1. Lower abundance of large diameter snags and down wood legacies in managed forests (and streams); e.g. lack of the U-shaped pattern; higher accumulation of smaller-diameter fuels in eastside forests.
    2. Reduced recruitment and retention of large trees to provide future legacies.
    3. Shorter mean residence time for down wood (i.e. faster decomposition as a function of reduced log diameter).
    4. Altered species composition of forests (westside: more Douglas-fir, less western red cedar; eastside: less pine, more true fir species).
- Several major lessons have been learned in the period 1979-1999 that have tested critical assumptions of these earlier management advisory models:
    - Calculations of numbers of snags required by woodpeckers based on assessing their biological potential. (that is, summing numbers of snags used per pair, accounting for unused snags, and extrapolating snag numbers based on population density) is a flawed technique. Empirical studies are suggesting that snag numbers in areas used and selected by some wildlife species are far higher than those calculated by this technique.

    - Setting a goal of 40% of habitat capability for primary excavators, mainly woodpeckers, is likely to be insufficient for maintaining viable populations.
    - Numbers and sizes (dbh) of snags used and selected by secondary cavity-nesters often exceed those of primary cavity excavators.
    - Clumping of snags and down wood may be a natural pattern, and clumps may be selected by some species, so that providing only even distributions may be insufficient to meet all species needs.
    - Other forms of decaying wood, including hollow trees, natural tree cavities, peeling bark, and dead parts of live trees, as well as fungi and mistletoe associated with wood decay, all provide resources for wildlife, and should be considered along with snags and down wood in management guidelines.
    - The ecological roles played by wildlife associated with decaying wood extend well beyond those structures per se, and can be significant factors influencing community diversity and ecosystem processes.
- Furthermore, although the analysis of inventory data presents data on dead wood abundance, management actions at the local level may best be focused on the ecological processes that lead to development of these forest structures rather than on the abundance of structures themselves. Management decisions also may require information on the spatial distribution (landscape pattern) of dead wood, which cannot be estimated from sample-based inventories.
- If detailed data on the current and historical range of natural conditions is lacking (which is likely), it may be preferable to substitute functional target values for specific wildlife species. For example, to provide maximum habitat elements for specific cavity-nesting species, a designated quantity and distribution of snags
- Effective management of decaying wood must do more than simply provide for inputs of dead trees. Rather, management should strive to provide for diversity of tree species and size classes, in various stages of decay and in different locations and orientations within the stand and landscape.
- Green trees function as a refugium of biodiversity in forests. For example, many species of invertebrate fauna in soil, stem, and canopy habitats of old-growth forests do not disperse well, and thus, do not readily recolonize clear-cut areas. The same concept holds for many mycorrhizae-forming fungal species. Added benefits of green tree retention include moderated microclimates of the cutover area, which may increase seedling survival, reduce additional losses of biodiversity on stressed sites, and facilitate movement of organisms through cutover patches of the landscape.
- In situations where forest management objectives extend beyond wood production to broader biological and human values, intensive forestry practices by themselves may inadequately maintain or restore biodiversity, especially in early and late successional forest development phases. Species, processes, and values associated with older stages of stand development (transition and shifting gap stages) are likely impaired or absent from intensively managed stands. Species and processes associated with the early establishment phase also have shorter duration than may occur naturally. This does not mean that intensive forest management practices are incompatible with multiple forest objectives at a landscape scale, but rather that species and processes associated with early and late stages of forest development should be assessed over large areas such as landscapes, subregions, and regions.

- Management for certain species must consider habitat requirements at different spatial and temporal scales. It may then be possible to modify silvicultural practices at the stand scale to meet multiple objectives at landscape and larger scales. The landscape perspective also is pertinent to managing riparian systems, where the role of wood decay in riparian environments varies according to the type and geography of the associated water body.
- The decline of species associated with late-successional forest structures, as well as the prolonged time needed to produce wood legacies, suggests that it is both ecologically and economically advantageous to retain legacy structures across harvest cycles wherever possible, rather than attempt to restore structures that have been depleted. This is especially obvious for slow-growing tree species and very large wood structures. Retention of old- growth structural legacies has been identified as critical to conservation of biodiversity between large reserves and conservation areas.

Old Growth Analysis Units

The Clearwater Forest Plan includes a "Research Need" to "Develop and validate a methodology for selecting and evaluating old growth habitat." This is properly interpreted as standardizing procedures for conducting field exams for the process of old-growth designation. Also see the Reilly, 2006 memo, committing the FS to performing field exams for old-growth designation during timber sale project analyses such as for Section 16.

The EA presents a few numbers "by Old Growth Unit (OGU)" which is the same as "Old Growth Analysis Units" (OGAUs) specified in the Forest Plan. There are two OGAUs overlapping Section 16, labeled 610 and 616. Yet since the FS has apparently not visited the OGAUs to gather reliable data on existing old-growth conditions, there's no way to see how the proposal would be consistent with the Forest Plan OGAU 5% standard. It seems highly unlikely that the FS used Forest Plan Appendix H procedures and criteria in the process of identifying and designating old growth in the OGAUs.

The Forest Plan also requires the FS to designate "replacement" (ROG) old growth in situations where old growth is below 5% in OGAUs. This means whatever ROG is identified to meet Forest Plan standards must both be clearly designated as "replacement" and logically suggests documentation of its status be maintained in a durable, publicly accessible inventory along with old growth.

The Wildlife Specialists Report says "There would be no harvest in **verified** old growth" and the EA states, "There would be no harvest in … **verified** existing old growth." (Emphases added.) However since the FS is apparently not in the business of verifying old growth during the development of projects, these statements are misleading and not informative as to whether or not old growth would be logged. The FS apparently does not want anyone—itself included—to be aware of the old-growth conditions and status in the project area.

In sum, if there was a genuine field review as part of this project analysis to determine how much old growth or step down/replacement old growth is being targeted for logging, we find no evidence of it.

The Reilly, 2006 memo states:

> I recognize that the Clearwater National Forest has updated its own old growth database which indicates there is 18 percent old growth on the Clearwater – substantially more than the FIA estimate. However, **the accuracy of estimates from this database has not yet been determined**. (Emphasis added.)

We assert that FIA data is not appropriate nor accurate enough to be utilized for inventorying old growth at the OGAU 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 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 roughly 10,000 acre size of Clearwater National Forest OGAUs, and it's easy to understand why any percentages derived from FIA data for OGAUs would be inaccurate and inappropriate for use in demonstrating compliance with the 5% Forest Plan OGAU Standard.

USDA Forest Service (1990) states, "Roads are generally undesirable within an old-growth habitat patch. The road corridor fragments the habitat by creating edge, and access may result in loss of snags to woodcutting."

Attachment A includes documents the NPCNF produced for NEPA analyses of timber sale projects to comply with the Nez Perce Forest Plan. Two pdfs (Old Growth SurveysSelway RD 1,2) document 1992 field surveys for old growth on the Selway Ranger District. The document, entitled "OLD GROWTH SURVEY" shows that the FS created a standard field survey form using Nez Perce Forest Plan Appendix N old-growth criteria as "CRITICAL COMPONENTS" and includes a rating for "LARGE TREE AGE" with a breakpoint being 150 years. Nez Perce Forest Plan Appendix N old-growth criteria are similar to those found in Clearwater Forest Plan Appendix H.

The FS must map the old growth designations in OGAUs, providing identifying labels on old growth polygons with which one may use to cross-reference to documents 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. The public must be able to tell why any given stand or contiguous group of stands, represented by mapped polygons, were designated to meet Forest Plan standards.

A document "Campbell OG analysis note.pdf" in Attachment A explains how the NPCNF 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.) This is also exemplified by the document, "Fish Bate Old Growth.pdf".

We offer examples of how proper old-growth surveys have been conducted. Attachment A includes documents the NPCNF produced for NEPA analyses of timber sale projects, to comply with the Nez Perce Forest Plan. One document (Old Growth SurveysSalmon 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 Nez Perce Forest Plan Appendix N old-growth criteria[6] for "West-side Mixed Conifer" and "West-side Ponderosa Pine", which is apparently an early example of the FS integrating the Green et al. (1992) 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.

Below is the "Snag Habitat Definition" as appears in Forest Plan Appendix H:

SNAG HABITAT DEFINITION *

1. Broken top.
2. 25" (+) dbh x for nest trees.
3. 18" (+) dbh x for food trees.
4. 70 percent bark cover especially on soft snags.
5. Preference for soft snags (grand fir).
6. Tree greater than 50 feet tall.
7. Feed trees are most often broken topped trees.
8. Live trees with broken tops/dead tops = 1 hard snag.

The above definition simply cannot be applied except in the context of undertaking field surveys.

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

---

[6] Nez Perce Forest Plan Appendix N old-growth criteria are similar to that for Clearwater Forest Plan Appendix H old-growth criteria.

> 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 conducted proper old-growth field surveys in the past. But the EA and specialist documents reveal nothing to lend credibility to the old-growth designation process used for Section 16.

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

Consistency with Clearwater National Forest forestwide old growth 10% Standard

The most recent Forest Plan Monitoring and Evaluation Report (Fiscal Year 2009) includes:

Table 57: Clearwater National Forest Estimates Of Percent Of Old Growth, Standard Error, And 90 Percent Confidence Intervals

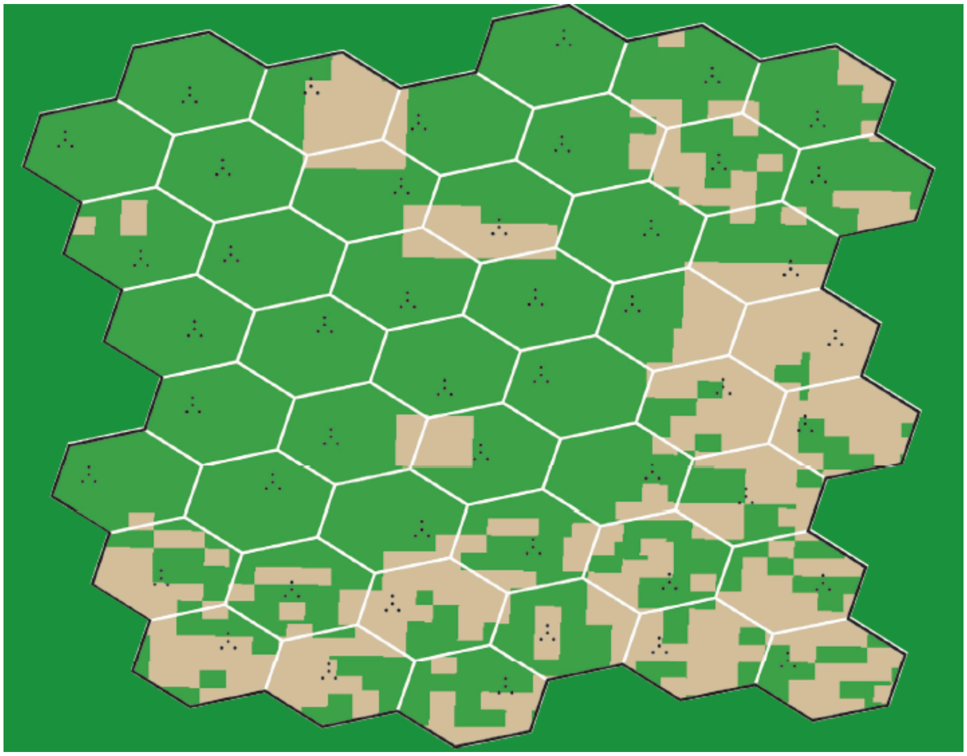
Forest	Estimated Percent Old Growth	90% Confidence Interval - Lower Bound	90% Confidence Interval - Upper Bound	Total Number PSUs	Number Forested PSUs
Clearwater	9.4%	7.3%	11.8%	305	300

So using FIA data, the FS cannot demonstrate the Clearwater NF is being managed consistent with Forest Plan Wildlife and Fish Standard 5.d.(1), which requires the agency maintain at a minimum 10% old growth forestwide.

On the next 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 the aspect that is kept confidential. That same plot is periodically resampled, typically once every ten years. (Id.)

So FIA methodology cannot specify the location and extent of old-growth stands within a national forest. In discussing such methodology, a Northern Region report (Bollenbacher, et al., 2009) states, "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." And, the Forest Service's 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."



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 could 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 old-growth stands.

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 the article "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.)

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 response to comment and objections in numerous contexts they haven't done so.

Aside from any recent directive, it is reasonable to expect the FS should have already created fairly complete forest-wide inventory of old growth simply because nearly every Clearwater NF watershed outside Wilderness has been logged over the life of the 1987 Forest Plan, and an old-growth inventory is required of project analyses to comply with Appendix H/standards. This assumption is reasonable because compliance with the Forest Plan involves verifying the old growth within each of the project boundaries. So the FS should be able to produce a forest-wide inventory from previously generated project area inventories, and shouldn't need estimates based on FIA data. But the FS discloses no such inventory. The FS lacks a publicly accessible inventory and mapping of old growth and replacement/step down old growth.

In 2020 FOC attempted to meet with the Forest Supervisor and the FS's qualified experts regarding its opaque old-growth inventory, but ultimately the Supervisor refused to cooperate. This is documented in a FOIA "OG FOIA 2020-03332 Final Response", a letter "OG Meeting Request", our notes "OG Meeting notes6-11-20" and email strings "Re Meeting Requestemail 6-15-20.pdf" and "RE Meeting Request".

Furthermore, following 35 years of Forest Plan implementation we're aware of no documentation of the FS ever designating "replacement old growth" (ROG) which has eventually/later fully met old-growth criteria. Without maintaining a transparent, accessible inventory the replacement old growth concept makes an empty promise to the public, to associated wildlife, and other old-growth values.

Forest Plan old growth direction is not based on best available science

Our comments on the NPCNF's Hungry Ridge Draft EIS 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."

We observe that the FS has no qualms about speculating on the amounts of various other categories of forest in project areas, and basing project objectives on such speculation. The FS may be reluctant to discuss the issue because the amount of old growth on the NPCNF is well below the historic range. That fact alone shows how the FS is managing inconsistent with best available science in being reckless with old growth.

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

One might assume Forest Plan quantitative old-growth standards are based upon historic amounts prior to EuroAmerican exploitation, so that maintaining such minimum would safeguard wildlife populations so they wouldn't vanish from any national forest or need listing under the Endangered Species Act. But estimates of the amount of old growth on the Clearwater NF prior to EuroAmerican management are not available nor reliable, because so much forest had been logged long before adoption of old-growth definitions. This is explained in, for example, USDA Forest Service, 2019c:

> Regarding the historic range of variability of old growth in the analysis area, **there is no way to accurately determine how much of the Forest may have met the Green definitions of old growth (Green et al., 1992**). To determine whether a forest stand meets those definitions, it requires detailed information on how many trees per acre exist in the stand over a certain diameter and age, the total stand density, the forest type and lastly, the habitat type group that the stand occupies. **No historical information exists that can provide that level of detail.** Therefore, a numeric desired condition or an HRV estimate for old growth is not included in this analysis. (Emphases added.)

Similarly, the Northern Region's Bollenbacher and Hahn, 2008g state, "actual estimates for the amount of OG are constrained by the limited field inventory data collected before the 1930s, and inconsistent—or absent—OG definitions."

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, its forest plan revision process would have increased the current Forest Plan "minimum[7]" 10% standard (and the 5% distribution standard) up to a level resembling reference conditions based on best available science, erring on the high side because wildlife viability and diversity is a mandate.

We next refer to the NPCNF's Clear Creek project file documents. One (111125VRUageclass.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:

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

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 bears some resemblance to 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 used by Green et al. The other document (111125VRUdfcmatt.pdf) includes narratives with the numbers (called "Typical stand age class distribution").

This is another topic concerning old growth about which the FS refuses to engage in dialogue. Since the native wildlife evolved prior to the era of 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 merely meeting its 1987 Forest Plan old growth percentage standards will maintain viable populations as the Forest Plan requires. The FS's reckless approach to old growth is arbitrary and capricious.

The most recent Forest Plan Monitoring and Evaluation Report (Fiscal Year 2009) claims, "During project analysis individual stands within the project area are field checked and evaluated as to whether or not they meet the criteria from Appendix H of the Forest Plan and the Old Growth Forest Types for the Northern Region by Green et al." Green et al. include age criteria for old growth designation.

A June, 2014 document ("1.0 Terrestrial & Aquatic Ecosystems and Watersheds") was written as part of the NPCNF's Assessment (a component of the forest plan revision process). 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 LMP includes Glossary definitions:

> Old Growth Forests: Are ecosystems distinguished by **old trees and related structural attributes**. Old growth encompasses the **<u>later stages</u> 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.

See Juel (2021), which cites many scientific references and FS documents, presenting a science- and experiential-based discussion of old growth relevant to the Section 16 EA's inadequate discussion of the topic.

Thomas et al., 1988 emphasized values pertaining to wildlife and diversity in the context of laws and regulations. From a perspective recognizing that meaningful implementation of regulatory requirements must include a concomitant awareness of the limits of scientific knowledge, they advocate **for preserving all that remains**:

> The lack of quantitative information about functional attributes of old growth and habitat associations of potentially dependent plants and animals and the rapidly declining old-growth resource indicates that purposely conservative management plans should be developed and adopted. Our knowledge and understanding of old-growth communities is not adequate to support management of remaining old growth on criteria that provide *minimum* habitat areas to sustain *minimum* viable populations of one or several species. The potential consequences and the distinct probability of being wrong are too great to make such strategies defensible in the ecological sense.
>
> …The answer to— "How much?"—must be predicated on the relatively small amount of unevenly distributed remaining old growth and the current, inconclusive scientific knowledge of old-growth ecosystems. Therefore, the best probability of success is to preserve all remaining old growth and, if possible, produce more.

<u>Old Growth Enhancement</u>

The FS notoriously proposed to conduct "old growth enhancement" with its Dead Laundry timber sale project, on the adjacent North Fork Ranger District. The Dead Laundry Vegetation Resource Report states:

> …areas that could benefit from treatment, for example stands getting filled in with smaller diameter shade intolerant species, would be thinned to promote desirable species and large diameter trees. …The treatments will be designed to retain enough overstory to maintain stand densities between the onset of crown closure and the lower limit of full site occupancy (as presented in Table 3 by Powell 1999, among others) while creating understory light conditions that allow for the establishment, and competitive advantage, of western redcedar in the understory and mid-story.

So on one hand the FS would conduct commercial logging in old growth to tweak it in favor seral western larch, western white pine and ponderosa pine by retaining mainly those species and opening up the forest canopy intending to enhance growth of those tree species. Yet this would also help to establish shade tolerant western redcedar. The FS did not reconcile these conflicting goals. Part of the problem is the application of novel "desired conditions" which conflict with best available science. Even the descriptions of the normal range of conditions of the various forest types in Green et al., 1992 do not include what the FS is intending with its "enhancement."

"Old growth enhancement" is a scam—a weak justification for logging large trees from old growth. The FS cites no evidence that is has successfully "enhanced" old growth consistent with any non-consumptive **old-growth values**. The FS doesn't even propose anything in the way of monitoring to verify its admittedly experimental "enhancement" theory. The same goes for the other "treatments" proposed for old growth, step down old growth or recruitment old growth (*see* Dead Laundry Vegetation Resource Report Table 15).

With the large, landscape-level project Middle-Black in the early 2000s on the North Fork District (project area partially overlaps with Dead Laundry), 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.)

The management paradigm upon which the current, Clearwater NF 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 OGAUs and forestwide to meet the other Forest Plan direction. 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 a section entitled "Protecting Old Growth Habitat In Excess of Minimums Prescribed In the NPNF Plan." And 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 paragraphs, 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 into these comments FOC's various comments on the forest plan revision process, one of which includes scientific criticism the old growth active management paradigm (e.g., 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 play God in old growth and outperform the natural processes which are the only known way old growth has ever come to existence in these forest ecosystems. Such hubris is a bull in the china shop, and has no place in the context of managing national forests.

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" 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 caused by "enhancement." These metrics could include associated old-growth characteristics or even occupancy by Forest Plan Management Indicator Species or other indicators of old growth.

The Forest Plan FEIS states Selected Alternative K: "…ranks last in the amount of suitable land in old growth." The FEIS thus attempts to minimize conflict between the needs of old-growth associated wildlife (leaving old growth unmanaged) and timber production goals.

<u>Old-growth criteria and failure to apply best available science</u>

In its Hungry Ridge project Updated Old Growth Analysis (UOGA) released in 2023 the NPCNF states: "North Idaho old growth (NIOG) definition (Green et al. 1992) was not considered when assessing old growth." In the Hungry Ridge FEIS section replaced by the 2023 Draft Supplemental EIS it 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.) The 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, this does not say that Hungry Ridge Draft Supplemental EIS is applying best available science in regards to old growth.

Moreover, the NPCNF 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.

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.
>
> 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.

(Emphases added.) The rationale the FS uses for amending the Forest Plan to adopt Green et al old-growth criteria for Clear Creek logically apply across the NPCNF. There's nothing special about the Clear Creek project area nor its old growth that justify amending a forest plan in that instance alone.

The Clearwater NF Forest Plan FEIS does recognize the importance of old trees in providing old-growth habitat: "Old growth is defined as a stand of trees **160 years or older** and 25 acres or larger in size. Certain timber types might provide old-growth of 100 years of age." (Emphasis added.) Omitting age criteria can result in an overestimate of the amount of habitat available forestwide for old-growth associated wildlife. This is contrary to best available science.

Green et al uses age of large trees as one of its minimum, nondiscretionary minimum criteria. Jahn (2012), the document commissioned by the FS to interpret Nez Perce Forest Plan direction, is also clear on this point.

Until stands of forest trees approach the 160-year breakpoint the Clearwater 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 why those criteria are used in Forest Plan Appendix H. And those are the aspects of forest stands that would be reduced by the Section 16 Project logging.

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.

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

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 Clearwater NF which might not as easily be recognized by the Forest Plan Appendix H criteria, and 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 discussed in the Forest Plan FEIS but not clearly emphasized in Forest Plan Appendix H. We invite a discussion about how Green et al might be applied as best available science concerning old growth.

But to date the FS has chosen to be nonresponsive and arbitrary in its actions rather than collaborate to find what consensus may be reached between its experts, independent scientists, and conservation interests. 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 next section of our comments discuss. Furthermore, the solution is not to throw out the baby with the bathwater as the NPCNF Is proposing to do with Hungry Ridge, both by turning its back on the diversity of habitat types featured in Green et al., and by ignoring age criteria both Green et al and the Forest Plan EIS recognize.

<u>Abusing Green et al. by conflating its old-growth screening criteria with a minimum requirement for old-growth.</u>

This is the controversy the previous section alludes to. And this was the topic of a public comment on the Clear Creek project (Clear Creek Final Supplemental Impact Statement 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 avoided addressing criticism of its application of 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 FS rational abusing of the Green et al., 1992 minimum large tree screening criteria leads to 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.[8] 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.

So this leads to the situation where the FS is justifying significant logging disturbance within old-growth stands, making nonsense statements that the logged old growth is still old growth: "…**shelterwood harvest, which can still meet old growth definitions**." (Hungry Ridge FEIS, emphasis added.) And, "**Intermediate harvest** would be conducted in a way to **preserve old growth stand characteristics** where the two overlap." (Hungry Ridge DSEIS, emphases added.)

And now with Section 16, "Intermediate harvest would impact approximately 63 acres of nesting habitat and 325 acres of foraging habitat. Intermediate harvest results in a stand which is fully stocked (i.e., completely occupies that site with the optimal number of stems per acre) and which retains approximately 60-70% canopy cover and would remain as suitable foraging and nesting habitat." (Terrestrial Wildlife Resources Report.) Also the EA states, "It does propose some intermediate treatment inside of step-down old growth (stands that are managed for future old growth) providing that the treatment would benefit the stand and increase the average stand diameter." In other words, logging in what is intended to achieve old-growth status under the Forest Plan is now FS policy.

This is also a topic of Kootenai National Forest (2004), which we incorporate into this Objection. 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

[8] 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."

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 by the FS.

GRIZZLY BEAR

See our incorporated LMP Objection, which elaborates upon what we state below.

Section 16 timber sale activities would further reduce grizzly bear connectivity and hinder population recovery in the grizzly bear recovery zone known as the Bitterroot Ecosystem (or "BE").

The USFWS's 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.

The proposed road construction and reconstruction would significantly impact grizzly bear habitat security and connectivity. Furthermore, since the EA fails to disclose the current level or degree of accessibility on all the routes for which it proposes "maintenance" and since the overall project area road inventory is tentative at best, it fails to portray an accurate estimation of the adverse impacts of the project on grizzly bears, other species of conservation concern affected by roads, and indeed many indicators of ecological integrity. What the EA calls "road maintenance" includes actions it also terms "road reconstruction" in other places. This "maintenance" involves "roadside brushing, blading, ditch cleaning, removal of small cutslope failures, removal of obstructions such as rocks and trees, spot placement of aggregate where needed to provide for safe passage of vehicles and road surface erosion control …maintenance of existing culverts, the addition of cross drain structures near stream crossings, road realignment or reshaping, and placement of roadway fill and installation of new signs or gates, installation of drainage dips, road blading, and removal of obstructions." This reconstruction of impassible roads reintroduces motor vehicle traffic to locations where it had subsided or diminished. Reconstruction of passible roads also tends to increase traffic volumes on roads already seeing some level of motor vehicle use because reconstruction inevitably improves the surface of the road, facilitating easier public access.

The Transportation Report discloses the extreme road density of the project area: "The road density for the Section 16 area during and after implementation will be 6.3 mi/mi^2."

Although "temporary" roads are intended to be decommissioned after completion of logging operations, this would take over ten years from the beginning of project activities: "…reestablishing vegetative cover on the roadway and areas where the vegetative cover has been disturbed by the construction of the road, within ten years after the termination of the contract, permit, or lease either through artificial or natural means." (DN.) Grizzly bear habitat security and connectivity are decreased over that duration. Habitat security and connectivity is not restored until temporary roads are fully and successfully decommissioned. And longstanding scientific research shows that resident grizzly bears will avoid areas of old road templates even with effectively barriers for many years. In other recovery areas and connectivity areas where there are limitations on motorized access to promote grizzly bear recovery, the amount of temporary roads that the FS can construct and use at any given time must be within stated limits on motorized access. The Clearwater Forest Plan has no such restrictions specifically favoring grizzly bear habitat security. Furthermore, the EA fails to disclose that elk habitat protections under the Forest Plan that included road density limits in some areas have been permanently removed.

The Wildlife Report recognizes Forest Plan direction relating specifically to the proposed project includes: “Provide for viable populations of all indigenous wildlife species, maintain and improve winter and summer habitat for big-game, limit motorized use on selected big-game range, and manage habitat to contribute to the recovery of threatened and endangered species on the Forest.” Yet the EA essentially ignores the grizzly bear, fails to take a hard look at management impacts on the grizzly, fails to disclose and consider all potential grizzly sightings and scientific information discussed above, and fails to consider and impose any measures facilitating better connectivity for migration—from reducing road construction and logging, to requiring personnel to take bear country training and carrying bear spray, to monitoring and reporting bear sightings.

WOLVERINE

See our LMP Objection, which further expresses our concerns in a Wolverine section. The impacts on habitat represented by the Section 16 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.

Wolverines use habitat ranging from Douglas-fir and lodgepole pine forest to subalpine whitebark pine forest (Copeland et al., 2007). Lofroth (1997), in a study in British Columbia, found that wolverines use habitats as diverse as tundra and old-growth forest. Wolverines are also known to use mid- to low-elevation Douglas-fir forests in the winter (USDA Forest Service, 1993).

Aubry, et al. 2007 note that wolverine range in the U.S. had contracted substantially by the mid-1900s and that extirpations are likely due to human-caused mortality and low to nonexistent immigration rates.

May et al. (2006) cite: “Increased human development (e.g. houses, cabins, settlements and roads) and activity (e.g. recreation and husbandry) in once remote areas may thus cause reduced ability of wolverines to perform their daily activities unimpeded, making the habitat less optimal or causing wolverines to avoid the disturbed area (Landa & Skogland 1995, Landa et al. 2000a).”

Ruggiero, et al. (2007) state: “Many wolverine populations appear to be relatively small and isolated. Accordingly, empirical information on the landscape features that facilitate or impede immigration and emigration is critical for the conservation of this species.”

Roads result in direct mortality to wolverines by providing access for trappers (Krebs et al., 2007). Trapping was identified as the dominant factor affecting wolverine survival in a Montana study (Squires et al. 2007). Female wolverines avoid roads and recently logged areas, and respond negatively to human activities (Krebs et al., 2007)

Ruggiero et al. (1994b) recognized that "Over most of its distribution, the primary mortality factor for the wolverines is trapping." Those authors also state, "Transient wolverines likely play a key role in the maintenance of spatial organization and the colonization of vacant habitat. Factors that affect movements by transients may be important to population and distributional dynamics."

Roads and human density are important factors influencing current wolverine distribution (Carroll et al. 2001b); and wolverine habitat selection is negatively correlated with human activity – including roads (Krebs et al. 2007). Wolverine occurrence has shown a negative relationship with road densities greater than 2.8 mi/mi^2 (1.7 km/km^2) (Carroll et al. 2001b).

(T)he presence of roads can be directly implicated in human-caused mortality (trapping) of this species. Trapping was identified as the dominant factor affecting wolverine survival in a Montana study (Squires et al. 2007).

Krebs et al. (2007) state, "Human use, including winter recreation and the presence of roads, reduced habitat value for wolverines in our studies."

Wisdom et al. (2000) state:

> Carnivorous mammals such as marten, fisher, lynx, and wolverine are vulnerable to over-trapping (Bailey and others 1986, Banci 1994, Coulter 1966, Fortin and Cantin 1994, Hodgman and others 1994, Hornocker and Hash 1981, Jones 1991, Parker and others 1983, Thompson 1994, Witmer and others 1998), and over-trapping can be facilitated by road access (Bailey and others 1986, Hodgman and others 1994, Terra-Berns and others 1997, Witmer and others 1998).
>
> …Snow-tracking and radio telemetry in Montana indicated that wolverines avoided recent clearcuts and burns (Hornocker and Hash 1981).
>
> Copeland (1996) found that human disturbance near natal denning habitat resulted in immediate den abandonment but not kit abandonment. Disturbances that could affect wolverine are heli-skiing, snowmobiles, backcountry skiing, logging, hunting, and summer recreation (Copeland 1996, Hornocker and Hash 1981, ICBEMP1996f).

Carroll et al. (2001b) state:

> The combination of large area requirements and low reproductive rate make the wolverine vulnerable to human-induced mortality and habitat alteration. Populations probably cannot sustain rates of human-induced mortality greater than 7–8%, lower than that documented in most studies of trapping mortality (Banci 1994, Weaver et al. 1996).

> … (T)he present distribution of the wolverine, like that of the grizzly bear, may be more related to regions that escaped human settlement than to vegetation structure.

Wisdom et al. (2000) offered the following strategies:

- Provide large areas with low road density and minimal human disturbance for wolverine and lynx, especially where populations are known to occur. Manage human activities and road access to minimize human disturbance in areas of known populations.
- Manage wolverine and lynx in a metapopulation context, and provide adequate links among existing populations.
- Reduce human disturbances, particularly in areas with known or high potential for wolverine natal den sites (subalpine talus cirques).

The EA also fails to analyze and disclose cumulative impacts of recreational activities on wolverine.

The Analysis of the Management Situation Technical Report for Revision of the Kootenai and Idaho Panhandle Forest Plans states:

> Direct mortality (related to access) from trapping, legal hunting, and illegal shooting has impacted all wide-ranging carnivores (e.g. lynx, wolverine, grizzly and black bears, wolves)…
>
> …Wolverine populations may have declined from historic levels, as a result of over-trapping, hunting, habitat changes, and intolerance to human developments. As the amount of winter backcountry recreation increases, wolverine den sites may become more susceptible to human disturbance.

FISHER

See our LMP Objection, which further expresses our position on FS habitat management in the Fisher section.

The EA discloses that heavy timber management in analysis area subwatersheds has severely reduced habitat quality for the Sensitive species fisher: "(T)he most current science for recommends landscapes that have greater than 50% mature forest arranged in contiguous, complex shapes with few isolated patches, and open areas comprising less than 5% of the area appear to constitute a forest pattern occupied by fishers (Sauder 2014, Sauder and Rachlow 2014). Current conditions do not represent habitat with a high potential for occupancy based on Sauder and Rachlow (2015). …(There is) a relatively low level of potential occupancy based on habitat criteria…"

Yet there is still apparently some fisher habitat value in the vicinity: "Surveys (snow track) have verified tracks within the project area. Several other observations within a mile or two of the project area have been verified through targeted surveys."

But following the Section 16 timber sale, "Proposed activities would impact approximately 335 acres of potential fisher habitat. …(T)he understory would become "simplified" (i.e., reductions in ground cover and coarse woody debris) in the short-term… The potential for recruitment of down woody debris within the project area would be reduced in both the short-term (snags removed as part of harvest) and in the longer-term (reduced potential for root rot to generate more snags)."

The EA's "Cumulative Effects" discussion for fisher only deals with activities on national forest lands: "Parachute Fuels, Powell Divide, and North Side Powell are all projects which fall within the analysis area for fisher. Parachute fuels includes harvest of 84 acres of fisher habitat, Norh Side Powell 376 acres, and Powell Divide 10 acres." However it avoids considering a quite logical outcome for the industrial timberlands that surround Section 16 on all four sides—heavy logging[9].

And we have the EA taking the position that the negative habitat impacts of the Section 16 timber sale would somehow be zero, likely to avoid performing any genuine cumulative effects analysis that would include surrounding private lands and the other three national forest projects:

> Because the Section 16 project retains suitable tree species, sizes, and canopy representative of potential fisher habitat this project, in combination with ongoing and reasonably foreseeable projects, is not expected to have cumulative impacts that measurably affect the trends of fisher populations at the local ad Forest scale.

This violates NEPA.

It so happens heavy logging has occurred for decades across much of the Clearwater NF, yet the EA provides no scientifically based cumulative effects analysis supporting the FS's conclusion that there is a viable fisher population on the Forest. The EA fails to include a genuine cumulative effects analysis properly considering past management activities.

Krohner (2020) highlights the critical importance of the NPCNF for 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)

[9] Elsewhere the EA mentions "Given the likely changes in land use in coming decades on adjacent land ownerships…" Also, "These sub-watersheds include an area of the Forest called "The Checkerboard", a mix of ownerships, 65% Forest Service and 35% private (mainly corporate timber lands)." And finally, "Areas surrounding the project are privately owned and managed for timber production and can be reasonably assumed to be in various stages of early succession."

> 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.

Starting with the relatively low numbers that the Nez Perce 2002 Forest Plan Monitoring and Evaluation report recognizes, impacts from trapping have been accumulating. Trapping is allowed on the NPCNF. 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. In the 2013-2014 season, IDFG reported that 22 fisher were trapped, ten of which died in traps. While the trappers reporting these numbers indicated the balance were released, the level of subsequent injured fisher mortality is unknown. Also, those are just the numbers reported, so it's unknown if there were more unreported, either because trappers chose not to or did not check their traps. While it's unknown where all 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 the NPCNF. *See* Idaho Fish and Game Commission (2020), compare with IDFG hunting units map (2020). 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 FS will build roads, both temporary and permanent.

Habitat loss has cumulatively impacted fisher. The FS has increased logging on this NPCNF, 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 analysis claiming that it might impact fisher, but would not impact the species as a whole. Those projects have added up forestwide, yet the FS has never properly accounted for them. The FS apparently has no idea how much fisher habitat has been eliminated with logging projects over the last few decades.

The EA also fails to adequately analyze the cumulative effects on fisher due to trapping and/or from use of the road and trail networks. Heinemeyer and Jones, 1994 state:

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

Also Jones, (undated) recognizes:

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

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

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.

Hayes and Lewis, 2006 state, "The two most significant causes of the fisher's decline were over-trapping by commercial trappers and loss and fragmentation of low to mid-elevation late-successional forests." Hayes and Lewis, 2006 also present a science synthesis in the context of a recovery plan for fisher in the state of Washington. They also state:

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

The analysis for the fisher, as for most wildlife, doesn't disclose the direct, indirect or cumulative impacts on important habitat components, such as snags, logs, foraging habitat configuration, connectivity, cover, prey species impacts, etc.

Research suggests that fishers are heavily associated with older forests throughout the year. (Aubry et al. 2013, Olsen et al. 2014, Raley et al. 2012, Sauder 2014, Sauder and Rachlow 2014, Schwartz et al. 2013, Weir and Corbould 2010.)

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

Most studies have found that fishers are reluctant to stray from forest cover and that they prefer more mesic forests (Buskirk and Powell 1994, Olson et al. 2014, Schwartz et al. 2013, Sauder 2014, Sauder and Rachlow 2014, Weir and Corbould 2010). Both Sauder and Rachlow (2014) and Weir and Corbould (2010) predicted the influence of openings on fisher habitat occupancy based on their data. For example, Weir and Corbould predicted that a 5% increase in forest openings would decrease the likelihood of fisher occupancy by 50%. Sauder and Rachlow (2014) suggested that an “increase of open area from 5% to 10% reduces the probability of occupation by fishers by 39%. Sauder and Rachlow (2014) reported that the median amount of open area within fisher home ranges was 5.4%. This was consistent with “results from California where fisher home ranges, on average, contained <5.0% open areas” (Raley et al. 2012).

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

From Ruggiero et al. 1994b:

> (T)he fisher is unique to North America and is valued by native and nonnative people as an important member of the complex natural communities that comprise the continent's northern forests. Fishers are an important component of the diversity of organisms found in North America, and the mere knowledge of the fisher's existence in natural forest communities is valued by many Americans.

Ruggiero et al. 1994b discuss habitat disruption by human presence:

> …The fisher's reaction to humans in all of these interactions is usually one of avoidance. Even though mustelids appear to be curious by nature and in some instances fishers may associate with humans (W. Zielinski, pers. obs.), they seldom linger when they become aware of the immediate presence of a human. In this regard, fishers generally are more common where the density of humans is low and human disturbance is reduced. Although perhaps not as associated with "wilderness" as the wolverine (V. Banci, Chapter 5), the fisher is usually characterized as a species that avoids humans (Douglas and Strickland 1987; Powell 1993).

Fragmentation of habitat negatively impacts species. *See* Laurance 2008. Pulsford et al. 2015 describes the importance of habitat connectivity.

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

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

The EA'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 this objection.

The Section 16 project would result in unauthorized **take** as defined by Section 9 of the ESA, in violation of the Endangered Species Act (ESA).

The EA 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 LMP 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 EA 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.

NORTHERN GOSHAWK

Our LMP Objection further 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 Section 16 EA doesn't properly apply best available science for insuring viable populations of the northern goshawk, a species whose habitat is adversely affected by logging and other forest management.

There is no indication the FS has systematically searched for goshawk nest stands in the project area. The comprehensive protocol, "Northern Goshawk Inventory and Monitoring Technical Guide" by Woodbridge and Hargis 2006 is consistent with the best available science. Also, USDA Forest Service 2000b state:

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

Scientific information indicates analysis must be conducted for adverse impacts in a roughly 6,000-acre northern goshawk home range or the post-fledging area (PFA). Reynolds et al. 1992 goshawk guidelines recommend ratios of (20%/20%/20%) each in the mid-aged forest, mature forest, and old forest Vegetative Structural Stage (VSS) classes for PFAs and foraging areas. Reynolds et al. 1992 calls for 100% in VSS classes 5 & 6 and 0% in VSS classes 1-4 in nest areas.

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

Crocker-Bedford (1990) noted: "After partial harvesting over extensive locales around nest buffers, reoccupancy decreased by an estimated 90% and nestling production decreased by an estimated 97%. Decreases were probably due to increased competition from open-forest raptors, as well as changes in hunting habitat and prey abundance."

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

PINE MARTEN

Our LMP Objection further expresses our concerns in a section on Old Growth and Old-Growth Ecosystems, plus FOC et al comments on the draft LMP/draft EIS includes a section entitled "Pine Marten."

The EA fails to consider best available science for insuring viable populations of the pine marten, a species whose habitat is significantly altered by thinning and other active forest management. (See Moriarty et al., 2016; Bull and Blumton, 1999; Hargis et al., 1999 and Wasserman et al., 2012).

The EA fails to conduct an analysis of the historic range of marten habitat on the Forest, thus it also fails to conduct the proper cumulative effects analysis.

Moriarty et al., 2016 found that the odds of detecting a marten was 1,200 times less likely in openings and almost 100 times less likely in areas thinned to reduce fuels, compared to structurally-complex forest stands.

Old growth allows martens to avoid predators, provides resting and denning places in coarse woody debris and large diameter trees, and allows for access under the snow surface. USDA Forest Service, 1990 reviewed research suggesting that martens prefer forest stands with greater than 40% tree canopy closure and rarely venture more than 150 feet from forest cover, particularly in winter. USDA Forest Service, 1990 also cites research suggesting that at least 50% of female marten home range should be maintained in mature or old growth forest. Also, consideration of habitat connectivity is essential to ensuring marten viability: "To ensure that a viable population of marten is maintained across its range, suitable habitat for individual martens should be distributed geographically in a manner that allows interchange of individuals between habitat patches (Id.).

Ruggiero et al. 1994b recognize that for martens, "trapper access is decreased, and de facto partial protection provided, by prohibitions of motorized travel."

The EA does not disclose the quantity and quality of habitat necessary to sustain the viability of the marten.

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."

The EA presents a generic, out-of-date and overall scientifically inadequate analysis for the Management Indicator Species pileated woodpecker, even though the proposed logging would degrade habitat for species needing the kind of habitat features found in mature and old-growth forests, such as the pileated woodpecker.

Bull et al. 2007 represents over 30 years of investigation into the effects of logging on the pileated woodpecker and is recent research information on such effects, and contrast the effects of natural disturbance with large-scale logging on pileated woodpeckers. Also see Bull et al., 1992, Bull and Holthausen, 1993, and Bull et al., 1997 for biology of pileated woodpeckers and the habitats they share with cavity nesting wildlife.

The Idaho Panhandle NF's original Forest Plan old-growth standards (USDA Forest Service, 1987c) were largely built around the habitat needs of one of the management indicator species, the pileated woodpecker. Bull and Holthausen 1993, recommend that approximately 25% of the home range be old growth and 50% be mature forest.

USDA Forest Service, 1990 indicates measurements of the following variables are necessary to determine quality and suitability of pileated woodpecker habitat:

- Canopy cover in nesting stands
- Canopy cover in feeding stands
- Number of potential nesting trees >20" dbh per acre
- Number of potential nesting trees >30" dbh per acre
- Average DBH of potential nest trees larger than 20" dbh
- Number of potential feeding sites per acre
- Average diameter of potential feeding sites

USDA Forest Service, 1990 states, "To provide suitable pileated woodpecker habitat, strips should be at least 300 feet in width…"

This preferred diameter of nesting trees for the pileated woodpecker is notable. McClelland and McClelland (1999) found similar results in their study in northwest Montana, with the average nest tree being 73 cm. (almost 29") dbh. The pileated woodpecker's strong preference for trees of rather large diameter is not adequately considered in the Forest Plan. The FS provides absolutely no commitments for leaving specific numbers and sizes of largest trees favored by so many wildlife species.

B.R. McClelland extensively studied pileated woodpecker habitat needs. McClelland, 1985 states:

> Co-workers and I now have a record of more than 90 active pileated woodpecker nests and roosts, …the mean dbh of these trees is 30 inches… A few nests are in trees 20 inches or even smaller, but the minimum cannot be considered suitable in the long-term. Our only 2 samples of pileateds nesting in trees <20 inches dbh ended in nest failure… At the current time there are many 20 inch or smaller larch, yet few pileateds selected them. Pileateds select old/old growth because old/old growth provides habitat with a higher probability of successful nesting and long term survival. They are "programmed" to make that choice after centuries of evolving with old growth.

McClelland (1977), states:

> (The Pileated Woodpecker) is the most sensitive hole nester since it requires old growth larch, ponderosa pine, or black cottonwood for successful nesting. The Pileated can be considered as key to the welfare of most hole-nesting species. If suitable habitat for its perpetuation is provided, most other hole-nesting species will be accommodated.
>
> Pileated Woodpeckers use nest trees with the largest dbh: mean 32.5 inches;
>
> Pileated Woodpeckers use the tallest nest trees: mean 94.6 feet;
>
> The nest tree search image of the Pileated Woodpecker is a western larch, ponderosa pine, or black cottonwood snag with a broken top (status 2), greater than 24 inches dbh, taller than 60 feet (usually much taller), with bark missing on at least the upper half of the snag, heartwood substantially affected by Fomes laracis or Fomes pini decay, and within an old-growth stand with a basal area of at least 100 sq feet/acre, composed of large dbh classes.
>
> A cluster analysis based on a nine-dimensional ordination of nest tree traits and habitat traits revealed close association between Yellow-bellied Sapsuckers, Mountain Chickadees, and Red-breasted Nuthatches. These three species plus the Pileated Woodpecker and Hairy Woodpecker are relatively grouped by coincident occurrence in old growth. Tree Swallows, Black-capped Chickadees, and Common Flickers are separated from the above five species by their preference for more open areas and their frequent use of small dbh nest trees.
>
> (Most) species found optimum nesting habitat in stands with a major component of old growth, particularly larch. Mean basal area for pileated woodpecker nest sites was 150 square feet per acre. (McClelland. B.R. and others, 1979)
>
> Many large snags are being cut for firewood. Forest managers should limit firewood cutting to snags less than 15 inches in d.b.h. and discourage use of larch, ponderosa pine, and black cottonwood. Closure of logging roads may be necessary to save high-value snags. Logging slash can be made available for wood gatherers.

The Forest Plan snag standards were not based the range of historical conditions for snags on the Clearwater NF. The FS must compensate for such shortcomings in project analyses. Recent scientific research reveals the inadequacy of the snag standards. For one example, Lorenz et al., 2015 state:

> Our findings suggest that higher densities of snags and other nest substrates should be provided for PCEs (primary cavity excavators) than generally recommended, because past research studies likely overestimated the abundance of suitable nest sites and underestimated the number of snags required to sustain PCE populations. Accordingly, the felling or removal of snags for any purpose, including commercial salvage logging and home firewood gathering, should not be permitted where conservation and management of PCEs or SCUs (secondary cavity users) is a concern (Scott 1978, Hutto 2006).

This means only the primary cavity excavators themselves, such as the pileated woodpecker, have the ability to decide if a tree is suitable for excavating. This also means managers know little about how many snags per acre are needed to sustain populations of cavity nesting species. Lorenz et al., 2015 must be considered best available science to replace inadequate forest plan snag retention guidelines.

The FS's Vizcarra, 2017 notes that researchers "see the critical role that mixed-severity fires play in providing enough snags for cavity-dependent species. Low-severity prescribed fires often do not kill trees and create snags for the birds."

On the same subject, Hutto 2006, notes from the scientific literature: "The most valuable wildlife snags in green-tree forests are relatively large, as evidenced by the disproportionate number of cavities in larger snags (Lehmkuhl et al. 2003), and are relatively deteriorated (Drapeau et al. 2002)."

Spiering and Knight (2005) examined the relationship between cavity-nesting birds and snag density in managed ponderosa pine stands and examined if cavity-nesting bird use of snags as nest sites was related to the following snag characteristics (DBH, snag height, state of decay, percent bark cover, and the presence of broken top), and if evidence of foraging on snags was related to the following snag characteristics: tree species, DBH, and state of decay. These authors state:

> Many species of birds are dependent on snags for nest sites, including 85 species of cavity-nesting birds in North America (Scott et al. 1977). Therefore, information of how many and what types of snags are required by cavity-nesting bird species is critical for wildlife biologists, silviculturists, and forest managers.
>
> Researchers across many forest types have found that cavity-nesting birds utilize snags with large DBH and tall height for nest trees (Scott, 1978; Cunningham et al., 1980; Mannan et al., 1980; Raphael and White, 1984; Reynolds et al., 1985; Zarnowitz and Manuwal, 1985; Schreiber and deCalesta, 1992).

Spiering and Knight (2005) found the following:

> Larger DBH and greater snag height were positively associated with the presence of a cavity, and advanced stages of decay and the presence of a broken top were negatively

> associated with the presence of a cavity. Snags in larger DBH size classes had more evidence of foraging than expected based on abundance.
>
> Percent bark cover had little influence on the presence of a cavity. Therefore, larger and taller snags that are not heavily decayed are the most likely locations for cavity-nesting birds to excavate cavities.
>
> The association of larger DBH and greater height of snags with cavities is consistent with other studies (Scott, 1978; Cunningham et al., 1980; Mannan et al., 1980; Raphael and White, 1984; Reynolds et al., 1985; Zarnowitz and Manuwal, 1985; Schreiber and deCalesta, 1992).

Spiering and Knight (2005) state that the "lack of large snags for use as nest sites may be the main reason for the low densities of cavity-nesting birds found in managed stands on the Black Hills National Forest. ...The increased proportion of snags with evidence of foraging as DBH size class increased and the significant goodness-of-fit test indicate that large snags are the most important for foraging."

The EA fails to quantify the cumulative snag loss in previously logged areas or subject to other management-caused snag loss such as road accessed firewood cutting.

Bate et al. (2007), found that snag numbers were lower adjacent to roads due to removal for safety considerations, removal as firewood, and other management activities. Other literature has also indicated the potential for reduced snag abundance along roads (Wisdom et al. 2000).

The EA fails to quantify snag loss would be expected because of safety concerns which vary with different methods of log removal.

The Section 16 EA does not cite any science to support its assumption that the FS management will result in snags and down logs in abundance to continuously support viable populations. No monitoring is cited to support claims of benefits to snag and down log-dependent species' population numbers or distribution.

The FS has stated: "Well distributed habitat is the amount and location of required habitat which assure that individuals from demes, distributed throughout the population's existing range, can interact. Habitat should be located so that genetic exchange among all demes is possible." (Mealey, 1983.) That document also provides guidance as to how habitat for the pileated woodpecker must be distributed for populations to persist.

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."

The EA presents an out-of-date and overall scientifically inadequate analysis for the Sensitive black-backed woodpecker. It fails to genuinely explain why this species is not expected to occur in Section 16, even though the species is wide ranging and scientific information, such as that we cite, indicates it would be expected to occur here.

The viability of the Sensitive black-backed woodpecker is threatened by fire suppression and other "forest health" policies that specifically attempt to prevent its habitat from developing. "Insect infestations and recent wildfire provide key nesting and foraging habitats" for the black-backed woodpecker and "populations are eruptive in response to these occurrences" (Wisdom et al. 2000). A basic purpose of the FS's management strategy, as exemplified by the EA, is to negate the natural processes that the black-backed woodpecker biologically rely on; the emphasis in reducing the risk of stand replacement fire events. Viability of this species is in jeopardy since habitat suppression is a forestwide policy.

The significance of project effects (including risk to viability) cannot be determined in the absence of a forestwide cumulative effects analysis of the FS's fire suppression policies.

Please see the Hanson Declaration, 2016 for an explanation of what a cumulative impact is with regard to the backed woodpecker, how the FS failed apply the best available science in their analysis of impacts to Black-backed Woodpeckers for a timber sale, why FS's (including Samson, 2006) reports are inaccurate and outdated, and why FS's reliance on them results in an improper minimization of adverse effects and cumulative impacts to black-backed woodpeckers with regard to the agency's population viability assessment.

Hutto, 1995 states: "Fires are clearly beneficial to numerous bird species, and **are apparently necessary for some**." (p. 1052, emphasis added.) Hutto, 1995 whose study keyed on forests burned in the 1988 season, noted:

> Contrary to what one might expect to find immediately after a major disturbance event, I detected a large number of species in forests that had undergone stand-replacement fires. Huff et al. (1985) also noted that the density and diversity of bird species in one- to two-year-old burned forests in the Olympic Mountains, Washington, **were as great as adjacent old-growth forests**…
>
> …Several bird species seem to be relatively **restricted** in distribution to early post-fire conditions… I believe it would be difficult to find a forest-bird species more restricted to a single vegetation cover type in the northern Rockies than the Black-backed Woodpecker is to early [first 6 years] post-fire conditions. (Emphasis added).

USDA Forest Service 2011c states:

> Hutto (2008), in a study of bird use of habitats burned in the 2003 fires in northwest Montana, found that within burned forests, there was one variable that exerts an influence that outstrips the influence of any other variable on the distribution of birds, and that is fire severity. Some species, including the black-backed woodpecker, were relatively abundant only in the high-severity patches. . **Hutto's preliminary results also suggested burned forests that were harvested fairly intensively (seed tree cuts, shelterwood cuts) within**

> **a decade or two prior to the fires of 2003 were much less suitable as post-fire forests to the black-backed woodpecker and other fire dependent bird species. Even forests that were harvested more selectively within a decade or two prior to fire were less likely to be occupied by black-backed woodpeckers.** (Emphasis added.)

Also see the agency's Fire Science Brief, 2009, which states, "Hutto found that Black-backed Woodpeckers fared best on sites unharvested before fire and poorest in the heavily harvested sites", raising a concern about logging for forest restoration that is not addressed in the Section 16 EA: How does pre-fire logging affect the future suitability of these forests to post-disturbance specialists?

Hutto, 2008 states, "severely burned forest conditions have probably occurred naturally across a broad range of forest types for millennia. These findings highlight the fact that severe fire provides an important ecological backdrop for fire specialists like the black-backed woodpecker, and that the presence and importance of severe fire may be much broader than commonly appreciated."

Cherry (1997) states:

> The black-backed woodpecker appears to fill a niche that describes everything that foresters and fire fighters have attempted to eradicate. For about the last 50 years, disease and fire have been considered enemies of the 'healthy' forest and have been combated relatively successfully. We have recently (within the last 0 to 15 years) realized that disease and fire have their place on the landscape, but the landscape is badly out of balance with the fire suppression and insect and disease reduction activities (i.e. salvage logging) of the last 50 years. Therefore, the black-backed woodpecker is likely not to be abundant as it once was, and **continued fire suppression and insect eradication is likely to cause further decline.** (Emphasis added.)

The black-backed woodpecker is a primary cavity nester, and an indicator for species depending upon the process of wildland fire in the ecosystem. Cherry (1997) notes:

> Woodpeckers play critical roles in the forest ecosystem. Woodpeckers are primary cavity nesters that excavate at least one cavity per year, thus making these sites available to secondary cavity nesters (which include many species of both birds and mammals). Black-backed and three-toed woodpeckers can play a large role in potential insect control. The functional roles of these two woodpecker species could easily place them in the 'keystone' species category—a species on which other species depend for their existence.
>
> Wickman (1965) calculated that woodpeckers may eat up to 50 larvae per day that were each about 50 mm in length. The predation on these larvae is significant. It has been estimated that individual three-toed woodpeckers may consume thousands of beetle larvae per day, and insect outbreaks may attract a many-fold increase in woodpecker densities (Steeger et al. 1996). The ability of woodpeckers in to help control insect outbreaks may have previously been underestimated.

Cherry (1997) also notes:

> Black-backed woodpeckers preferred foraging in trees of 34 cm (16.5 in) diameters breast height and (63 ft) 19 m height (Bull et al. 1986). Goggans et al. (1987) found the mean dbh of trees used for foraging was 37.5 cm (15 in) and the mean dbh of trees in the lodgepole pine stands used for foraging was 35 cm (14 in). Steeger et al. (1996) found that both (black-backed and three-toed) woodpecker species fed in trees from 20-50 cm (8-20 in) dbh.
>
> Black-backed woodpeckers excavate their own cavities in trees for nesting. Therefore, they are referred to as primary cavity nesters, and they play a critical role in excavating cavities that are later used by many other species of birds and mammals that do not excavate their own cavity (secondary cavity nesters). Black-backed woodpeckers peel bark away from the entrance hole and excavate a new cavity every year. Other woodpeckers sometimes take over their cavities (Goggans et al. 1987).

Also, FS biologists Goggans et al., 1989 studied black-backed woodpecker use of unburned stands in the Deschutes NF in Oregon. They discovered that the black-backed woodpeckers used unlogged forests more than cut stands. In other words, effects to the black-backed woodpecker accrue from logging forest habitat that has not been recently burned.

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

> Black-backed woodpeckers occupy forested habitats that contain high densities of recently dead or dying trees that have been colonized by bark beetles and woodborer beetles (Buprestidae, Cerambycidae, and Scolytidae). These beetles and their larvae are most abundant within burned forests. In unburned forests, bark beetle and woodborer infested trees are found primarily in areas that have undergone natural disturbances, such as wind-throw, and within structurally diverse old-growth forests (Steeger and Dulisse in press, Bull et al. 1986, Goggans et al. 1987, Villard 1994, Hoffman 1997, Weinhagen 1998).

Bond et al., 2012a explain the need for a conservation strategy for the black-backed woodpecker:

> In California, the Black-backed Woodpecker's strong association with recently burned forest, a habitat that is ephemeral, spatially restricted, and often greatly modified by post-fire logging, as well as the species' relative rarity, may make the woodpecker vulnerable to declines in the state. Additionally, Black-backed Woodpeckers in California are affected by the management of unburned forests – both because pre-fire stand conditions affect the suitability of post-fire habitat for the species, and because a substantial proportion of California's Black-backed Woodpeckers nest and forage at a low population density in unburned forests. Conserving the Black-backed Woodpecker in California likely requires appropriate management and stewardship of the habitat where this species reaches its

highest density – recently burned forest – as well as appropriate management of 'green' forests that have not burned recently.

In the nearby Blue Mountains of Eastern Oregon (Bull et al. 1986, Nielsen-Pincus 2005), it was found that grand fir cover types were used approximately 27% of the time for nesting in Bull's 1970s study and 14% of the time in Nielsen-Pincus's study of the same general area in 2003-2004. The Section 16 project would target grand fir for removal in some of the most valuable woodpecker habitat in the vicinity.

The emphasis on stand thinning and salvage of dying trees is of a concern for the black-backed woodpecker (Hutto 2008, Dudley et al. 2012, and Tingley et al. 2014).

The viability of black-backed woodpeckers is threatened by the FS's fire suppression and other "forest health" policies, which specifically attempt to prevent its habitat from developing. "Insect infestations and recent wildfire provide key nesting and foraging habitats" for the black-backed woodpecker and "populations are eruptive in response to these occurrences" (Wisdom et al. 2000). A basic purpose of the Section 16 project is to negate the natural occurrence that the black-backed woodpecker biologically relies on; the emphasis in reducing the risk of stand loss due to stand density coupled with the increased risk of stand replacement fire events. This emphasis also occurs on a large portion of the NPCNF. Viability of a species cannot be assured, if habitat suppression is a forestwide policy.

ROCKY MOUNTAIN 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 habitat. Servheen, et al., 1997 indicate that motorized trails increase elk vulnerability and reduce habitat effectiveness, and provide scientific management recommendations.

The EA 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.

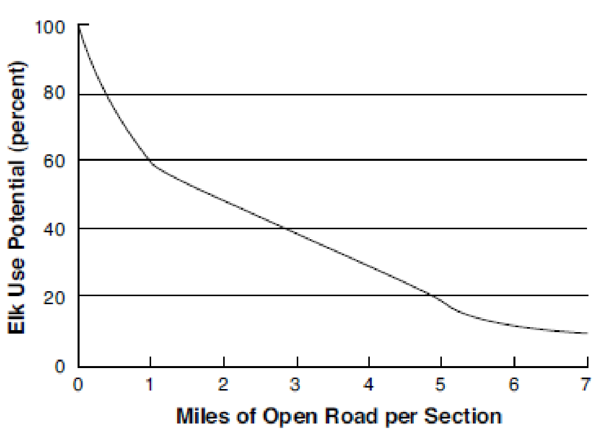
Regarding Black et al. (1976) conclusions, Thomas et al., 1988a state, “We concur. New research on elk use of habitat on summer and winter ranges has become available, however (Leckenby 1984). Land-use planning requirements indicate that a model of elk winter-range habitat effectiveness is required.”

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.

GRAY WOLF

The NPCNF's January 2024 Sourdough Sheep Wildlife Specialists Report states, "Idaho's 2021 wolf trapping legislation changes may increase wolf trapping and risk of incidental trapping of wolverines because of the use of snares, extended trapping seasons, and financial incentives." Further, the Idaho Gray Wolf Management Plan 2023-2028 (Idaho Department of Fish and Game, 2023) reveals the intent of the state of Idaho to reduce wolf population numbers in the state: "During 2019-2021, Idaho's wolf population has fluctuated around 1,270 animals. ...The Plan identifies goals and strategies to reduce wolf numbers and to manage Idaho's wolf population to fluctuate around 500 animals." Yet the Section 16 wildlife report and EA fail to further analyze the wolf's status and potential cumulative impacts, in violation of NEPA and NFMA.

Also, see the FOC et al LMP Objection in the section on the grizzly bear, which discusses the keystone role the wolf plays in the ecosystem including interrelationships with other wildlife.

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."

The FS fails to set meaningful thresholds and assumes without scientific basis that project-caused habitat losses will not threaten population viability. Of such analyses, Schultz (2010) concludes, "the lack of management thresholds allows small portions of habitat to be eliminated incrementally without any signal when the loss of habitat might constitute a significant cumulative impact." In the absence of meaningful thresholds of habitat loss and no monitoring of wildlife populations at the Forest level, projects will continue to degrade habitat across the NPCNF over time. (See also Schultz 2012.)

USDA Forest Service, 1987d states:

> Defining viable populations and assessing diversity are difficult tasks in the time frame of the Forest Plan. The wildlife and fisheries section of the Forest Service Handbook on Planning (FSH 1902.12) defines a viable population as one that "consists of the number of individuals, adequately distributed throughout their range, sufficient to perpetuate their long-term existence in natural self-sustaining populations." Shaffer (1981) refines this definition by saying a minimum viable population is one that can withstand these environmental changes and have a 99 percent chance of surviving 1000 years. The terms viable, minimum viable and threshold level are often used interchangeably in relation to population levels. I prefer to distinguish between viable and minimum viable populations and consider a minimum viable population as a population at the threshold level of viability. Above the threshold the population is viable, below it isn't.

Salwasser and Hanley (1980) also list five factors that largely determine population viability. These factors are:

> 1. population size and density;
> 2. reproductive potential;
> 3. dispersal capability
> 4. competitive capability; and
> 5. habitat characteristics.
>
> (T)here are some wildlife species that are very sensitive to Forest activities and development such as timber sales, road construction, and oil, gas and mineral development. …Maintaining viable populations of these species will require special consideration. These species can be lumped into three categories:
> 1. endangered, threatened or sensitive species
> 2. old-growth dependent species; and
> 3. snag dependent species.

The FS must address issues consistent with best available scientific information, such as the "estimated numbers", minimum number of reproductive individuals of each species, and population dynamics.

Traill et al., 2010 and Reed et al., 2003 are published, peer-reviewed scientific articles discussing what constitutes a minimum viable population. The FS does not identify best available scientific information that provides scientifically sound, minimum viable populations for any species.

Traill et al., 2010 state:

> To ensure both long-term persistence and evolutionary potential, the required number of individuals in a population often greatly exceeds the targets proposed by conservation management. We critically review minimum population size requirements for species based on empirical and theoretical estimates made over the past few decades. This literature collectively shows that thousands (not hundreds) of individuals are required for a population to have an acceptable probability of riding-out environmental fluctuation and catastrophic events, and ensuring the continuation of evolutionary processes. The evidence is clear, yet conservation policy does not appear to reflect these findings, with pragmatic concerns on feasibility over-riding biological risk assessment. As such, we argue that conservation biology faces a dilemma akin to those working on the physical basis of climate change, where scientific recommendations on carbon emission reductions are compromised by policy makers. There is no obvious resolution other than a more explicit acceptance of the trade-offs implied when population viability requirements are ignored. We recommend that conservation planners include demographic and genetic thresholds in their assessments, and recognise implicit triage where these are not met.

The fact that the Clearwater NF has not monitored the population trends of its MIS as required by the Forest Plan begs more discussion. Considering potential difficulties of using population viability analysis at the project analysis area level (Ruggiero, et al., 1994a), the cumulative effects of carrying out multiple projects simultaneously across the Forest makes it imperative that population viability be assessed at least at the forest-wide scale (Marcot and Murphy, 1992). Also, temporal considerations of the impacts on wildlife population viability from implementing something with such long duration as a Forest Plan must be considered (*Id.*) but the FS has not done this either. It is also of paramount importance to monitor population trends (which the FS promised the public it would do during development of the Forest Plan) during Forest Plan implementation in order to validate assumptions used about long-term species persistence i.e., population viability (Marcot and Murphy, 1992; Lacy and Clark, 1993).

Schultz, 2010 criticizes FS wildlife analyses based primarily upon habitat availability, because habitat alone is insufficient for understanding the status of populations. (See also Noon et al., 2003; Committee of Scientists, 1999.). Schultz, 2010 recommendations call for peer review of large-scale assessments and project level management guidelines, and for adoption of robust, scientifically sound monitoring and measurable objectives and thresholds for maintaining viable populations of native species.

Mills, 1994 also criticizes the FS's use of the term "viable" while only referring to habitat characteristics while ignoring population dynamics. Population dynamics refers to persistence of a population over time—which is key to making predictions about population viability. Mills, 1994 explains the range of parameters that must be used to make a scientifically sound assessment of wildlife species viability, including assessing population size, population growth rate, and linkages to other populations. Ruggiero, et al. (1994a) also point out that a sound population viability analysis must utilize measures of population dynamics. Finally, USDA, 2000 (NFMA planning regulations) also recognized the importance of consideration of population dynamics for sustaining species. The FS fails to consider best available science on population dynamics.

The EA relies upon Northern Region wildlife habitat relationship models (Samson 2006a, Samson 2006b) or other models. It fails to address the fact that Sampson's analyses are about as old as a Forest Plan was designed to last, and who knows how old the data are that was used in the analyses. Samson did not evaluate long-term viability for the fisher and marten, but he did do so for the goshawk, pileated woodpecker, flammulated owl and black-backed woodpecker. Sampson concluded, "In regard to long-term viability, this conservation assessment has found that long-term habitat conditions in terms of Representativeness, Redundancy, and Resiliency are "low" for all species." The EA fails to disclose Sampson's long-term viability conclusions. In his analysis, Sampson merely uses home range size for each species and makes assumptions of overlap in ranges of males and females. Home range size is then multiplied by the effective population size (n_{e} - a number that includes young and non-breeding individuals - Allendorf and Ryman 2002) and this is projected as the amount of habitat required to maintain a minimal viable population in the short-term. This simplistic approach ignores a multitude of factors and makes no assumptions about habitat loss or change over time. For the fisher and marten, Samson uses a "critical habitat threshold" as calculated in another publication (Smallwood 2002).

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

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

Thus, the short-term viability analysis is scientifically unsound and it is very doubtful it could sustain scientific peer review. Schultz (2010) captured this sentiment in her critique: "some interviewees also thought the work should be peer reviewed, especially if it was conducted by USFS management, and several were skeptical that it would survive such review."

FOC's comments on the Dead Laundry EA provided this same detailed critique of that EA's reliance on Samson assessments. In the responses to comments, the FS wrote nothing regarding those specific criticisms. The FS ignores what it cannot refute.

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 Section 16 proposal is not consistent with that statute.

In a report prepared for the Environmental Protection Agency, Endicott, 2008 notes the "physical impacts of forest roads on streams, rivers, downstream water bodies and watershed integrity can be dramatic and have been well documented." According to Endicott, 2008, "forestry-related sediment is a leading source of water quality impairment to rivers and streams nationwide." Remarkably, EPA indicates that "up to 90% of the total sediment production from forestry operations" comes from logging roads and steam crossings.[10] A significant portion of this sediment is collected and discharged directly into rivers and streams through ditches, channels, and culverts. (Endicott, 2008.)

The EPA states, "[s]tormwater discharges from logging roads, especially improperly constructed or maintained roads, may introduce significant amounts of sediment and other pollutants into surface waters and, consequently, cause a variety of water quality impacts."[11]

Endicott, 2008 states:

> There is no question that stormwater pollution from industrial logging roads and forest roads is harming and has the potential to harm beneficial uses, including spawning and rearing habitat for salmon and steelhead and drinking water supplies. Important ecological, economic, and social consequences stem from the sediment discharged from ditches, channels, and culverts along forest roads. Ecologically, fine and coarse-grained sediment loading degrades water quality and detrimentally affects fish and other aquatic species' habitat. (Endicott, 2008.) Sedimentation affects streams by reducing pool depth, altering substrate composition, reducing interstitial space, and causing braiding of channels (Rieman and McIntyre 1993), which reduce carrying capacity. The effects of road construction and associated maintenance account for a majority of sediment loads to streams in forested areas;
>
> Sedimentation negatively affects bull trout embryo survival and juvenile bull trout rearing densities. (Shepard et al. 1984 at 6; Pratt 1992 at 6.) An assessment of the interior Columbia Basin ecosystem revealed that increasing road densities were associated with declines in four nonanadromous salmonid species (bull trout, Yellowstone cutthroat trout (*Oncorhyncus clarkii bouvieri*), westslope cutthroat trout (*O. c. lewisi*), and redband trout (*O. mykiss spp.*)) within the Columbia River basin, likely through a variety of factors associated with roads. Bull trout were less likely to use highly roaded basins for spawning and rearing and, if present in such areas, were likely to be at lower population levels. (Quigley and Arbelbide 1997 at 1183.) These activities can directly and immediately threaten the integrity of the essential physical or biological features necessary for bull trout survival.

Endicott, 2008 concluded:

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[10] *Guidance Specifying Management Measures For Sources of Nonpoint Pollution in Coastal Waters,* EPA Guidance Paper 840-B-93-001c, at 27 (1993); *see also* Endicott 2008 at p. 9.

[11] 77 Fed. Reg. 30473 (May 23, 2012).

> The physical impacts of roads have detrimental effects on fish and fish habitat. Mechanisms through which roads exert these deleterious impacts include fine sediment effects, changes in streamflow, changes in water temperature caused by loss of riparian cover or conversion of groundwater to surface water, and migration barriers. The physical impacts of roads discussed above have widespread and profound effect on fish habitat and fish communities in populations across a wide range of environments and conditions (Lee at al., 1997).

The FS has performed no economic analysis that identifies sources of funds needed to maintain the road system. When the project mitigation stops in a year or two, the trajectory for fish habitat conditions will be downward. Beschta et al., 2004 state:

> (R)oad and landing construction is expensive and can siphon limited funds away from effective restoration measures, such as obliteration and maintenance. The backlog in maintenance of U.S Forest Service roads has been estimated to be several billion dollars (U.S. Department of Agriculture Forest Service 2000), and road construction inevitably adds to this seemingly insurmountable backlog.

Johnson (1995) states, “For the roads we no longer actively use, our dwindling road maintenance budget will make it difficult to maintain the culvert crossings. When these fail during storm and runoff events, tremendous amounts of sediment can be delivered directly to the channel and from there down to lower streams with significant beneficial uses such as sensitive fish habitat.” The FS fails to analyze the significance of this foreseeable lack of maintenance in the project area—the direct, indirect and cumulative effects poorly maintained roads have on water quality. From the intersection of Forest Roads 569 and 569-G, the latter road has a ditch on the inside of the road for a long ways, which hydrologist Johnson (1995) points out is typical of older roads, and which greatly increases drainage velocity (Id.) From a June 5 survey, the main vegetation affecting the suitability of motorized travel along that road is extensive alders rooted along that ditch. Where that ditch terminates at a culvert going under Road 569, a metal culvert is barely visible:

In fact is appears someone may have recently dug there to reveal the culvert's presence. (We could not find the culvert outlet.) In any event, during storm events or periods of quick snowmelt, water being transmitted down that Road 569-G ditch would simply flood and erode that area, including Road 569. Clearly, ongoing road maintenance is not addressing this. Furthermore, the main road accessing the project area—569—is heavily rutted in many places from its beginning at Highway 12 and throughout the project area, making driving with a passenger vehicle dicey. Clearly, routine road maintenance is not adequate.

The EA does not disclose the impacts of project area system roads not maintained in conformance to BMPs or in compliance with standards, because of funding shortfalls or other management inadequacies. The EA does not disclose the impacts of roads that go without maintenance because they are unauthorized or non-system. Nonsystem roads are not on any Forest inventory, and are not addressed by the annual road maintenance budget. As the

Transportation Systems Report recognizes, "The Forest System Roads in the analysis area are identified in INFRA and mapped in GIS. The current map and inventory data are dynamic and **will change as more information is collected through field verification and road surveys**." (Emphasis added.)

The Transportation Systems Report states: "Broken FS barriers will be repaired or replaced, and additional mitigation measures will be recommended for routes that showed evidence of breach around existing barriers." Yet the EA does not disclose the degree of such barrier ineffectiveness, nor provide any analysis on the wildlife species that would be affected.

"Temporary roads" often remain on the landscape indefinitely. Also Beschta et al., 2004 explain that, whatever "temporary" means in this project's context, the newly disturbed sites have most of the hydrological and soil impacts of new road construction over the short- and long-term:

> Accelerated surface erosion from roads is typically greatest within the first years following construction, although in most situations sediment production remains elevated over the life of a road (Furniss et al. 1991; Ketcheson & Megahan 1996). Thus even "temporary" roads can have enduring effects on aquatic systems. Similarly, major reconstruction of unused roads can increase erosion for several years and potentially reverse reductions in sediment yields that occurred with disuse. (Potyondy et al. 1991). Where roads are unpaved or insufficiently surfaced with erosion-resistant aggregate, sediment production typically increases with increased vehicular usage (Reid & Dunne 1984).

Reid & Dunne, 1984 state:

> Runoff rates and sediment concentrations from 10 road segments subject to a variety of traffic levels were monitored to produce sediment rating curves and unit hydrographs for different use levels and types of surfaces. These relationships are combined with a continuous rainfall record to calculate mean annual sediment yields from road segments of each use level. A heavily used road segment in the field area contributes 130 times as much sediment as an abandoned road. A paved road segment, along which cut slopes and ditches are the only sources of sediment, yields less than 1% as much sediment as a heavily used road with a gravel surface.

Even several years after decommissioning, conditions that affect erosion (e.g. infiltration & erodibility, vegetation cover) undergo nominal improvement (Foltz et al. 2007) and there's no indication that these conditions ever fully recover.

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

On January 12, 2001, the FS issued the final National Forest System Road Management Rule. The rule revised regulations concerning the management, use, and maintenance of the National

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

The EA does not incorporate the required science-based transportation analysis, and so there was no assessment that identifies all of the unneeded roads. Our comments on the Draft Revised Forest Plan state:

> …the Nez-Clear National Forest has yet to identify, let alone achieve, a MRS that complies with Subpart A requirements. It is unclear if the Forest Service recognizes this fact, as it asserts, "*[i]n 2015, a forest-level roads analysis was completed for the Nez Perce-Clearwater. This analysis established a minimum road system for arterial, collector, and important local class National Forest roads on the Nez Perce-Clearwater.*"[12] Only NEPA-level decisions can identify the minimum road system, as the analysis may have acknowledged when it explained agency officials utilize the report as it works to identify the MRS.[13]…Further, we question the utility of the 2015 Travel Analysis Report as it recommended only 14 miles of road as "unneeded."[14] The Nez-Clear National Forest contains 7,682 miles of NFS road, and 14 miles represents just 0.18 percent of the total road system. It is beyond likely such a reduction could ever represent long-term funding expectations as required by Subpart A, or that such a small reduction would result in a road system that provides for the protection of NFS lands. A fact the Forest Service seems to recognize since it has decommissioned over 200 miles of road between 2015-2018.[15]As such, the Forest Service cannot rely on its 2015 TAR to adequately inform recommendations that will satisfy Subpart A requirements.

Across the NPCNF, roads are not being maintained as needed. In the January 7, 2003 Clearwater National Forest Roads Analysis Report it states:

> **Key Findings: Road maintenance funding is not adequate to maintain and sign roads to standard.**

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[12] Draft Revised Forest Plan DEIS, p. 3.4.4-7.
[13] *Id.*, (stating, "The travel analysis report is used by the Nez Perce-Clearwater to prioritize maintenance needs and identify opportunities to decommission roads or put them into intermittent stored service as the Nez Perce-Clearwater works to identify the minimum number of routes needed for an efficient transportation system, as directed in 36 CFR § 212 subpart A.").
[14] *Id.*
[15] *Id.,* p. 3.4.4-10, Table 1. (That DEIS states incorrectly that Table 2 provides decommissioning numbers for the Nez Perce National Forest, but the table's title states "Miles of roads constructed from 1999 to 2018 on the Nez Perce National Forest.").

> This road analysis clearly shows that annual appropriated maintenance funding is inadequate to maintain the current road system on the Forest. Many roads will continue to build up additional deferred maintenance costs and degrade unless increases in road management funding become available.

Also, "Road maintenance funding is not adequate to maintain and sign roads to standard. …Congressionally appropriated road maintenance funding is approximately 22% of what is needed for the current classified road system." (*Id.*) The Sourdough Sheep Transportation Systems Report echoes this, acknowledging the situation is not getting better: "Deferred maintenance is continually accruing, especially due to the reduced capacity to perform annual maintenance on Level 2 & 3 roads. Long intervals between project associated maintenance, has exacerbated the maintenance backlog."

Also, "Congressionally appropriated road maintenance funding is approximately 9% of what is needed for the current classified road system." (Nez Perce National Forest Roads Analysis Report, 2006.) That report also admits:

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

One forest supervisor frankly assesses FS roads policies, stating that projects are a "chance to at least correct some (BMP) departures rather than wait until the funding stars align that would allow us to correct all the departures at once." (Lolo National Forest, 1999, emphasis added.) The FS simply fails to analyze the implications of insufficient funding for project area watersheds.

FOC's August 27, 2014 Travel Analysis letter to the Forest Supervisor cited scientific information including Wisdom, et al. (2000):

> Our analysis also indicated **that >70 percent of the 91 species are affected negatively by one or more factors associated with roads.** Moreover, maps of the abundance of source habitats in relation to classes of road density suggested that road-associated factors hypothetically may reduce the potential to support persistent populations of terrestrial carnivores in many subbasins. Management implications of our summarized road effects include the potential to mitigate a diverse set of negative factors associated with roads. **Comprehensive mitigation of road-associated factors would require a substantial reduction in the density of existing roads as well as effective control of road access in relation to management of livestock, timber, recreation, hunting, trapping, mineral development, and other human activities.**
>
> **...Efforts to restore habitats without simultaneous efforts to reduce road density and control human disturbances will curtail the effectiveness of habitat restoration, or even contribute to its failure; this is because of the large number of species that are simultaneously affected by decline in habitat as well as by road-associated factors.**

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

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

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

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

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

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

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

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

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

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

The FS did not validate to Road Management Objectives (RMOs) in its overly narrow conception of the project Purpose and Need including ignoring mandates of Forest Plan water quality and fish standards.

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

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

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

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

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

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

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

Frissell, 2014 states:

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

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

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

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

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

The FS may find out later that significant erosion, sediment, or other resource damage problems exist on roads not needed for log hauling, but the EA makes no commitments to bring all the roads up to BMP standards or otherwise fix the damage. The EA fails to consider the resulting impacts on water quality and fish habitat.

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

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

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

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

We cannot discern if the FS has conducted any on-the-ground surveys for inventorying sediment sources in the project area. Fly et al., 2011 describes a thorough survey in the Boise National Forest.

Roads influence many processes that affect aquatic ecosystems and fish: human behavior (poaching, debris removal, efficiency of access for logging, mining, or grazing, illegal species introductions), sediment delivery, and flow alterations. We incorporate The Wilderness Society (2014), which discusses some of the best available science on the ecological impacts of roads. We also incorporate the WildEarth Guardians, 2020 report, "The Environmental Consequences of Forest Roads and Achieving a Sustainable Road System."

When considering how effective BMPs are at controlling non-point pollution on roads, both the rate of implementation of the practice, and the effectiveness of the practice should both be considered. The FS tracks the rate of implementation and the relative effectiveness of BMPs from in-house audits. This information is summarized in the National BMP Monitoring Summary Report with the most recent data being the fiscal years 2013-2014 (Carlson et al. 2015). The rating categories for implementation are "fully implemented," "mostly implemented," "marginally implemented," "not implemented," and "no BMPs." "No BMPs" represents a failure to consider BMPs in the planning process. More than a hundred evaluations on roads were conducted in FY2014. Of these evaluations, only about one third of the road BMPs were found to be "fully implemented" (Id., p. 12).

The monitoring audit also rated the relative effectiveness of the BMP. The rating categories for effectiveness are "effective," "mostly effective," "marginally effective," and "not effective." "Effective" indicates no adverse impacts to water from project or activities were evident. When treated roads were evaluated for effectiveness, almost half of the road BMPs were scored as either "marginally effective" or "not effective" (Id, p. 13).

A recent technical report by the FS (Edwards et al., 2016) summarizes research and monitoring on the effectiveness of different BMP treatments. Researchers found that while several studies have found some road BMPs are effective at reducing delivery of sediment to streams, the degree of each treatment has not been rigorously evaluated. Few road BMPS have been evaluated under a variety of conditions, and much more research is needed to determine the site-specific suitability of different BMPs (Id.; also see Anderson et al., 2012).

Edwards et al., 2016 cites several reasons for why BMPs may not be as effective as commonly represented. Most watershed-scale studies are short-term and do not account for variation over time, sediment measurements taken at the mouth of a watershed do not account for in-channel sediment storage and lag times, and it is impossible to measure the impact of individual BMPs when taken at the watershed scale. When individual BMPs are examined there is rarely broad-scale testing in different geologic, topographic, physiological, and climatic conditions. Finally, in some instances, a single study is used to justify the use of a BMP across multiple states without adequate testing.

Climate change will further put into question the effectiveness of many road BMPs (Edwards et al., 2016). While the impacts of climate will vary from region to region (Furniss et al. 2010), more extreme weather is expected across the country, which will increase the frequency of flooding, soil erosion, stream channel erosion, and variability of streamflow (Id). BMPs designed to limit erosion and stream sediment for current weather conditions may not be effective in the future. Edwards et al., 2016 state, "More-intense events, more frequent events, and longer duration events that accompany climate change may demonstrate that BMPs perform even more poorly in these situations. Research is urgently needed to identify BMP weaknesses under extreme events so that refinements, modifications, and development of BMPs do not lag behind the need."

Climate change is also expected to lead to more extreme weather events, resulting in increased flood severity, more frequent landslides, altered hydrographs, and changes in erosion and sedimentation rates and delivery processes. (Halofsky et al., 2011.) Many National Forest roads are poorly located and designed to be temporarily on the landscape, making them particularly vulnerable to these climate alterations. (Id.) Even those designed for storms and water flows typical of past decades may fail under future weather scenarios, further exacerbating adverse ecological impacts, public safety concerns, and maintenance needs. (Strauch et al., 2015.) At bottom, climate change predictions affect all aspects of road management, including planning and prioritization, operations and maintenance, and design. (Halofsky et al., 2011.)

The FS fails to analyze in detail the impact of climate change on forest roads and forest resources. It should start with a vulnerability assessment, to determine the analysis area's exposure and sensitive to climate change, as well as its adaptive capacity. For example, the agency should consider the risk of increased disturbance due to climate change when analyzing this proposal. It should include existing and reasonably foreseeable climate change impacts as part of the affected environment, assess them as part of the agency's hard look at impacts, and integrate them into each of the alternatives, including the no action alternative. The agency should also consider the cumulative impacts likely to result from the proposal, proposed road activities, and climate change. In planning for climate change impacts and the proposed road activities, the FS should consider: (1) protecting large, intact, natural landscapes and ecological processes; (2) identifying and protecting climate refugia that will provide for climate adaptation; and (3) maintaining and establishing ecological connectivity. (Schmitz and Trainor, 2014.)

The EA does not show that project area Road Management Objectives have been developed consistent with the Travel Management Regulations.

When designating off-road vehicle trails and areas, federal agencies are required to minimize damage to forest resources, disruption of wildlife, and user conflicts. Exec. Order No. 11,644 § 3(a), 37 Fed. Reg. 2877 (Feb. 8, 1972), *as amended by* Exec. Order No. 11,989, 42 Fed. Reg. 26,959 (May 24, 1977). The FS must locate designated trails and areas in order to minimize the following criteria: (1) damage to soil, watershed, vegetation, and other public lands resources; (2) harassment of wildlife or significant disruption of wildlife habitat; and (3) conflicts between off-road vehicle use and other existing or proposed recreational uses. 36 C.F.R. § 212.55(b)(1)-(3).

The Section 16 EA does not demonstrate that the FS has implemented or applied the minimization criteria in the route designation process, consistent with the objective of minimizing impacts. The EA does not adequately reflect how the FS applied the minimization criteria in its motorized trail and area designations, and the agency's draft DN is arbitrary and capricious and violates the Administrative Procedure Act (APA), NEPA, the National Forest Management Act (NFMA), the Travel Management Rule and the ORV Executive Orders.

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

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

> Erosion on roads is an important source of fine-grained sediment in streams draining logged basins of the Pacific Northwest. Runoff rates and sediment concentrations from 10 road segments subject to a variety of traffic levels were monitored to produce sediment rating curves and unit hydrographs for different use levels and types of surfaces. These relationships are combined with a continuous rainfall record to calculate mean annual sediment yields from road segments of each use level. A heavily used road segment in the field area contributes 130 times as much sediment as an abandoned road. A paved road segment, along which cut slopes and ditches are the only sources of sediment, yields less than 1% as much sediment as a heavily used road with a gravel surface.

US Fish and Wildlife Service, 1998 indicates that bull trout are absent when road densities exceed 1.71 mi./mi^2., depressed when the road density = 1.36 mi/mi^2 and strong when road density equals or is less than .45 mi/mi^2. (P. 67.)

U.S. Fish and Wildlife Service, 2015 describe problems of the type the EA fails to address:

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

Members of the FS's ID Team for the Clear Creek Project fully expressed concerns in project files for that project. From 110606TransportationNFMAQuestions.docx:

2. What is broke or at risk?
The existing size of the transportation system is in excess of what is needed for current uses of the National Forest land. Newer technologies require a less invasive road system structure. A history of skid road or jammer road use, and not properly stabilizing roads has lead to a higher risk of failure by landslides and culvert washouts. These risks are even higher in landslide prone landscapes.

Another concern with the large transportation system is that it is cost prohibitive to maintain. The Forest cannot currently maintain all of the transportation system. Currently higher priority roads are being maintained to minimal standards, while other roads are not being maintained and have deferred maintenance. Roads with reduced maintenance or no maintenance are at a higher risk of failures and road closures.

More than 50 percent of the Nez Perce National Forest roads were built between 1960 and 1979. Road standards used during construction of these roads employed current BMPs. The life span of BMPs range anywhere from 10 to 50 years with repeated maintenance, so it is likely that many BMPs installed during original construction are at the end of their life span. BMPs productivity and life spans are reduced if maintenance has not occurred. Roads with BMPs near or at the end of their life span have a higher risk of failure.

4. How do you fix it?
Analyze all the system and non-system roads in the area and determine a minimum road system required based on needs and risks. Maintain roads needed for public and administrative use. Prioritize the repair of the needed roads based on risk and needs. Update all needed roads to ensure existing standards are met. Updates may include reconstruction, relocation or maintenance of roadways so they are in a stable condition. During the updates, use BMPs for minimal impact on the watershed.

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

9. What are the social / resource implications of no actions?
With only limited road maintenance and no decommissioning, roads will fail causing irreparable resource damage. Road fill and culvert failures will have an impact on stream

quality. Public safety is also a concern with no action. To protect individuals from failing roads, road closures would be a common occurrence. Limited to no maintenance leads to structure failures of culverts, bridges and road fills. As road densities in the assessment area are considered high, by no action, there will be a continued adverse affects on the wildlife.

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

(Emphasis added.) From 111017WildlifeClearCreekNFMAComments.docx:

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

From 110606NFMAQuestionsKaren.docx:

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

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

The FS must prepare an EIS that incorporates the minimum road system prepared in compliance with the Travel Management Rule.

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."

Based on the reports we obtained on the Section 16 website, it doesn't appear that a FS soil scientist actually documented soil conditions using site-specific surveys during project development. This self-imposed blindness risks soil productivity, watersheds, and everything else given the fundamental status of soils for ecosystems.

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 EA 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 EA's minimal 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[16] 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 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

[16] Nitrogen

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; 2000 NFMA 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. The blog states:

> 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. Our forests 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 EA 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 EA says, "residual linear disturbances appear to be legacy skid trails from logging completed in the late 1950s, and the compaction present on the skid trails is interfering with proper soil function." The EA neglects to disclose the entire scope and scale of the problem of such 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 EA doesn't disclose their extent outside of project activity areas, and in part because the FS hasn't made a genuine attempt to survey soil conditions anyway. The EA 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 almost singularly.

The R-1 SQS and EA 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 Section 16 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.

WILDLAND FIRE

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

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 EA 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 well away from human occupied neighborhoods.

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

We note that the draft EIS for the NPCNF forest plan revision recognizes that the mixed-severity fire regime is the most prevalent one on the NPCNF.

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 an indication of 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 a more enlightened view 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—differences which 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 EA 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 EA 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 EA 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 EA fails to explain the fire implications of no treatment applied to untreated portions of the project area under the action alternatives.

The EA 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 EA does not comply with NEPA's requirements for scientific integrity.

Huff et al., 1995 state:

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

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

> For example, the 20-foot wind speed[17] must exceed 50 miles per hour for midflame wind speeds to reach 5 miles per hour within a dense Stand (0.1 adjustment factor). In contrast, in an open stand (0.3 adjustment factor), the same midflame wind speeds would occur at only a 16-mile-per-hour wind at 20 feet.

The EA also fails to recognize 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 EA, 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

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

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.

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.

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.

Two new peer-reviewed scientific articles suggest genuine solutions. First, 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.

Secondly, 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.

Atchley et al., 2021 note that naturally dense forest stands actually slow fire spread. They also note:

> 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.

Portraying the proposed timber sale as restoring "early seral species composition (and) mixed species diversity" is disingenuous—this project is all about timber production. As much as the agency promotes its overblown priority to "provide economic benefits to local rural communities" by providing timber, the agency's defensive smokescreen of its logging agenda with phony "restoration" greenwashing and propaganda merely highlights its corruption.

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 EA 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 "that allow for a strategic and safe location to conduct 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 to withhold personnel from entering 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.

The FS must prepare an EIS that remedies the above noted analytic and scientific deficiencies.

INVASIVE WEEDS

See our LMP Objection, which expresses our concerns in a section titled the same.

SCIENTIFIC INTEGRITY

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

Huck, 2000 states:

> The basic idea of reliability is summed up by the word consistency. Researchers can and do evaluate the reliability of their instruments from different perspectives, but the basic question that cuts across these various perspectives (and techniques) is always the same: "To what extent can we say the data are consistent?" …(T)he notion of consistency is at the heart of the matter in each case.
>
> …(R)eliability is conceptually and computationally connected to the data produced by the use of a measuring instrument, not to the measuring instrument as it sits on the shelf.

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

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

FS analysis methodology relies upon assumptions that the FS knows with some precision the parameters that define normal ranges of conditions. The reliability of the data sources used to construct these normal ranges must be disclosed.

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

The next level of scientific integrity is the notion of "validity." So even if FS data input to its models are reliable, a question remains of the analysis and modeling methodology validity. In other words, are the models scientifically appropriate for the uses for which the FS is utilizing them? As Huck, (2000) explains, the degree of "content validity," or accuracy of the model or methodology is established by utilizing other experts. This, in turn, demonstrates the necessity for utilizing the peer review process. The FS must disclose the limitations of the models the FS relies upon for project analyses, which begins to address model validity.

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."

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

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

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

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

Where is the evidence that the FS has performed validation of the models it utilizes? There must be documentation of someone using observation or experiment to confirm model hypotheses.

As Huck, (2000) explains, the degree of "content validity," or accuracy of the model or methodology is established by utilizing other experts. This, in turn, demonstrates the necessity for utilizing the peer review process. The validity of the various models utilized by the FS must be established for how agency utilizes them. Do any specific scientific studies establish their content validity? Has independent expert peer review process of the models occurred?

Larson et al. 2011 state:

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

A 2000 Northern Region forest plan monitoring and evaluation report (USDA Forest Service, 2000c) provides an example of the FS itself acknowledging the problems of data that is old and incomplete, leading to the limitation of models the FS typically uses for wildlife analyses:

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

In that case, the FS expert believed the data were unreliable and thus they properly questioned the validity of model use.

Another Kootenai NF project EIS (USDA Forest Service, 2007a) notes the limitations of modeling methodology the FS relies upon for wildlife analyses (by Samson):

> In 2005, the Regional Office produced a Conservation Assessment of the Northern goshawk, black-backed woodpecker, flammulated owl, and pileated woodpecker in the Northern Region (Samson 2005). This analysis also calculated the amount of habitat available for these species, but was based on forest inventory and analysis (FIA) data. FIA data is consistent across the Region and the state, but **it was not developed to address site-specific stand conditions for a project area.** In some cases, these two assessments vary widely in the amount of habitat present for a specific species. (P. 116.)

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

Beck and Suring, 2011 state:

> Developers of frameworks have consistently attained scientific credibility through published manuscripts describing the development or applications of models developed within their frameworks, but a major weakness for many frameworks continues to be a lack of validation. Model validation is critical so that models developed within any framework

can be used with confidence. Therefore, we recommend that models be validated through independent field study or by reserving some data used in model development.

Larson et al. 2011 state:

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

Beck and Suring, 2011 developed several criteria for rating modeling frameworks—that is, evaluating their validity. Three of their criteria are especially relevant to this discussion:

Habitat–population linkage	Does the modeling framework incorporate vital rates (e.g., production, survival), other demographic parameters (e.g., density, population size); surrogates (e.g., quality of home ranges, habitat conditions in critical reproductive habitats, presence/absence) of population demographic parameters; or does the modeling framework model habitat conditions without specific consideration of wildlife population parameters?	0 = does not rely on population demographics or surrogates of modeled species 1 = relies on surrogates for population demographic parameters or framework; can utilize population demographics if desired, but is not dependent on them 2 = specifically relies on population demographics of modeled species
Scientific credibility	Has the framework gained credibility through publication of results, application of results, or other mechanisms to suggest acceptance by an array of professionals?	0 = limited credibility 1 = at least 1 publication of results using this framework, or other application of the modeling framework
Output definition	Is the output well defined and will it translate to something that can be measured?	1 = difficult 2 = moderate 3 = easy

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

The Kootenai NF's Elk Rice EA states, "Be aware the modeling is not an attempt to depict reality, but merely an analysis for comparison purposes." The EA doesn't explain how ANY comparisons would be meaningful, in the context of such limitations. That EA's statement is made about modeling the amount of particulate produced by fire, however the Section 16 EA does no better in discussing the limitations of any modeling upon which its analyses are based.

A scientist from the research branch of the Forest Service, Ruggiero, 2007 states, "Independence and objectivity are key ingredients of scientific credibility, especially in research organizations that are part of a natural resource management agency like the FS. Credibility, in turn, is essential to the utility of scientific information in socio-political processes."

Ruggiero, 2007 (a scientist from the research branch of the FS) recognizes a fundamental need to demonstrate the proper use of scientific information, in order to overcome issues of decisionmaking integrity that arise from bureaucratic inertia and political influence.

Ruggiero, 2007 points out that the Forest Service's scientific research branch **is distinct** from its management branch:

> The Forest Service is comprised of three major branches: the National Forest System (managers and policy makers for National Forests and National Grasslands), Research and Development (scientists chartered to address issues in natural resource management for numerous information users, including the public), and State and Private Forestry (responsible for providing assistance to private and state landowners). This article is directed toward the first two branches.
>
> The relationship between the National Forest System and the Forest Service Research and Development (Research) branches is somewhat hampered by confusion over the respective roles of scientists (researchers) and managers (policy makers and those that implement management policy). For example, some managers believe that scientists can enhance a given policy position or management action by advocating for it. This neglects the importance of scientific credibility and the difference between advocating for one's research versus advocating for or against a given policy. Similarly, some scientists believe the best way to increase funding for research is to support management policies or actions. But, as a very astute forest supervisor once told me, "Everyone has a hired gun…they are not credible…and we need you guys [Forest Service Research] to be credible."

The Forest Service Manual (FSM) provides direction on how to implement statutes and related regulations. FSM 4000 – Research and Development Chapter 4030 states: "To achieve its Research and Development (R&D) program objectives, the Forest Service shall ... maintain the R&D function as a **separate entity** … with clear accountability through a system that **maintains scientific freedom…**" (Emphasis added). This is difficult in today's political climate ("Help Wanted: Biologists to Save the West From Trump").

Ruggiero, 2007 discusses the risk to scientific integrity if that separation is not maintained, that is, if politics overly influences the use of scientific research:

> This separation also serves to keep conducting science separate from formulating policy and the political ramifications of that process. The wisdom here is that science cannot be credible if it is politicized. Science should not be influenced by managers, and scientists should not establish policy. This logic keeps scientific research "independent" while ensuring that policy makers are free to consider factors other than scientific understandings. Thus, science simply informs decision making by land managers. As the new forest planning regulations clearly state, those responsible for land management decisions must consider the best available science and document how this science was applied (Federal Register 70(3), January 5, 2005; Section 219.11(4); p. 1059).

Sullivan et al. 2006 state that "Peer-reviewed literature ...is considered the most reliable mainly because it has undergone peer review." They explain:

> *Peer review*.—A basic precept of science is that it must be verifiable, and this is what separates science from other methods of understanding and interpreting nature. The most direct method of verification is to redo the study or experiment and get the same results and interpretations, thus validating the findings. Direct verification is not always possible for nonexperimental studies and is often quite expensive and time-consuming. Instead, scientists review the study as a community to assess its validity. This latter approach is the process of peer review, and it is necessary for evaluating and endorsing the products of science. **The rigor of the peer review is one way to assess the degree to which a scientific study is adequate for informing management decisions.**

Sullivan et al. 2006 contrast peer-reviewed literature with gray literature (such as Samson, 2005 and Samson, 2006,) which:

> ...does not typically receive an independent peer review but which may be reviewed in-house, that is, within the author's own institution. ...Gray literature, such as some agency or academic technical reports, ...commonly contains reports of survey, experimental or long-term historical data along with changes in protocols, meta-data, and the progress and findings of standard monitoring procedures.

Along with Ruggiero, 2007, Sullivan et al., 2006 discuss the dangers of the "Politicization of Science":

> Many nonscientists and scientists believe that science is being increasingly politicized. Articles in newspapers (e.g., Broad and Glanz 2003) and professional newsletters document frequent instances in which the process and products of science are interfered with for political or ideological reasons. In these cases, the soundness of science, as judged by those interfering, turns on the extent to which the evidence supports a particular policy stance or goal. ...Politicization is especially problematic for scientists supervised by administrators who may not feel the need to follow the same rules of scientific rigor and transparency that are required of their scientists.

Agency expert opinion and gray literature relied upon by the FS is not necessarily the same as "the best scientific information" available. Sullivan et al., 2006 discuss the concept of best available science in the context of politically influenced management:

> Often, scientific and political communities differ in their definition of best available science and opposing factions misrepresent the concept to support particular ideological positions. Ideally, each policy decision would include all the relevant facts and all parties would be fully aware of the consequences of a decision. But economic, social, and scientific limitations often force decisions to be based on limited scientific information, leaving policymaking open to uncertainty.

The American Fisheries Society and the Estuarine Research Federation established this committee to consider what determines the best available science and how it might be used to formulate natural resource policies and shape management actions. The report examines how scientists and nonscientists perceive science, what factors affect the quality and use of science, and how changing technology influences the availability of science. Because the issues surrounding the definition of best available science surface when managers and policymakers interpret and use science, this report also will consider the interface between science and policy and explore what scientists, policymakers, and managers should consider when implementing science through decision making.

As part of their implicit contract with society, environmental scientists are obliged to communicate their knowledge widely to facilitate informed decision making (Lubchenco 1998). For nonscientists to use that knowledge effectively and fairly, they must also understand the multifaceted scientific process that produces it.

Science is a dynamic process that adapts to the evolving philosophies of its practitioners and to the shifting demands of the society it serves. Unfortunately, these dynamics are often controversial for both the scientific community and the public. To see how such controversies affect science, note that over the last decade nonscientists have exerted increasing influence on how science is conducted and how it is applied to environmental policy. Many observers find this trend alarming, as evidenced by several expositions titled "science under siege" (e.g., Wilkinson 1998; Trachtman and Perrucci 2000).

To achieve high-quality science, scientists conduct their studies using what is known as the scientific process, which typically includes the following elements:

4. A clear statement of objectives;
5. A conceptual model, which is a framework for characterizing systems, stating assumptions, making predictions, and testing hypotheses;
6. A good experimental design and a standardized method for collecting data;
7. Statistical rigor and sound logic for analysis and interpretation;
8. Clear documentation of methods, results, and conclusions; and
9. Peer review.

The Committee of Scientists (1999) state:

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

NEPA states that "Accurate scientific analysis... (is) essential to implementing NEPA." And the NEPA regulations at 40 CFR § 1502.24 ("Methodology and scientific accuracy") state:

> Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements. They shall identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement. An agency may place discussion of methodology in an appendix.

To conform with NEPA's requirements for scientific integrity, the FS must insure the reliability of data relied upon by the models, and validate the models for the uses applied.

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

> (A)s currently structured there are essentially two independent planning processes in operation for the management of the National Forest System: forest planning as called for in the legislation; and the Congressional budgeting process, which budgets on a project basis. The major problem is that there are essentially two independent planning processes occurring simultaneously: one involving the creation of individual forest plans and a second that involves congressionally authorized appropriations for the Forest Service. **Congressional funding for the Forest Service is on the basis of programs, rather than plans, which bear little or no relation to the forest plans generated by the planning process.** There is little evidence that forest plans have been seriously considered in recent years when the budget is being formulated. Also, the total budget appropriated by the Congress is typically less than what is required to finance forest plans. Furthermore, the Forest Service is limited in its ability to reallocate funds within the budget to activities not specifically designated. **Thus, the budget process** commonly provides fewer resources than anticipated by the forest plan and often also **negates the "balance" across activities that have carefully been crafted into forest plans. Balance is a requisite part of any meaningful plan.** Finally, as noted by the GAO Report (1997), fundamental problems abound in the implementation of the planning process as an effective decision making instrument. Plans without corresponding budgets cannot be implemented. Thus forest plans are poorly and weakly implemented at best. Major reforms need to be implemented to coordinate and unify the budget process.

(Emphases added.) The FS has not undertaken the process of a Science Consistency Review for the Forest Plan or for EA conclusions (Guldin et al., 2003, 2003b.) Guldin et al., 2003:

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

> information.

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

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

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

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

CUMULATIVE EFFECTS

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

The EA and project maps disclose the proximity of large tracts of industrial timberland of other ownerships. Our PA comments stated:

> Section 16 is surrounded by sections of private land… Cumulative impacts from private land logging, national forest logging, the nearby highway, winter snowmobile use, and other uses need to be considered. This might push this into an EIS given the extensive logging in the area on adjacent private land.

However, the uncertainty of those industrial landowners' actions is taken by the EA as its ticket to not assessing cumulative effects at all. That violates NEPA. Potential chronic and cumulative water quality issues stand out as likely significant, but those and other risks are hardly analyzed anywhere, including in specialists reports.

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 EA.

It is vital that the results of past monitoring be incorporated into project analysis and planning, yet the EA does 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 EA 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. See 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 regeneration logging, which involves removing most 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 arguing here. In Chapter V, it states:

> Project environmental analyses provide an essential source of information for Forest Plan monitoring. First, as project analyses are completed, new or emerging public issues or management concerns may be identified. Second, the management direction designed to facilitate achievement of the management area goals are validated by the project analyses. Third, the site-specific data collected for project environmental analyses serve as a check on the correctness of the land assignment. All of the information included in the project environmental analyses is used in the monitoring process to determine when changes should be made in the Forest Plan.

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 a lot of assumptions in this EA. 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 of this new timber sale proposal.

The EA 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 EA 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 EA 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 EA 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.

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."

According the project Biological Evaluation, both bull trout and westslope cutthroat trout are expected to inhabit Parachute Creek in the project area:

> According to Idaho Department of Fish and Game, bull trout utilize Parachute Creek as year-round residents, however this has not been verified (2004). Additionally, in two unnamed tributaries off Parachute Hill, eDNA detected bull trout in 2018. eDNA samples were collected in Parachute Creek and 'Imnamatnoon Creek in 2023, results are still processing.
>
> Above the Section 16 project area in the headwaters of Parachute Hill, Westslope cutthroat trout have been detected via eDNA. In 2003, Parachute Creek was determined to be used year-round by year-round resident westslope cutthroat trout (Shepard and May 2003).

Even if bull trout do not currently inhabit Parachute Creek, the likelihood they had previously is demonstrated with the FS's attribution to the Idaho Department of Fish and Game mentioned above. FS Section 16 project documents indicate excessive sediment in Parachute Creek is attributable to land management activities. Yet the Section 16 project reveals the FS is willing to risk likely further degradation of Parachute Creek and other watersheds, despite their importance to fisheries and biodiversity.

"Based on a 2023 Forest Service survey, Parachute Creek cobble embeddedness is 36%. Parachute Creek is not meeting standards and the project must not result in a measurable increase in sediment delivery to Parachute Creek." The EA does not define "measurable" but WEPP modeling results from Table 4 in the Watershed Effects Supporting Information report predict sediment could very well move off roads and through stream buffers, in contradiction to the EA. That report's claim of "negligible and effectively immeasurable" is arbitrary.

Table 4 also fails to present any modeling results for Road 5645, which crosses Parachute Creek in the project area at a location where soil disturbance would likely occur within the PACFISH Riparian Habitat Conservation Area. Project maps show this as a location where road maintenance as part of the Section 16 project would occur.

The NPCNF's 2016 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.
>
> 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.

Thus, we see the Watershed Effects Supporting Information report (author unknown) is based on an invalid conclusion where it interprets the WEPP output numbers as unquestionably accurate.[18]

The NPCNF's Sourdough Sheep EA explains, "An increase in sediment input could also increase cobble embeddedness; this would tend to decrease spawning and rearing habitat for fish." Yet such an increase is grudgingly acknowledged for Section 16, even though the FS makes "no impact" statements to the contrary.

Further, 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

[18] "…amounts …would be divided by 4" where no possibility of error or "difficulty predicting sediment output" or that "Models …provide estimates, not absolutes" was acknowledged.

World Biological Assessment). Second, its modeling is not reliable for predicting actual results (measureable amounts of cobble embeddedness and sediment delivery).

Parachute Creek cobble embeddedness has not been consistent with the Forest Plan for decades. The EA doesn't demonstrate the proposed action will restore presently degraded fish habitat consistent with the Forest Plan. The EA doesn't genuinely demonstrate a positive, upward trend. So without any assurance this situation would quickly improve markedly, Project increases in streambed sediment would violate the Forest Plan.

Table 1 (Resource Indicators and Metrics Used to Evaluate Water Resource Effects) in the Watershed Effects Supporting Information report lists the following Metrics ("Measures"):

- Percent Increase in ECA per HUC 12
- Percent increase in sediment yield over base erosion rates compared to Forest Plan Guidelines or Base levels
- Description of field evaluations of road sedimentation potential
- Miles of roads in RHCAs
- Number of Stream Crossings
- Description of model output and roads on landslide prone terrain
- Predicted change in water temperature based on change in riparian cover

Yet, aside from Percent Increase in ECA (the first metric), that report neglects reporting on the "Measures" it deems important for this analysis.

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

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

The Section 16 timber sale would involve an estimated 940 round trips of log trucks, on highly erosive road surfaces.

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

> Erosion on roads is an important source of fine-grained sediment in streams draining logged basins of the Pacific Northwest. Runoff rates and sediment concentrations from 10 road segments subject to a variety of traffic levels were monitored to produce sediment

> rating curves and unit hydrographs for different use levels and types of surfaces. These relationships are combined with a continuous rainfall record to calculate mean annual sediment yields from road segments of each use level. A heavily used road segment in the field area contributes 130 times as much sediment as an abandoned road. A paved road segment, along which cut slopes and ditches are the only sources of sediment, yields less than 1% as much sediment as a heavily used road with a gravel surface.

The Section 16 Soil Effect Analysis Supplement states, "Though permanent roads impact both soil productivity and soil stability, they are not considered in the soils analysis, as the **evaluation of effects of permanent roads is most effectively done at the watershed scale** (U.S. Department of Agriculture, Forest Service, Northern Region 2014)." (Emphasis added.) This FS "evaluation" was presumably its WEPP modeling. Yet "watershed scale" WEPP modeling results are not disclosed.

Under "Watershed" for "No Action" the EA admits, "sedimentation in the watersheds are primarily from the road system—both Forest System roads as well as non-system legacy roads. Past harvest actions are reflected in current conditions of the streams, which are **functioning within Forest Plan objectives**." (Contradiction with other EA statements emphasized.)

The EA does not disclose the populations or population trends of ESA-listed or Sensitive fish species in the appropriate streams in or downstream of the project area.

We cannot even find a detailed map of all the analysis area streams and other Riparian Habitat Conservation Areas in the EA or specialists reports published on the project website. This is consistent with what is indicated in the Forested Vegetation Resource report, that the specialists haven't adequately surveyed the project area. At the intersection of Forest Roads 569 and 5650 is a low-gradient area typical of many hydrologic divides that aren't ridgetop. There is a well-established dispersed camping site here. A few feet up Road 5650 from the intersection is a culvert, which was conducting a small stream on June 5. This is not a roadside ditch. There is extensive riparian vegetation fed by this stream in this area, which is fully encompassed within the Section 18 logging unit. And yet the FS says wetlands are not an issue to be considered in its NEPA.

The EA's conclusion that there will be no meaningful increase in sediment is contradicted by other facts. PACFISH/INFISH buffers cannot stop the sedimentation once it enters a stream, and skid trails, landings, and temporary roads link to existing roads and ditches, where runoff goes down the ditch to a culvert and is conducted into small streams, which carry sediment into larger streams. Below is an illustration of this; the hillside ditch of the road is filled with fine sediment. It was taken on the Clearwater National Forest in the Lowell WUI project in 2018 (before the road in this exact same area was blown out from a landslide).


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

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

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

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

This is how sedimentation is transmitted into a stream, which can be upstream of any logging buffers next to the stream.

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

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

The third photo (below) shows the inlet of the culvert—empty of water despite the storm because of the tempering effect of the native forest vegetation in the draw above the road. We point out that, despite the cloudburst, no flow occurs here, because there's no road effect above this culvert. (This also shows the culvert has begun to plug up since the time of installation or previous maintenance, meaning it is becoming vulnerable to a blowout during if a subsequent storm event does cause flow here.)

Those three photos show typical problems of roads without proper drainage features and/or lacking frequent enough maintenance, leading to accelerated erosion during storm or spring runoff events and necessitating more imminent maintenance steps needed to keep the road usable by the public. The EA ignores the fact that once the project is completed, there will be insufficient funds both in the project area and forestwide to deal with the inevitable ongoing erosive processes on a timely basis.

<u>Cumulative effects</u>

The EA's self-deceptive "no effects" conclusion for fish leads it to neglect performing *any* quantitative analysis considering the following statements:

> Future actions may include timber harvest on private lands and/or sale of the private timberlands to buyers who may convert the land use to residential development. Current plans and status of the private lands has not been shared completely with the Forest Service.
>
> …road maintenance and timber haul are expected to occur in riparian habitat conservation areas.
>
> There is private property surrounding the Section 16 Project area which has the potential to effect bull trout and bull trout DCH in the future downstream of the project area.

> Management on private land does not go through federal agencies so, the degree of impact cannot be determined due to the uncertainty on those lands. (Biological Evaluation)

In other words, the FS's mathematics maintains that zero plus something that we don't want to quantify must equal zero.

CONCLUSION

The FS's push to implement timber production from the Section 16 project area threatens to degrade the natural quality of this area of the NPCNF. The FS must prepare an Environmental Impact Statement in order to serve the purposes of NEPA, provide accurate analysis, and arrive at a better alternative to this proposal.

Sincerely submitted,

Jeff Juel, Forest Policy Director
Friends of the Clearwater (Lead Objector)
jeffjuel@wildrockies.org
509-688-5956

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

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