Friends of the Clearwater
Keeping Idaho's Clearwater Basin Wild
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May 26, 2023

Transmitted via online project portal at:
https://cara.fs2c.usda.gov/Public//CommentInput?Project=57827

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

Re: Dead Laundry Project Objection

Objection Reviewing Officer:

Pursuant to 36 CFR Part 218, Friends of the Clearwater (FOC), Alliance for the Wild Rockies (AWR), and WildEarth Guardians file this objection to the April 2023 Dead Laundry Final Environmental Assessment (Final EA, or EA) and Dead Laundry Draft Decision Notice and Finding of So Significant Impact (DN). This timber sale is proposed for the North Fork Ranger District of the Clearwater National Forest (a portion of the administratively combined Nez Perce-Clearwater National Forests). The Responsible Official is District Ranger Andrew Skowlund.

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

The selected alternative is described in the 2023 draft DN:

> In summary, this decision will:
> 1. Conduct regeneration harvest on up to 2,057 acres. The majority of treatments will maintain and/or re-establish long-lived early seral species by reducing stand densities and addressing insect and disease infestations.
> 2. Approve non-commercial mechanical hand treatment on 700 acres that were originally proposed for regeneration harvest (Units 24X, 25, 31, 39, 78, 84Y, 97, 101, 106, 127X, 128X, 130, 140, 158X, 24A, 26B, 26C, 77A, 77B, 92A). Work would be accomplished by using a combination of hand thinning, mastication, and controlled ignitions depending on vegetative and fuel characteristics. Work may include low or modified low thinning, precommercial thinning, slashing of sub-merchantable trees and brush, hand piling, pile burning, under/jackpot prescribed burning, or pruning and leave tree protection.
> 3. Conduct landscape fuels treatments on up to 1,350 acres.

4. Complete non-commercial fuels activities on up to 640 acres (See EA Table 4) to reduce potential fire behavior, facilitate fire suppression activities, increase the likelihood of suppression success within and adjacent to WUI areas by reducing surface and ladder fuels, increasing crown base height, and selecting for fire resilient early seral species.
5. Change proposed commercial treatment in OGE units 123A, 67A and 67B, (56 acres) to only hand/mechanical non-commercial fuels activities to assist protecting adjacent private lands, assist with wildfire suppression efforts and to protect the stands themselves. Old growth characteristics would be maintained.
6. Drop all proposed commercial Old Growth Enhancement (OGE) treatments in proposed units 19A, 40A, 40B, 41, 64, 88, 89,90, 90B, and 130A. **This results in no commercial Old Growth Enhancement (OGE) treatments for this project.**
7. Construct approximately 30 miles of temporary roads to facilitate harvest. These roads will be decommissioned after all project activities are completed.
8. Construct up to 12 miles of permanent roads. The majority of this construction will occur on previously decommissioned and/or unauthorized routes on the landscape where there is an existing road prism. These roads would be operational maintenance level 1, maintained in storage for long term forest management needs, following completion of project activities.
9. Conduct road maintenance as needed to accommodate safe log haul.

The DN also describes the supersized clearcuts it approves:

Figure 2. Dead Laundry Project Openings Over 40 Acres

Opening #	*NEPA Units*	*Opening Acreage*
1	15	48
2	59A	44
3	72, 72A	57
4	71	58
5	84	46
6	158	44
7	124, 127, 128, 37A, 37B, 38A, 37B, 68	158
8	56	89
9	48	83
10	107	89
11	109	73
12	30	432
13	33B, 33C	155
14	34A, 34B, 35, 63	116

We notice the Proposed Action in the April 2023 Dead Laundry Project "Final Environmental Assessment" does not reflect the same figures as cited above from the new DN. Instead, except for changes in road figures, the Proposed Action in that 2023 Final EA is identical to the Proposed Action as described in the December 2021 Environmental Assessment and December 2021 draft decision notice. With the uncertainty inherent with that contradiction, this objection reads very much like our previous objection.

We see no written rationale from the Forest Service (FS) for the DN's changes to the Final EA's Proposed Action. There is rough correspondence to issues we raised in previous comments and our earlier objection, but again there's no explanation as to why the FS has made the changes. The new DN does not refer to any of the issues we've previously raised as reasons for changes. The FS has had no dialogue whatsoever with FOC, AWR, or WildEarth Guardians since the original draft DN was published. And although many of the new DN's changes are in the right direction, the FS still does not make a convincing argument that the project as it describes represents sound, sustainable management.

The 2023 Final EA states the logging from 2,218 net acres is expected to yield 39.6 million board feet of timber (enough to fill nearly 8,000 log truck loads, based on figures from Oester and Bowers, 2009), although with the changes noted in the 2023 draft DN, the expected volume may be less.

We incorporate our comments on the NPCNF Draft Forest Plan/Draft EIS, because those comments discuss many of the same resource issues raised in this objection. We also fully incorporate all of our previous comments into this objection, and also the comments and objections written by Harry Jageman.

AWR participated during the public process as the Northern Rockies Lynx Management Direction (NRLMD) was developed, and we believe the Forest Plan/NRLMD does not consider the best available science. We incorporate the documentation of AWR's participation in the NRLMD public process, within this objection.

Attachments, references, and other incorporated documents mentioned in objection statements are included on data disks along with this or our previous objection, sent to the Forest Service Objection Reviewing Officer via US mail postmarked on this date.[1]

We request notice of all actions taken regarding the Dead Laundry project, pursuant to 40 C.F.R. § 1506.6. Please email all such notices to the contacts identified below for each organization.

INTRODUCTION

The 2021 Final EA states, "A 30-day comment period on the draft EA began on May 28, 2021. 9 comment letters and other reference materials were submitted to the Forest. Comments and reference materials were considered by the Forest in the development of this final EA." Whereas it's common for the Forest Service (FS) to publish a document containing all its written responses to comments on EAs, in this case no such document appeared on the project website during the original objection period. When asked for a copy of such a document, the District Ranger replied that we would have to request it under the Freedom of Information Act. So when we emailed the FOIA, the FS's response stated, "Due to the complex nature of your request an additional 10 days may be required. We anticipate a response to you on or before February 11, 2022." Apparently the FS finds it very difficult to simply email it to someone upon request, or

[1] Since the Forest Service already has the documents Objectors submitted with our February 14, 2022 objection, the documents we are now submitting concentrate on those not previously submitted.

better yet place it on the project website at the same time as the draft DN. It's possible the FS hadn't even written responses before we requested them.

Finally, on Friday afternoon, February 4, 2022 the FS emailed us its written responses to comments on original Final EA. From our reading of the responses to specific comments, it seems the FS mostly just refers back to the pages in the EA where the FS presented the issue to begin with, or likewise to other documents, some of which are on the website. We got no sense the FS processed our comments or "considered" how they might relate to the issues we commented on. The FS essentially treats the public involvement process as perfunctory. With this new objection period, the FS did not update its response to comments, nor provide any written responses to specific points expressed in previous objections.

The Ninth Circuit U.S. Court of Appeals provides a possible explanation for Forest Service non-transparency in a 2006 opinion: "We have noticed a disturbing trend in the [Forest Service's] recent timber-harvesting and timber-sale activities…It has not escaped our notice that the [Forest Service] has a substantial financial interest in the harvesting of timber in the National Forest. We regret to say that in this case, like the others just cited, the [Forest Service] appears to have been more interested in harvesting timber than in complying with our environmental laws." *Earth Island Institute v. United States Forest Service* 442 F.3d 1147 (2006).

Also, we noted the FS did not update a single specialist's report following the original EA comment period, although they were found under a heading, "Updated Specialist Reports for Final EA" on the current project website. (See our document, "Same old specialists reports" which is a screenshot of the project website. Also, we noticed the FS's response to comments document refers to some apparently mythical modifications of some of their reports.)

Within this objection, we've written all the headings of the sections from our EA comments and previous objection, to remind of our incorporating those documents.

This objection (including the documents it incorporates, e.g. EA comments) explains in detail how the EA analyses are inadequate. The Dead Laundry project is an example of an outmoded world view, one that destroys the natural world in a misguided attempt to "manage" it. At this point, the only way for the FS to **remedy** this situation is for it to withdraw its EA/DN and start over, prepare an Environmental Impact Statement (EIS) if any parts of its Dead Laundry proposal can pass scientific, economic and rational muster. More wisely, the agency should abandon this proposal altogether.

We look forward to discussing what the FS proposes to do in response to objections, at upcoming objection resolution meeting(s).

ENVIRONMENTAL ASSESSMENT DOES NOT COMPLY WITH NEPA

(We discussed this problem in EA comments at pp. 1-3.)

The purpose and need statement does not conform the letter or the spirit of the National Environmental Policy Act (NEPA). That there is only one action alternative is one problem.

NEPA requires a reasonable range of alternatives. The FS has drawn the purpose and need so narrowly that only its action alternative will fit. Because the FS hasn't considered any reasonable alternatives, it violates NEPA.

Suggestions by the public included use of temporary roads instead of new system roads, no new roads, construction of no or far fewer temporary roads, and more road decommissioning. The FS did not adequately consider such alternatives because it believes that the suggested alternatives "would not meet the purpose and need of the project of managing towards desired conditions (DFCs) and objectives identified in the Forest Plan." When referring to desired conditions and objectives identified in the Forest Plan, the FS is cherry-picks those regarding forest vegetation, and in fact uses some not even in the Forest Plan. And, the proposed action would make no progress toward desired conditions for water quality and aquatic habitat.

The alternatives suggested by the public ***are*** in alignment with direction for water quality and aquatic habitat found in the Forest Plan for the Clearwater National Forest (CNF). For example, one of the 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." Actions to improve water quality and aquatic habitat are clearly in alignment with the Forest Plan, and its direction for these resources should be on equal footing desired conditions for forest vegetation.

NATIONAL ENVIRONMENTAL POLICY ACT REGULATIONS

(We discussed this in EA comments at pp. 3-4.)

AN ENVIRONMENTAL IMPACT STATEMENT IS REQUIRED

(We discussed this in EA comments at pp. 4-5.)

Because the project may have a significant impact, the Forest Service must prepare an environmental impact statement.

From the dimensions of impacted acreage alone, the proposed action will likely have a significant impact on the environment and thus the FS must prepare an Environmental Impact Statement (EIS) for this project. The Council for Environmental Quality (CEQ) regulations require agencies to prepare an EIS if a project may significantly affect the human environment. CEQ regulations define significance in terms of context and intensity, which includes the scope of beneficial and adverse impacts, unique characteristics of the geographic area, degree of controversy, degree of uncertainty, the degree to which an action may affect species listed or critical habitat designated under the Endangered Species Act, and whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the

environment. 40 C.F.R. § 1508.27 (defining "significantly"). This project may significantly affect the human environment because, inter alia, it:

- Will cause significant impacts, both beneficial and adverse. Specifically, the massive amount of regeneration harvest (effectively clearcuts) across 3,580 acres requires Regional Forester approval since a total of 26 harvest units will exceed the 40-acre limit. Eight exceed 100 acres, and the largest would result in a staggering 432-acre clearcut. Any suggestion that such actions do not constitute significant adverse impacts would be arbitrary and capricious, particularly in light of the routine authorizations issued by Regional Forester Marten, as documented by Friends of the Clearwater (*see* Bilodeau and Juel, 2021).
- Involves a geographic area with unique characteristics, including ecologically critical areas such as areas of connectivity for grizzly bears dispersing from recovery areas, as well as in the Moose Mountain Inventoried Roadless Area (IRA) and within an uninventoried roadless area adjacent to the Hoodoo IRA.
- Involves effects on the human environment that are likely to be highly controversial, including the use of regeneration harvests to mimic natural disturbance patterns.
- Involves effects that are highly uncertain or involve unique or unknown risks, which is certainly the case in the context of climate change.
- Is related to other actions with cumulatively significant impacts, as we further discuss below.
- May adversely affect species listed or critical habitat designated under the Endangered Species Act (ESA), including grizzly bear (given the increase in road densities that can further hinder habitat connectivity and thus recovery), Canada lynx, and bull trout.

Assumptions And Uncertainty About Vegetation Treatments And Wildfire

We question the agency's assumptions that reducing tree densities and fuel loadings will result in less intense fire behavior. Powell, 2019: ("what fire scientists call a forest's 'fuel load' is not the main cause of large, unstoppable fires; it's climate factors such as temperature, humidity, and especially wind. But the weather is ephemeral and invisible, while thick underbrush is easy to see and photograph); see also, ProPublica, 2020: "Despite What the Logging Industry Says, Cutting Down Trees Isn't Stopping Catastrophic Wildfires" and Mountain Town News, 2020: "Colorado's Troublesome megafire".

Science shows that fuel treatments have a modest effect on fire behavior, and that fuel reduction does not necessarily suppress fire. Lydersen, et al., 2014 explain that reducing fuels does not consistently prevent large forest fires, and seldom significantly reduces the outcome of large fires. Studies from the FS's own Rocky Mountain Research Station refute the assumptions that vegetation treatments will result in less intense fire behavior. Calkin, et al., 2014 explain, "[p]aradoxically, using wildfire suppression to eliminate large and damaging wildfires ensures the inevitable occurrence of these fires")

Large fires are driven by several conditions that completely overwhelm 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.)

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 where fires later occur. 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 central to estimating likely risks, costs and benefits incurred with the treatment of "fuels." If fire does not affect treated areas while "fuels" are reduced, treatment impacts are not counterbalanced by benefits from reduction in fire impacts. 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."

"Fuel" treatments tend to make fire impacts worse—exacerbating the problems the FS is claiming to address. Fuel reduction may actually exacerbate fire severity in some cases since such actions leave behind combustible slash through at least one dry season, open the forest canopy to create more ground-level biomass, and increase solar radiation which dries out the understory. [Graham, et al., 2012; Martinson and Omi, 2013 (finding that in about a third of cases reviewed mechanical fuel reductions increased fire spread).] Also fuel reduction can exacerbate fire spread by opening up a forest to wind penetration. (Declaration of Dr. Joseph Werne, *Unite the Parks v. U.S. Forest Service*, E.D. Cal, 2021.)

We question the wisdom of attempting to control wildfire instead of learning to adapt to fire. 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 FS must recognize that past logging and thinning practices likely increased risk of intense fire behavior on this landscape. But instead of learning from these past mistakes, here the FS is committing to making the same mistakes by proposing widespread logging and repeated burning across the landscape. It is well-established that communities (homes) are best protected from fire by home hardening, and judicious removal of fuels within the surrounding 100-200 ft. radius. (Syphard et al. 2014; Cohen, 2000.) The FS fails to disclose the fact that addressing the home ignition zone will do more to protect property than the proposed activities.

We also question the need to reduce wildfire, a natural forest process. While some may view wildfires as tragic and the aftermath as a destruction zone, natural ecology shows otherwise. (See Powell, 2019, explaining how a young burned forest is an essential natural process and "nature's best-kept secret," providing new habitat for a plethora of birds, abundant wildflowers, insects, mushrooms, etc.). Further, in 2019 conservation scientists Dominick DellaSala and Chad Hanson published a study disputing the assumption that high-severity has increased in recent decades. In this megafire trend study, the researchers analyzed data on large high-severity burn patches across 11 western dry pine and mixed-conifer forests over three decades. They found no significant increase in the size of large high-severity burn patches since the early 1990s. (DellaSala and Hanson, 2019.) Most research studies define high severity as 90% tree mortality. (Moritz et al. 2014). The FS overestimates the risk of increasing of the amount of high severity

wildfire. This leads to a bias towards carrying out widespread and intensive fuel treatments to respond to the ostensive increase in high intensity fire.

Impacts from climate change, including changing weather patterns and drought, are other driving factors for wildfires. (Id.) Instead of focusing on thinning and prescribed burning to manage the forest, the FS should focus on changing its practices to adapt to the changing climate. At an absolute minimum, these studies demonstrate that the proposed treatments are controversial, ill-supported, and have the potential for significant impacts requiring preparation of an EIS.

Assumptions and Uncertainty About Vegetation Treatments and Forest Resilience

The FS believes that increased tree density and tree succession have resulted in a higher susceptibility to insects and disease, and improving resistance to insects means restoring and maintaining more open (less dense) stand structures to reduce tree stress. Yet, the best available science brings into question many FS underlying assumptions about 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").

Ultimately, science provides only weak support for vegetative treatments as a way to improve forest resilience to large-scale disturbances such as high severity crown fire and insects, and numerous studies question this approach or have found it to be ineffective. In addition, all mechanized treatments guarantee damage to ecosystem components, including soils, mycorrhizal networks, aquatics, and vegetation; they also have the potential to spread exotic plants and pathogens.

In a literature review, Simons (2008) states, "Restoration efforts aimed at the maintenance of historic ecosystem structures of the pre-settlement era would most likely reduce the resilient characteristics of ecosystems facing climate change (Millar 1999)."

The FS claims fuel treatments will help prevent outbreaks of bark beetle, but they virtually always leave slash through the next warm season, when a bark beetle outbreak could occur. Slash should not be left on the ground through the warm season following thinning treatments. This could precipitate a bark beetle outbreak.

The FS must prepare an EIS to carefully consider the best available science on likely impacts, and determine the efficacy of specific treatments.

FOREST SERVICE IS ILLEGALLY IMPLEMENTING THE DRAFT REVISED FOREST PLAN

(We discussed this in EA comments at pp. 5-13.)

Flawed rationales for the claimed purpose and need.

The FS's newly concocted "desired conditions" result in cursory rationales to support a massive timber extraction proposal, in part by citing departures from historic conditions, 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 (Chief's Wildland Fire Direction, August 2, 2021). The agency's underlying assumptions are both highly controversial and uncertain, thereby necessitating analysis under an EIS. 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).

The Vegetation Resource Report discloses that, "even after implementation of the Proposed Action, future treatments will be needed to continue moving the project area into desired ranges. Treatment must occur over both space and time to meet and remain within desired conditions." The FS is not citing the current forest plan when it's talking about "desired ranges" etc. and there has never been any NEPA process which examines the impacts of such actions or potentially better alternatives. Whatever plan the Vegetation Resource Report is talking about is not the CNF Forest Plan.

In describing Project "desired" vegetation conditions, no less that six times this Vegetation Resource Report states, "Forest Plan Revision Desired Conditions for MA3 (Probert 2017**), very similar to E1 MA**" (emphasis added). This depiction of similarity is not based upon any genuine comparison of existing Forest Plan direction for Management Area E1 and the draft RFP's Management Area 3 (MA3). For one example, current CNF forest plan Management Area E1 Timber Standards include 4.c.: "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." However "Forest Plan Revision Desired Conditions for MA3" includes nothing close to the current CNF forest plan old growth direction for Management Area E1.

Forest Plan Appendix H includes a requirement: "Old-growth stands should be distributed across the major habitat types found in the Forest in proportion to their occurrence." This should be considered a desired condition under the current management scheme, because it's direction in the Forest Plan. But the EA fails to address that portion of the Forest Plan Standards.

To ensure that the agency has taken the required "hard look," courts hold that the agency must utilize "public comment and the best available scientific information." *Biodiversity Cons. Alliance v. Jiron*, 762 F.3d 1036, 1086 (10th Cir. 2014) (internal citation omitted). The FS fails

to demonstrate the widespread use of specific proposed treatments will improve ecosystem resilience as part of the desired condition. There is no assurance that attempting to attain such a goal will in fact restore ecological integrity. The FS relies on uncertain and controversial assumptions that the proposed treatments will effectively achieve the intended purposes and meet the stated needs.

CUMULATIVE EFFECTS AND MONITORING

(We discussed this in EA comments at pp. 13-15.)

The FS ignores—or is apparently unaware of—recent vegetation (and other) management projects it has authorized and implemented in the Dead Laundry project area. This results in omission of relevant recent FS management from the EA. The FS seems intent on erasing much of the history of its management. Therefore the FS fails to explain how this present proposal fits in with its overall management scheme.

For one example, there's the Deception Fuels Project, Decision Memo signed 1/20/2009 (see Deception Fuels DM.pdf). Comparison of the Dead Laundry activities map and the map included with that DM reveals that most of the acreage which experienced "fuel reduction" under the Deception Fuels Project is being proposed for treatment once again. The main objective of Deception Fuels was to thin out "young, dense overstocked stands that provide continuous ladder fuels" to reduce fire hazards to adjacent landowners—similar to Dead Laundry objectives. What went wrong—such that many of the same areas are once again needing "treatment"? Or was the FS deceiving the landowners in claiming to be adequately reducing the fire hazard? And are those landowners even entitled to—or in need of—endless and repeated U.S. taxpayer dollars for their protection?

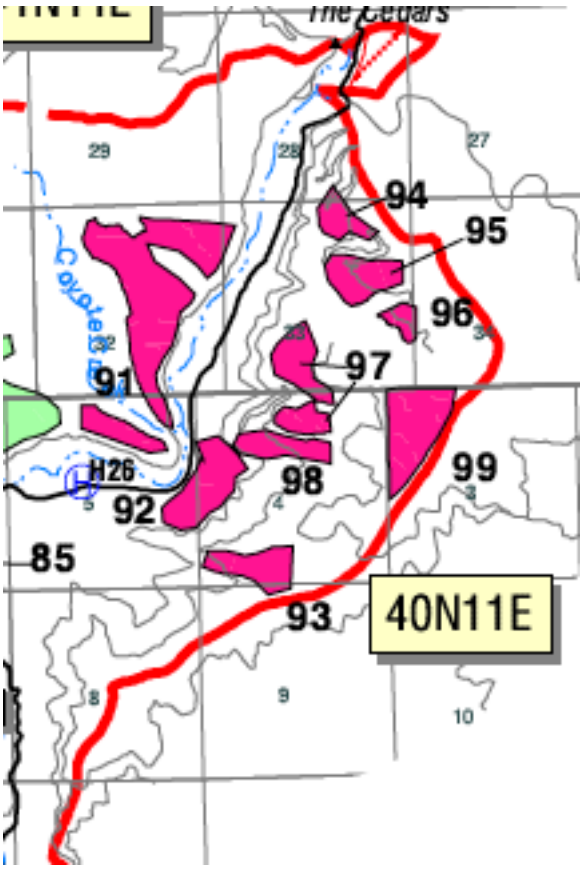
A similar situation exists with the Independence Thinning Timber Sale, Decision Memo signed 8/8/2006 (*see* Independence Thinning DM.pdf). That earlier objective was to "improve forest health" not unlike an objective of Dead Laundry. Again, there is much overlap of proposed Dead Laundry acreage with the Independence Thinning acreage. So what went wrong—and why is treatment needed again? Was the FS being deceptive in claiming it was accomplishing significant improvements in forest health with the recent Independence Thinning Timber Sale? Or maybe the FS simply failed to properly examine existing conditions before preparing the Dead Laundry EA?

The FS authorized a larger landscape project just a few years before those—the Middle-Black timber sale. According to the Final EIS, its purposes were to:

- Restore vegetative successional stages across the analysis area to a more natural condition, recognizing historical patch sizes and locations.
- Restore white pine as the major cover type on LTAs where it historically occurred and improve forest health by reducing the current high levels of grand fir, Douglas-fir, and western redcedar cover types through planting western white pine and western larch,
- Actively restore fire to maintain healthy ecosystems and reduce the risk of widespread catastrophic wildfire.

- Protect the natural condition and biodiversity of the area by eliminating new invaders (a weed species not previously reported in the area), reducing the extent and density of established noxious weeds, and preventing or limiting the spread of established weeds.
- Begin watershed restoration by repairing upland sediment sources, preventing potential failures, and removing passage barriers to fish and other aquatic organisms.

This map from the Middle-Black EIS shows the overlap portion between that timber sale and Dead Laundry:



The key from that map specifies those reddish units for "Prescribed Burns of logging slash and brush in preparation for planting." Comparison of this map with maps of the Dead Laundry proposal reveals significant overlap of the two project's vegetation manipulations. That map also displays "Major Roads" and "Collector and Local Roads" not shown on Dead laundry maps.

Since no cumulative effects analysis examining the effects or results of recent projects in the Dead Laundry project area is found in this EA, the outcome of those projects are apparently unknown to this ID Team—which minimizes the credibility of the Dead Laundry reports and analyses. We remind the FS that our comments on the EA included:

> It is vital that the results of past monitoring be incorporated into project analysis and planning. The following must be disclosed:
> - 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.

ROADLESS AREAS

(We discussed this in EA comments at pp. 15-19.)

The FS is required to discuss a project's impacts on areas of "sufficient size" for future wilderness designation. *Lands Council*, 529 F.3d at 1231, citing 16 U.S.C. § 1131(c).

The FS doesn't recognize best scientific information that indicates the high ecological integrity and functioning of roadless and unmanaged areas. Management activities have damaged the streams and other natural features found in the project area watersheds. The FS has yet to demonstrate it can extract resources in a sustainable manner in roaded areas.

Unroaded areas greater than about 1,000 acres, whether they have been inventoried or not, provide valuable natural resource attributes that are better left protected from logging and other management activities. Scientific research on roadless area size and relative importance is ongoing. Such research acknowledges variables based upon localized ecosystem types, naturally occurring geographical and watershed boundaries, and the overall conditions within surrounding ecosystems. In areas such as the Dead Laundry project area, where considerable past logging and management alterations have occurred, protecting relatively ecologically intact roadless areas even as small as 500 - 1,000 acres has been shown to be of significant ecological importance. These valuable and increasingly rare roadless area attributes include: water quality; healthy soils; fish and wildlife refugia; centers for dispersal, recolonization, and restoration of adjacent disturbed sites; reference sites for research; non-motorized, low-impact recreation; carbon sequestration; refugia that are relatively less at-risk from noxious weeds and other invasive non-native species, and many other significant values. (See USDA Forest Service, 2000e.)

See Friends of the Clearwater, 2020 for an observation on how roadless rules are being exploited to downgrade the wilderness values and roadless characteristics of IRAs.

As we pointed out in our EA comments, the USFS Northern Region explains the concept of "Roadless Expanse" in a document entitled "Our Approach to Roadless Area Analysis of Unroaded Lands Contiguous to Roadless Areas" (USDA Forest Service, 2010e). In summary, this paper is FS interpretation of federal case law/judicial history regarding the Roadless Area Conservation Rule. It states that "projects on lands contiguous to roadless areas must analyze the environmental consequences, including irreversible and irretrievable commitment of resources on roadless area attributes, and the effects for potential designation as wilderness under the

Wilderness Act of 1964. This analysis must consider the effects to the entire roadless expanse; that is both the roadless area and the unroaded lands contiguous to the roadless area." (Emphasis added.) This is also consistent with the ruling in *Kettle Range Conservation Group v. US Forest Service*, 971 F. Supp. 480 (D. Or. 1997). Yet the EA ignores this, and logging is proposed in unroaded areas along the boundary of the Hoodoo IRA, which would degrade wilderness character and commit them to a status not likely to be proposed as Wilderness in the upcoming revised forest plan.

FIRE POLICY AND FIRE ECOLOGY

(We discussed this in EA comments at pp. 19-38.)

Missoula CURRENT
Missoula's News Journal

Missoula County to Forest Service: More emphasis on home ignition zones

By Martin Kidston
December 23, 2021

https://missoulacurrent.com/outdoors/2021/12/missoula-ignition-zones/

In a letter to the Forest Service, Missoula County is asking the local agency to make greater emphasis of home ignition zones and the role they can play in preventing the devastating fires that have plagued other Western communities in recent years.

Relying on forest management alone may leave some with a false sense of security, the county said.

"There might be good reason to do those forest treatments, for landscape ecology or restoration purposes," said Commissioner Dave Strohmaier. "But nobody's hope should be elevated to think that's going to appreciably do anything to save your home in a fire."

The county's letter, addressed to the Missoula Ranger District, relates to the Wildfire Adapted Missoula plan being developed by the Lolo National Forest. Among other things, the plan calls for a number of forest treatment projects across more than 455,000 acres, including 177,000 acres on Forest Service lands.

Several demonstration projects have already taken place, such as the Grant Creek Fuels Reduction project, the Marshall Woods Forest Restoration Project and maintenance work in Pattee Canyon.

The plan's environmental assessment was recently released and the county has commented throughout the process. The Forest Service recently issued its Record of Decision, though the county believes it doesn't give adequate play to home ignition zones.

"There's 100 years of institutional inertia focused on fire control and some fundamental lack of awareness," Strohmaier said. "The sort of community destruction we've seen, whether it's those abutting forest lands or in Denton, where there's not a tree in site, has much more to do with what you do in your home ignition zone than some of the forest treatments that are sometimes promised as a means to protect your community."

The county believes the agency's Wildfire Adapted Missoula plan must parallel efforts to restore the role that fire plays on the landscape. The county also acknowledged that new tools are needed as climate change unfolds.

That may challenge the "institutional culture" of the Forest Service, the county wrote.

"Largely, we commented on the importance of home ignition zones relative to community wildfire resiliency," said county planner Chet Crowser. "It's fair to say we haven't felt like those concerns have been heard as well as we'd like, but the conversations have moved forward."

Strohmaier and Jack Cohen, a retired fire scientist with the Fire Sciences Laboratory in Missoula, have been vocal in recent years in asking the Forest Service and the public to abandon their expectations that 100% of all wildland fires can be doused 100% of the time.

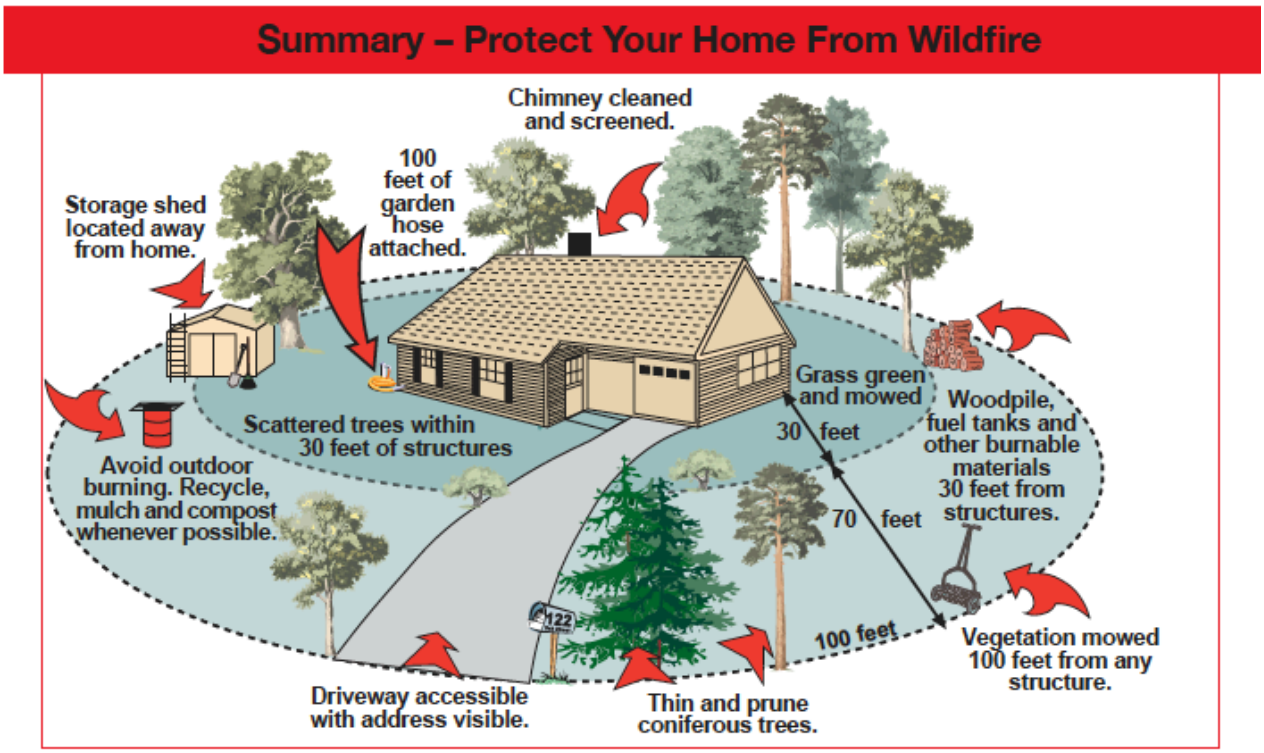
Rather, they've worked to shift the conversation to the role home ignition zones play in the equation. In Cohen's research, he's seen houses burn to the ground while nearby trees are still green and wooden fences still stand.

Lofted embers can spark new fires outside the burn and neglecting the home ignition zones can lead to disaster. Keeping fires outside the urban interface may rely more heavily on preparation than on large scale forest treatment plans, Strohmaier said.

"There's still an opportunity to have some of that language included in a modified record of decision," Strohmaier said of the Forest Service plan. "There's also some other things on our end we can start working on, like updating our Community Wildfire Protection Plan, which admittedly might need to have the dust blown off it a little bit."

The EA states, "The heart of the project area contains private inholdings and has been identified as Wildland Urban Interface (WUI) by Clearwater County." The EA doesn't demonstrate the FS is applying the legal WUI definition. Clearwater County is not the proper authority. Furthermore, it is a huge stretch to consider a few private inholdings, basically summer cabins far from any genuine urban area constitute anything "urban" or compel spending taxpayer money to "reduce risks."

Objectors remind the FS that scientific research has concluded the Dead Laundry "hazardous fuel reduction" techniques increase the severity of subsequent fire, including increase the rate of fire spread—as our comments on the EA state. And in failing to inform readers of these important factors, the FS violates NEPA. Worse, the FS fails to provide the kind of vital information that could lead property owners to implement critical firewise steps they are uniquely positioned to implement.



From LIVING WITH FIRE: HOMEOWNERS' FIRESAFE GUIDE FOR MONTANA, 2009

"The key is to reduce fire intensity as wildfire nears the house. Consequently**, the most important person in protecting a house from wildfire is not a firefighter, but the property owner**. And it's the action taken by the owner before the wildfire occurs (such as proper landscaping) that is critical." (Living With Fire, 2009 emphasis added.)

The Firesafe Guide emphasizes that fuel conditions within the Home Ignition Zone ("the home itself and the immediate surrounding 30 to 200 feet") most influence structure survival during a wildfire. Yet instead of acting as a resource for homeowner education on this topic, the FS instead chooses to propagandize that "fuel" conditions well beyond the Home Ignition Zone

(HIZ) are most important—attempting to harness the public's fear so as to neutralize opposition to its timber production program.

And hence the same old false solutions being peddled by the Biden Administration, in publicizing its "paradigm shift" in January of this year. An article in the *Missoulian* ("Fire Strategy Stuck with old tactics, experts warn") quotes retired Forest Service fire scientist Jack Cohen responding to the government's latest set of false solutions. Cohen stated, "I saw no new strategy but rather a potential increase in the same fire control strategy of 'fuel treatment' to enhance fire control." Below are more passages from that article:

> Cohen found no evidence that the writers considered best available science, which shows that wildland-urban disasters are mainly a factor of how houses catch fire, not forest management, he said. He cited extensive research explaining how community wildfire destruction (incidents where more than 100 homes get destroyed) happens when fires overrun the fuel breaks and forest treatments intended to control them. But it's not the "big flames of high intensity wildfires (that) cause total home destruction," but rather "lofted burning embers (firebrands) on the home and low intensity surface fire spreading to contact the home" that did the damage, often hours after the main fire had subsided or moved elsewhere.
>
> "The use of tired, old, ill-defined language such as 'hazardous fuels' does little to describe what the fuels (i.e., wildland vegetation) is hazardous to," said Missoula County Commissioner Dave Strohmaier... "We seem to have learned nothing from recent fires that have resulted in community destruction, such as Denton, Montana. This was a grass fire, and there were no forests to thin or otherwise eliminate the risk of crown fire from."
>
> "Community destruction is (a home ignition zone), not a fire control problem," Strohmaier said. Throwing more money at treatments that won't get the expected outcomes "does no one any good and sets up false expectations as to what will truly reduce the risk of community destruction and improve ecological and community resilience."

The perspectives of the former Forest Service researcher and the Missoula County commissioner are further illustrated:

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

(Cohen and Strohmaier, undated.) Responsibility for reducing risk of fire burning private structures ought to and does rest squarely on the shoulders of the owners of those structures—not on U.S. taxpayers.

The FS omits discussion regarding how the WUI boundary was delineated, which undermines informed environmental decisionmaking. Counties all across the country have inconsistently

delineated their WUI boundaries, and in many cases, counties have included large swaths of backcountry in their WUI boundaries for the sake of expediting logging operations far from homes and communities. A discussion about Clearwater County's WUI delineation is relevant because one of the stated needs for the project is to reduce hazardous fuels within the WUI. As such, it is imperative for the public and the agency to understand how the WUI was delineated.

Harry Jageman scoping comments stated:

> You also overstate concerns regarding private inholdings which only amount to a few hundred acres of old historical mining claims. The cabins are largely used by miners with mineral claims in the Moose Creek drainage during the summer and in the fall as hunting cabins. There are no roads maintained during the winter and all winter access is by snowmobile over several miles of difficult terrain. It is hardly an area where one would set up a permanent residence or a location that should be considered as a Wildland Urban Interface. There are much more appropriate and higher risk areas for the expenditure fuel treatment dollars than this location.

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

Former FS Deputy Chief James Furnish weighs in:

> For a long time, we have heard that the problem is in the forests, and that we must ramp the pace and scale of work in these forests. The proponents ask for our continued faith that scaling is possible, even though they have been at it for nearly 30 years and most of our home and community loss happens in grasslands and shrublands.
>
> Let me begin by citing the large Jasper Fire, in SD's Black Hills National Forest, circa 2000. Jasper Fire burned almost 90,000 acres of intensively managed Ponderosa pine forest, about 10 percent of the entire national forest. Human caused, it was ignited on a hot, dry, windy July day – quite typical of weather in peak burning periods nowadays. Suppression efforts were immediate and used every tool in the agency's tool box… to no avail. Notably, the burned terrain exemplifies what we consider the best way to reduce fire intensity, if not fireproof, a forest. This mature forest of small saw timber had been previously thinned to create an open stand intended to limit the likelihood of a crown fire. Yet, the fire crowned anyway and raced across the land at great speed, defying control efforts. Much of the area remains barren 20 years later, while the Forest Service slowly replants the area.
>
> I cite this example, because it represents precisely what agencies posit as the solution to our current crisis: 1) aggressively reduce fuel loading through forest thinning on a massive scale of tens if not hundreds of millions of acres (at a cost of several $ billion, and then do it again), while trying to 2) come up with sensible answers about how to utilize the finer woody material that has little or no economic value; and 3) rapidly expanding the use of

prescribed fire to reduce fire severity. These solutions are predicated on the highly unlikely (less than 1%) probability that fire will occur exactly where preemptive treatments occurred before their benefits expire. These treatments are not durable over time and space, and only work if weather conditions are favorable, and fire fighters are present to extinguish the blaze.

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

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

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

In his opinion piece in the *Missoulian*, biologist and fire ecologist Hutto (2022) echoes those points. Also see DellaSala (2022). Yet as the EA reveals, the FS keeps spewing the same old fear mongering propaganda, representing to the public that logging is needed to protect firefighters and homeowners from fire.

During hot, dry, and/or windy conditions, no amount of "fuel reduction" would significantly alter any of the FS's ill-defined metrics and fire concepts. It is during those occasions when wildland fires cover the most acres, most quickly—largely nullifying all "fuel reduction" and suppression efforts.

Large fires are driven by several conditions that completely overwhelm 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 instead of learning to adapt to fire. 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 FS must recognize that past logging and thinning practices likely increased risk of intense fire behavior on this landscape. But instead of learning from these past mistakes, here the FS is committing to making the same mistakes by proposing widespread logging and repeated burning across the landscape. It is well-established that communities (homes) are best protected from fire by home hardening, and judicious removal of fuels within the surrounding 100-200 ft. radius. (Syphard et al. 2014; Cohen, 2000.) The FS fails to disclose the fact that addressing the home ignition zone will do more to protect property than the proposed activities.

We incorporate the John Muir Project document "Forest Thinning to Prevent Wildland Fire …vigorously contradicted by current Science"

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

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

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

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

FS researchers have long since recognized that logging, especially the extensive and homogeneous logging "regeneration" cuts create, actually *increase* fire severity where the fire might otherwise have been severe. Stone et al. (2008), a technical report based on a presentation in 2004 (Proceedings of the Second International Symposium on Fire Economics, Planning, and Policy: A Global Perspective), discuss a study of a forested area southeast of Missoula, Montana affected by the Cooney Ridge fire complex. The scientists found fire severely and uniformly burned a watershed which had been extensively and homogeneously logged, in contrast to an adjacent watershed with higher fuel loads but greater heterogeneity which experienced mosaic of burn severities. They conclude, "Harvesting timber does not translate simply into reducing fire risk." Similar results have been repeatedly found in other published science.

Also see documents:

- Fire Strategy Stuck with old tactics, experts warn
- Colorado's Suburban Firestorm
- Forests need fire — communities do not
- The 'ecological hate speech' developed around wildfire
- Nuance in Wildfire Policy is Badly Needed
- Living With Fire
- Living With Fire, 2009
- A New Direction for California Wildfire Policy
- As California burns, some ecologists say it's time to rethink forest management
- Logging makes forests and homes more vulnerable to wildfires
- Scientists Letter, 2018
- Scientists Letter, 2021

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, $\geq$18 tree-ring reconstructions, 15 land survey reconstructions, and analysis of forest inventory data. Our rebuttal shows that evidence omitted in the review left a falsification of the scientific record, with significant land management implications. The low-severity model is rejected and mixed-severity model is supported by the corrected body of scientific evidence.

So let's follow the money. Baker et al., 2023 point out that many research scientists who are funded by or work for the FS promote the "low severity fire model" so they can justify the myth that logging will prevent forests from being "destroyed" by the prevailing fire regime: mixed- and high-severity fires. The so-called "emergency situation" is a smokescreen for expedited logging. Since fire cannot be entirely removed from this landscape that will continue to feature mixed- and high-severity fires, actions taken in the Home Ignition Zone of privately owned structures are the real key for structure survival. Furthermore, the public has never been provided a guarantee of hazard-free ingress/egress—nor should we. That would essentially involve an annual removal of all combustible vegetation adjacent to roads, and furthermore everywhere in the fireshed from whence a fire could emit firebrands that could be carried by the thermal forces

and the wind onto private properties—a ridiculous proposition whereby the U.S. taxpayers provide infinite subsidies for the uncertain benefits of a few.

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

It makes no scientific sense to replace dense conifer forests with clearcuts and densely packed little trees–in the name of reducing severe fire behavior. Atchley et al., 2021 note that heavier fuels actually slow fire spread. They also state:

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

Good graphics can be found on the interagency "Living with Fire" publications, such as can be found at: https://www.fs.usda.gov/Internet/FSEDOCUMENTS/fsbdev3020876.pdf. This booklet spans many regions and on page 4 provides the graphics showing that an open pine forest can burn at 150 acres per hour while dense conifer forest can burn at 15 acres per hour with 20 mph. wind speeds.

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

Summing up, the FS has failed to properly analyze and consider the fact that the proposed logging will actually create conditions for more rapid and severe fire spread and cumulative impacts in the coming decades.

The draft EIS for the forest plan revision recognizes that the mixed-severity fire regime is the most prevalent one on the NPCNF. 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)." Lesmeister et al. (2019) discuss in more enlightened terms the kind of fire events demonized in FS analyses:

> 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).

Lesmeister et al., 2019 discuss the positive role that old-growth ("untreated" old growth) plays in countering impacts from high-severity fires—protecting these areas are a part of the climate solution, not a problem to be logged. If there is any increase in the frequency of fire-severity on the landscape, it is likely due to the FS's management practices. Regarding the logging of old growth, best available science indicates it isn't justified.

There is no coherent plan for integrating wildland fire into this ecosystem. This is all about continuing a repressive and suppressive regime, however the FS has never conducted an adequate cumulative effects analysis of forestwide fire suppression despite the vast body of science that has arisen since the Forest Plan was adopted. The FS's idea 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.

With perpetual fire suppression under FS management of the project area virtually assured according to the Forest Plan and EA, proposed management activities would occur periodically, because they would be needed to maintain vegetation in the FS's version of safer conditions. The FS fails to provide a full and detailed accounting of the costs to those who would pay for this never-ending "fuels" cycle—the American public. It is also in the FS's best interest to know what sort of long-term financial commitments it is making. Further, the FS fails to disclose the inherent uncertainties of perpetually funding these activities, and the implications of their being left undone.

The FS must have a detailed long-term program for maintaining the allegedly safer conditions, including how areas will be treated in the future following proposed treatments, or how areas not needing treatment now will be treated as the need arises. 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 has not conducted a forestwide cumulative effects analysis of FS fire suppression policies. The FS also has not conducted ESA consultation on its forestwide fire management plan.

Regardless of FS claims of unnatural conditions due to fire suppression, the agency doesn't provide scientific support for its claims that disturbance regimes have somehow been altered to the degree that its proposed actions are justified.

FOREST SERVICE IS DECEIVINGLY AND DELIBERATELY EXACERBATING CLIMATE CHANGE, ALREADY ON AN EXTREMELY DANGEROUS TRAJECTORY

(We discussed this in EA comments at pp. 38-49.)

The FS rejects peer reviewed scientific articles and other documents submitted for consideration by the public, in its apparent belief that only its opinion on this extremely serious and controversial subject is worthy of consideration.

Although we have been pushing the FS to recognize the scale of the climate crisis and find appropriate responses, the agency just more deeply augurs its head into the sand. The FS is willfully participating in the destruction of the Earth's atmosphere. All of the scientific conclusions we cite are common knowledge by now, so it takes callous, active denial to ignore it.

In the recent revised Forest Plan Draft EIS for the Custer-Gallatin National Forest, the FS's words are, "Climate change is expected to continue and have profound effects on the Earth's ecosystems in the coming decades (IPCC 2007)." As alarming as the words in the FS's cited IPCC 2007 are, more recent reports from the Intergovernmental Panel on Climate Change (IPCC) makes that 2007 report seem optimistic. See e.g., IPCC Special Report, 2014 for starters.

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

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

A *Missoulian* article on the release of that report quotes United Nations Secretary-General Antonio Guterres: "Humanity is on thin ice — and that ice is melting fast. …Our world needs climate action on all fronts —everything, everywhere, all at once." That article quotes from the report, "The choices and actions implemented in this decade will have impacts for thousands of

years" calling climate change "a threat to human well-being and planetary health." It quotes report co-author and water scientist Aditi Mukherji: "We are not on the right track but it's not too late. Our intention is really a message of hope, and not that of doomsday."

From a 2022 report, "The rise in weather and climate extremes has led to some irreversible impacts as natural and human systems are pushed beyond their ability to adapt." (IPCC Climate Change 2022, Impacts, Adaptation and Vulnerability, Summary for Policymakers - Working Group II Contribution.) Also see news accounts "AP-Report warns of looming climate catastrophe", "BBC-IPCC report warns of 'irreversible' impacts of global warming" and "AP-UN 'house on fire' report".

There is extremely urgent scientific concern expressed over the imminent effects of climate change on the earth's ecosystems, and therefore on civilization itself. The IPCC's 2018 report states that if greenhouse gas emissions continue at the current rate, the atmosphere will warm up by as much as 2.7 degrees Fahrenheit (1.5 degrees Celsius) above preindustrial levels by 2040, inundating coastlines and intensifying droughts and poverty. The report paints a much darker picture of the immediate consequences of climate change than previously described, and says that avoiding the damage requires transforming the world economy at a speed and scale that has "no documented historic precedent."

The 2018 IPCC report describes a world of worsening food shortages and wildfires, and a mass die-off of coral reefs as soon as 2040—a period well within the lifetime of much of the global population. The report "is quite a shock, and quite concerning," said Bill Hare, an author of previous IPCC reports and a physicist with Climate Analytics, a nonprofit organization. "We were not aware of this just a few years ago." The report was the first to be commissioned by world leaders under the Paris agreement, the 2015 pact by nations to fight climate change.

The authors of the 2018 IPCC report project that if greenhouse gas emissions continue at the current rate, the atmosphere will warm by as much as 2.7 degrees Fahrenheit (1.5 degrees Celsius) above preindustrial levels by 2040, inundating coastlines and intensifying droughts and poverty. Previous work had focused on estimating the damage if average temperatures were to rise by a larger number, 3.6 degrees Fahrenheit (2 degrees Celsius), because that was the threshold scientists previously considered for the most severe effects of climate change. The 2018 IPCC report, however, shows that many of those effects will come much sooner, at the 2.7-degree mark.

Executive Order 13990 of January 20, 2021 (Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis) sets the policy of the Biden Administration to "…reduce greenhouse gas emissions; to bolster resilience to the impacts of climate change…". Executive Order (EO) 13990 Section 5 (Accounting for the Benefits of Reducing Climate Pollution) at (a) states, "It is essential that agencies capture the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account. Doing so facilitates sound decision-making, recognizes the breadth of climate impacts, and supports the international leadership of the United States on climate issues."

Executive Order 14008 of January 27, 2021 (Tackling the Climate Crisis at Home and Abroad)

begins, “The United States and the world face a profound climate crisis. We have a narrow moment to pursue action at home and abroad in order to avoid the most catastrophic impacts of that crisis and to seize the opportunity that tackling climate change presents.” Further, President Biden’s Executive Order 14027 calls it a “**global** climate crisis” (emphasis added).

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

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

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

We incorporate our August 5, 2022 letter to the Forest Service and BLM in response to the July 15, 2022 Biden Administration Request For Information seeking input on the development of a definition for old-growth and mature forests on Federal lands and requesting public input on a series of questions.

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

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

(Emphasis added.) Part of any reasonable interpretation of “inventory” as applied to forests would be—is any particular place in a forest **inside** the mature and old-growth inventory, or is it **not**? At this point, the Biden Administration has not produced an inventory that could answer such a question, despite the suggestions it has. No spatially specific or ecological definition of old growth was adopted, which would have incorporated old growth and mature forests’ relationships to wildlife, water, and many other natural values.

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)” released along with the French memo, 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 the reports just released nor in EO 14072 itself recognize the threat of logging to old growth and mature forests.

At this point, any lofty goals for EO 14072 as claimed by the president remain remote. Of huge concern to the global community, this includes prioritizing the role of forests as natural climate solutions, instead of targeting them to serve the prevailing capitalist consumptive values that chronically threaten the entire biosphere and our collective future.

DellaSala, et al. (2023) argue:

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

The Draft EIS for the NPCNF’s revised forest plan admits, “The current 1987 Forest Plans do not address climate change.” That same Draft EIS includes these definitions:

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

Neither of the terms “Carbon stock” or “carbon pool” appeared in the Dead Laundry EA. Nor did the word “climate” appear, except as part of the title of a section of the EA. This is the EA’s analysis of the subject in its entirety:

See Talberth, 2023 for a discussion on how the draft EIS and draft Revised Forest Plan fail to

account for life cycle greenhouse gas emissions (emissions from logging, road building and livestock grazing) and how they're elevated over the long term as compare to natural, unlogged and ungrazed forests); (b) changes in carbon sequestration capacity (logging turns forest from net carbon accumulators into carbon emitters for at least 15 years after logging), and (c) changes in climate resiliency—which means how more much less logged forests are capable of withstanding the ongoing impacts of climate change as compared to natural mature and old forests. There has been much peer-reviewed science on these topics (as cited in this Objection) that has emerged in recent years, which the FS consistently ignores.

> **Climate Change**
> The combined Nez Perce-Clearwater National Forests represent a very small amount of the carbon stored in forests in the United States (Heath et al. 2011). Given the available data and tools (USDA 2015; USDA 2016a), patterns and trends of carbon dynamics are best determined at larger scales and over long periods of time. This project and others taking place on the forest will at most affect a very small percentage of the forest carbon stocks, and a small fractional proportion of the total forest carbon stocks of the United States. The affected forest lands in this proposal would remain forests, not be converted to other land uses, and long-term forest services and benefits would be maintained. As such, the long-term cumulative effects of forest management will have little impact overall on a potential future scenario of carbon accumulation and loss. None of the alternatives would have a measurable impact on carbon stocks in either the short nor long term, because the area of treatment is a small fraction relative to regional and global carbon stocks (Z-001; NPC Forests Carbon Cycling and Storage Specialist Report).

As noted above, the project's purpose and need is skewed heavily toward departures from historic conditions. Yet, in relying on such historic conditions to inform project activities, the FS fails to account for the fact that climate change is fundamentally altering the agency's assumptions about the efficacy of the proposed actions. In other words, the FS cannot rely solely on historic reference conditions to formulate its vegetation treatments. Rather, the agency must also include current reference conditions from areas that have a passive management emphasis, in addition to future reference conditions based on the best available climate models.

Recent science supports the need to look beyond historical references to inform proposed actions: "in a time of pervasive and intensifying change, the implicit assumption that the future will reflect the past is a questionable basis for land management (Falk 2017)." Coop et al., 2020. While it is useful to understand how vegetative conditions have departed from those in the past, (and the role mixed-severity fire played in Ponderosa pine dominated stands), the FS cannot rely on them to define management actions, or reasonably expect the action alternatives will result in restoring ecological processes. Given changing climate conditions, the FS should emphasize reference conditions based on current and future ranges of variability, and less on historic departures. Further, the agency needs to shift its management approach to incorporate the likelihood that no matter what vegetation treatments it implements, there are going to be future forest wildfire-triggered conversions to other vegetation types. As such, the FS cannot rely on the success of resistance strategies, as Coop et al., 2020 explains:

> Contemporary forest management policies, mandates, and science generally fall within the

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

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

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

Given the fallacies of using historic conditions as a reference for desired conditions and the uncertainty that treatments will maintain or restore ecological integrity in the context of climate change and likely forest conversion scenarios, the FS must reevaluate its assumptions about its proposed vegetative treatments, especially in regards to restocking success and species composition. Significant controversy exists as to the need for such treatments given the improper use and reliance on historic conditions. In fact, there is a high likelihood based on the aforementioned studies that some areas will not regenerate and will instead result in conversion to different vegetative groups. The FS should consider whether attrition due to climate change will reduce tree densities sufficiently so that thinning treatments are not needed to meet the project's purpose. NEPA mandates that the agency address this controversy and science that contradicts agency assumptions in an EIS.

In addition to the questionable success of the FS's pursuit of resistance strategies underlying its proposed actions, the agency must also reconsider numerous other assumptions. In fact, many of the agency's assumptions run contrary to the most recent science regarding the impact of logging on wildfire behavior, resilience of the forest to large-scale disturbances, and ability to provide quality wildlife habitat. Many of the scientific studies cited within our comments call into

question the FS assumption that its proposed actions will achieve the stated purpose and need. Ultimately, the agency cannot assert that there is broad consensus in the scientific literature that commercial timber harvest or thinning in combination with prescribed fire reduces the potential for high severity wildfire to the extent characterized in the EA. For example, we have seen the FS rely heavily on Prichard et al. 2021 to support its proposed actions and assert broad scientific consensus as to their efficacy. Yet, even here the researchers raise several factors that the FS must address in an EIS. For example, they explain:

> Fuel reduction treatments are not appropriate for all conditions or forest types (DellaSala et al. 2004, Reinhardt et al. 2008, Naficy et al. 2016). In some mesic forests, for instance, mechanical treatments may increase the risk of fire by increasing sunlight exposure to the forest floor, drying surface fuels, promoting understory growth, and increasing wind speeds that leave residual trees vulnerable to wind throw (Zald and Dunn 2018, Hanan et al. 2020). Such conclusions indicate that treatments within areas of mesic site conditions may not be appropriate.

In addition, Prichard et al, 2021 explains the following:

> In other forest types such as subalpine, subboreal, and boreal forests, low crown base heights, thin bark, and heavy duff and litter loads make trees vulnerable to fire at any intensity (Agee 1996, Stevens et al 2020). Fire regimes in these forests, along with lodgepole pine, are dominated by moderate- and high-severity fires, and applications of forest thinning and prescribed underburning are generally inappropriate.

Ultimately, what the agency proposes is a long-term active management regime that will require repeated tree cutting and burning since nowhere does the FS state it has any plans to allow unmanaged wildfire to play its natural ecological role. This equates to perpetual management with logging and prescribed burning, which is hardly ecological restoration. The FS's misguided efforts to mimic natural disturbance patterns fail to allow natural processes to function, causing unknown long-term results.

Ecological resilience, which the FS implies it is creating through this project, is not the absence of natural disturbances like wildfire or beetle kill, rather it is the opposite (DellaSala and Hanson, 2015, Chapter 1, pp. 12-13). What the FS promotes is the human control of the forest ecosystem through mechanical and other heavy-handed means to maintain unnatural stasis by eliminating, suppressing or altering natural disturbances such as wildfire, to facilitate the extraction of commercial resources for human use. This is the antithesis of ecological resilience and conservation of native biodiversity. Ecological resilience is the ability to ultimately return to predisturbance vegetation types after a natural disturbance, including higher-severity fire. This sort of dynamic equilibrium, where a varied spectrum of succession stages is present across the larger landscape, tends to maintain the full complement of native biodiversity on the landscape. (Thompson et al., 2009).

The FS must consider and disclose the direct, indirect, and cumulative impacts of the proposed project on climate change, as well as the direct, indirect, and cumulative impacts of climate change on the proposed action. Climatic conditions, particularly extreme rainfall, snowmelt, and

flooding, pose substantial risks to the infrastructure on and near the National Forests. See Six et al., 2018 (studying increased mortality of trees, driven directly or indirectly by climate change), and Schoennagel et al., 2017. These events result in damage or destruction of infrastructure and impacts to environmental resources. Rapid climate change is very likely to increase the size and frequency of these climatic stressors, increasing the hazards and risk to infrastructure, people, and ecosystems. These concerns are especially important given the project area is alleged to include the WUI, and as a result cumulative impacts from this project and climate change are likely to have devastating impacts to people living in or near the WUI.

The FS must also consider and disclose in an EIS how changes in weather patterns due to climate change, including drought and extreme winds, play a major role in wildfire behavior and wildfire risk. Ignoring these factors will ignore key relevant factors that affect the agency's claimed purpose and need.

Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews.
The FS must disclose and 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 project will have direct, indirect, and cumulative impacts on climate change because the vegetation treatments will impact the ecosystem's ability to store carbon. Many of the area's forests are likely currently acting as carbon sinks, meaning they are storing more carbon than they are emitting. Science makes clear that the proposed action will likely worsen climate emissions by removing trees that are currently fixing carbon, turning them into wood products (which results in a significant loss of that carbon fixed in wood), and leaving a landscape with fewer or no trees and (eventually) seedlings that fix far less carbon than mature forests for decades if not centuries.

The Council on Environmental Quality Guidance, 2016 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 Dead Laundry 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 has also rejected that same kind of analysis because cumulative effects would always dilute individual timber sale effects. (USDA Forest Service, 2016d at pp. 818-19).

So the FS must quantify greenhouse gas emissions. The agency can only use a qualitative method if tools, methodologies, or data inputs are not reasonably available, and if that is the case, there needs be rationale as to why a quantitative analysis is not warranted. There are plenty of quantitative tools for this analysis. See https://ceq.doe.gov/guidance/ghg-accounting-tools.html; USDA 2014. We seen nothing in the EA to indicate the FS is acting in consistency with this guidance.

Logging harms potential of forest ecosystems to sequester carbon and mitigate effects of climate change

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

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).

Logging, especially large trees as the Dead Laundry EA proposes, would exacerbate climate change. Mildrexler, et al., 2020 state:

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

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

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

See also DeLuca, 2009. Also, Lutz et al., 2018 (co-authored by dozens of scientists) "recommend managing forests for conservation of existing large-diameter trees or those that can soon reach large diameters as a simple way to conserve and potentially enhance ecosystem services." DeLuca, 2009 points to research that "showed that if the objective of management is carbon storage, old-growth forests are better left standing. …Old growth, rather than being thought of as stagnant with respect to carbon fixation, can sequester atmospheric carbon dioxide long past the achievement of old-growth conditions."

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

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

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

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

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

At a time when species are going extinct faster than any period in human history, the survival of species and persistence of healthy ecosystems requires science-based decisions. A new analysis by NatureServe addresses five essential questions about biodiversity–the variety of life on Earth–that need to be answered if we are going to effectively conserve nature. In the first report of its kind, *NatureServe, 2023* reveals an alarming conclusion: **34% of plants** and **40% of animals** are at risk of extinction, and **41% of ecosystems** are at risk of range-wide collapse. The analyses presented in the report inform how to effectively and efficiently use our financial resources to make the best conservation decisions.

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

> When primary forests, whether in Canada or elsewhere, are logged they release significant amounts of carbon dioxide, exacerbating climate change. Because primary forest

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

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

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

We fully incorporate the document, "Flat Country DEIS cmt Forest Carbon Appendix, 3-16-2020" written by Oregon Wild. From our review of that comment letter, which includes voluminous scientific opinion, every page is fully applicable as comments on your proposal.

Moomaw and Smith, 2017 conclude:

> With the serious adverse consequences of a changing climate already occurring, it is important to broaden our view of sustainable forestry to see forests …as complex ecosystems that provide valuable, multiple life-supporting services like clean water, air, flood control, and carbon storage. We have ample policy mechanisms, resources, and funding to support conservation and protection if we prioritize correctly.
>
> …We must commit to a profound transformation, rebuilding forested landscapes that sequester carbon in long-lived trees and permanent soils. Forests that protect the climate also allow a multitude of species to thrive, manage water quality and quantity and protect our most vulnerable communities from the harshest effects of a changing climate.
>
> Protecting and expanding forests is not an "offset" for fossil fuel emissions. To avoid serious climate disruption, it is essential that we simultaneously reduce emissions of carbon dioxide from burning fossil fuels and bioenergy along with other heat trapping gases and accelerate the removal of carbon dioxide from the atmosphere by protecting and expanding forests. It is not one or the other. It is both!

> Achieving the scale of forest protection and restoration needed over the coming decades may be a challenging concept to embrace politically; however, forests are the only option that can operate at the necessary scale and within the necessary time frame to keep the world from going over the climate precipice. Unlike the fossil fuel companies, whose industry must be replaced, the wood products industry will still have an important role to play in providing the wood products that we need while working together to keep more forests standing for their climate, water, storm protection, and biodiversity benefits.
>
> It may be asking a lot to "rethink the forest economy" and to "invest in forest stewardship," but tabulating the multiple benefits of doing so will demonstrate that often a forest is worth much more standing than logged. Instead of subsidizing the logging of forests for lumber, paper and fuel, society should pay for the multiple benefits of standing forests. It is time to value U.S. forests differently in the twenty-first century. We have a long way to go, but there is not a lot of time to get there.

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 Dead Laundry EA doesn't recognize or analyze highly relevant information or even consider scientific information that questions its underlying assumptions and makes them scientifically controversial. This is compounded by the multitude of timber sales in this Forest, which represent cumulative effects that could be analyzed for carbon sequestration and global warming impacts at local and regional levels.

Forests are carbon sinks—they store carbon in both the soils and the vegetation. Carbon sinks are important for mitigating the impacts of climate change. The U.S. has many forests owned by the public and managed by the Forest Service. Harvesting wood "represents the majority of [carbon] losses from US forest...." Harris et al. 2016. Additionally, Achat et al. 2015 has estimated that intensive biomass harvests could constitute an important source of carbon transfer from forests to the atmosphere. Pacific Northwest forests hold live tree biomass equivalent or larger than tropical forests. Law and Waring 2015. "Alterations in forest management can contribute to increasing the land sink and decreasing emissions by keeping carbon in high biomass forests, extending harvest cycles, reforestation, and afforestation." Law et al. 2018. The EA has no genuine carbon accounting of the carbon outputs of the proposed project.

Buotte et al. 2019 published an article prioritizing forest lands for preservation based on "carbon priority ranking with measures of biodiversity." This is new and important information that the FS must consider. The researchers mapped "high carbon priority forests in the western US exhibit features of older, intact forest with high structural diversity[], including carbon density and tree species richness." Here is the map from that article:

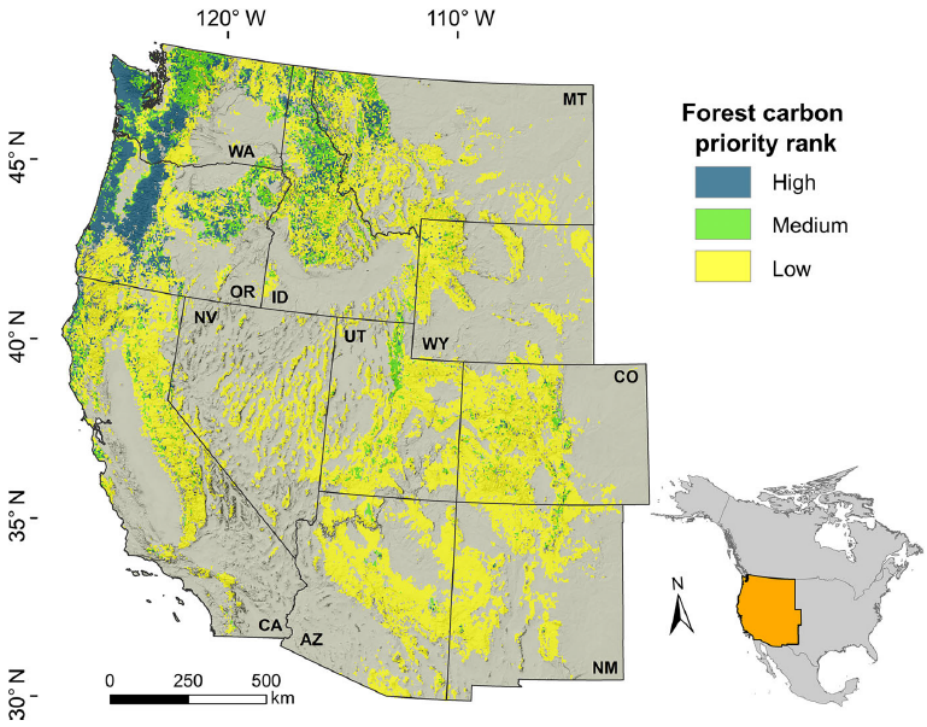


FIG. 1. Forested land in the western conterminous United States classified into priority for preservation to mitigate climate change based on the spatial co-occurrence of low vulnerability to drought and fire and low, medium, and high potential carbon sequestration. WA, Washington; ID, Idaho; MT, Montana; OR, Oregon; CA, California; NV, Nevada; UT, Utah; CO, Colorado; AZ, Arizona; NM, New Mexico.

The above ranks the NPCNF at medium, with pockets of high. This Forest's potential to sequester carbon is significant. Profita (Jan. 1, 2020).

Logging does not serve to increase carbon sequestration in the future. McKinley et al. 2011 states, "Because forest carbon loss contributes to increasing climate risk and because climate change may impede regeneration following disturbance, avoiding deforestation and promoting regeneration after disturbance should receive high priority as policy considerations." One specific strategy McKinley et al. also discusses is decreasing forest harvests, either by interval or intensity, to increase forest carbon stocks. McKinley et al. 2011 recognizes, "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." The strategy of harvesting and replanting might work for southeastern forests, but not for the NPCNF. Avoiding deforestation, afforestation, and reducing harvest are the first three strategies that McKinley et al. 2011 list. McKinley et al. 2011 recognizes that avoiding deforestation and reducing harvest as strategies for carbon storage in forests, acknowledging that climate change may impede regeneration, contradicting the FS's representation of it.

The FS's position is that individual projects would have insignificant contributions to global carbon emissions. The obvious problem with that viewpoint is, once can say the same thing about every source of carbon dioxide and other greenhouse gas emission on earth, and likewise justify inaction. In their comments on the KNF's Draft EIS for the Lower Yaak, O'Brien, Sheep project, the EPA rejected that sort of analysis, basically because that cumulative effects scale dilutes project effects. (See USDA Forest Service, 2016d at 818-19.) We would add that, if the

FS wants to refer to a wider scope to analyze its carbon footprint, we suggest that it actually conduct such a cumulative effect analysis and disclose it in a NEPA document.

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

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

Best available science supports the proposition that forest policies must shift away from logging if carbon sequestration is prioritized.[2] Forests must be preserved indefinitely for their carbon storage value. Forests that have been logged should be allowed to convert to eventual old-growth condition. Such management has the potential to double the current level of carbon storage in some regions. (See Harmon and Marks, 2002; Harmon, 2001; Harmon et al., 1990; Homann et al., 2005; Law, 2014; Solomon et al., 2008; Turner et al., 1995; Turner et al., 1997; Woodbury et al., 2007.)

Moomaw and Smith, 2017 state:

> Multiple studies warn that carbon emissions from soil due to logging are significant, yet under-reported. One study found that logging or clear-cutting a forest can cause carbon emissions from soil disturbance for up to fifty years. Ongoing research by an N.C. State University scientist studying soil emissions from logging on Weyerhaeuser land in North Carolina suggests that "logging, whether for biofuels or lumber, is eating away at the carbon stored beneath the forest floor."

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

> All plant material releases slightly more carbon per unit of heat produced than coal. Because plants produce heat at a lower temperature than coal, wood used to produce electricity produces up to 50 percent more carbon than coal per unit of electricity.

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

> Trees are harvested, dried, and transported using fossil fuels. These emissions add about 20 percent or more to the carbon dioxide emissions associated with combustion.

Keith et al., 2009 state:

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

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

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

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

> It has been suggested that thinning trees and other fuel-reduction practices aimed at reducing the probability of high-severity forest fire are consistent with efforts to keep carbon (C) sequestered in terrestrial pools, and that such practices should therefore be rewarded rather than penalized in C-accounting schemes. By evaluating how fuel treatments, wildfire, and their interactions affect forest C stocks across a wide range of spatial and temporal scales, we conclude that this is extremely unlikely. Our review reveals

> high C losses associated with fuel treatment, only modest differences in the combustive losses associated with high-severity fire and the low-severity fire that fuel treatment is meant to encourage, and a low likelihood that treated forests will be exposed to fire. Although fuel-reduction treatments may be necessary to restore historical functionality to fire-suppressed ecosystems, we found little credible evidence that such efforts have the added benefit of increasing terrestrial C stocks.

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

Harmon, 2009 is the written record of "Testimony Before the Subcommittee on National Parks, Forests, and Public Lands of the Committee of Natural Resources for an oversight hearing on The Role of Federal Lands in Combating Climate Change." The author "reviews, in terms as simple as possible, how the forest system stores carbon, the issues that need to be addressed when assessing any proposed action, and some common misconceptions that need to be avoided." His testimony begins, "I am here to …offer my expertise to the subcommittee. I am a professional scientist, having worked in the area of forest carbon for nearly three decades. During that time I have conducted numerous studies on many aspects of this problem, have published extensively, and provided instruction to numerous students, forest managers, and the general public."

Climate change science suggests that logging for sequestration of carbon, logging to reduce wild fire, and other manipulation of forest stands does not offer benefits to climate. Rather, increases in carbon emissions from soil disturbance and drying out of forest floors are the result. The FS must minimize manipulation of forest stands, especially stands that have not been previously logged, allowing natural processes to function. Furthermore, logging involves the burning of fossil fuels. Reducing fossil fuel combustion is vital. Everything from travel planning to monitoring would have an important impact in that realm.

Old growth also helps to mitigate the effects of climate change on wildlife habitat. Frey et al., 2016 find: "Vegetation characteristics associated with older forest stands appeared to confer a strong, thermally insulating effect. Older forests with tall canopies, high biomass, and vertical complexity provided cooler microclimates compared with simplified stands. This resulted in differences as large as 2.5°C between plantation sites and old-growth sites, a temperature range equivalent to predicted global temperature increases over the next 50 years." They believe older, more complex forests may help to "buffer organisms from the impacts of regional warming and/or slow the rate at which organisms must adapt to a changing climate…" Large trees serve as important carbon capture and storage (Stephenson et al. 2014). Also see DellaSala and Baker, 2020 and Scientists Letter, 2020. Additionally, forest canopies can buffer climate extremes and promote microclimates that in turn provide refugia for species in the understory—on a daily basis, buffering is most strongly related to forest cover. (Davis et al. 2019b.)

Given the urgency of preventing additional greenhouse gas emissions and continuing carbon sequestration to mitigate climate change, it would be best to protect large trees for their carbon

stores, and also for their co-benefits of habitat for biodiversity, resilience to drought and fire, and microclimate buffering under future climate extremes.

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

Achat et al. 2015 state, "Compared with other terrestrial ecosystems, forests store some of the largest quantities of carbon per surface area of land." Much stored carbon is within soils. (Id.) Forest management can modify soil organic carbon stocks, losing soil organic carbon when comparing conventional harvests like clearcutting or shelterwood cutting with unharvested forests. (Id.) Not only does it lose the carbon stored in the soils, but cutting trees eliminates the trees' potential to continue to sequester carbon. (Id.)

Logging and associated activities emit vast amounts of greenhouse gases

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

> (T)he maximum reduction in CO2 emissions from avoiding deforestation and forest degradation is probably about 12% of current total anthropogenic emissions (or 15% if peat degradation is included) - and that is assuming, unrealistically, that emissions from deforestation, forest degradation and peat degradation can be completely eliminated.
>
> ...reducing fossil fuel emissions remains the key element for stabilizing atmospheric CO2 concentrations.
>
> (E)fforts to mitigate emissions from tropical forests and peatlands, and maintain existing terrestrial carbon stocks, remain critical for the negotiation of a post-Kyoto agreement. Even our revised estimates represent substantial emissions ...

Interaction of management actions and climate change

Vegetation management efforts that propose attempting to replicate pre-European conditions ignores the larger pattern of climate, ignores climate change, and ignores natural succession. Millar and Wolfenden 1999 discuss important patterns within the context of climate change.

The FS (in USDA Forest Service, 2017b) discusses some effects of climate change on forests, including the following statement "In many areas, it will no longer be possible to maintain vegetation within the historical range of variability. Land management approaches based on current or historical conditions will need to be adjusted." Yet, the EA lacks any acknowledgement, awareness or analysis that achieving the desired conditions is very much climate dependent. The EA has no scientific basis to support its assumption that proposed "treatments" will result in sustainable vegetation conditions under increasing temperatures.

Furthermore, the FS doesn't present a scientific basis to support its assumption that proposed "treatments" will result in sustainable vegetation conditions under increasing temperatures. Browne et al., 2019 discussed that adaptational lag to temperature in valley oak (Quercus lobata) can be mitigated by genome-informed assisted gene flow. Even using seed source from local

species may not hold for management practices because trees can lag in adapting to temperature. This has not been accounted for.

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

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

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

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

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

Conventional wisdom dictates that forests regenerate and recover from wildfire, and that forests can regenerate and recover from logging. And these days, "resilience" is a core tenant of FS planning. Unfortunately, assumptions relating to historic and desired conditions are incorrect. NEPA requires a "hard look" at the best available science relating to future concentrations of greenhouse gases and gathering climate risk as we move forward into an increasingly uncertain and uncharted climate future. This has not been done. The EA does not include a legitimate climate-risk analysis, much less one based on the best available science.

No amount of logging, thinning and prescribes burning will cure the cumulative effects (irretrievable loss) already baked into the foreseeably impending climate chaos. "Treatments" must be acknowledged for what they are: adverse cumulative environmental effects. Logging can neither mitigate, nor prevent, the effects of wildfire or logging. Both disturb forests, and the assumed resilience no longer exists. It is way too late ignore the elephant in the room.

Millar et al. 2007 state:

> Over the last several decades, forest managers in North America have used concepts of historical range of variability, natural range of variability, and ecological sustainability to set goals and inform management decisions. An underlying premise in these approaches is that by maintaining forest conditions within the range of presettlement conditions, managers are most likely to sustainably maintain forests into the future. We argue that although we have important lessons to learn from the past, we cannot rely on past forest

> conditions to provide us with adequate targets for current and future management. This reality must be considered in policy, planning, and management. Climate variability, both naturally caused and anthropogenic, as well as modern land-use practices and stressors, create novel environmental conditions never before experienced by ecosystems. Under such conditions, historical ecology suggests that we manage for species persistence within large ecoregions.

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

Other forest activities emit greenhouse gases

The EA fails to quantify CO2 and other greenhouse gas emissions from other common human activities related to forest management and recreational uses. These include emissions associated with machines used for logging and associated activities, vehicle use for administrative actions, recreational motor vehicles, and emissions associated with livestock grazing. The FS is simply ignoring the climate impacts of those management actions and other authorized or allowed activities.

The FS has refused to even attempt to cumulatively examine the effects, which is significant as the Northern Region has been approving many supersized clearcuts across the national forests of Montana and Northern Idaho. *See* Bilodeau and Juel, 2021. This region has approved over 93,000 acres of supersized clearcuts just in the last seven years. How much carbon stores would that eliminate? How much fossil fuel would be burned in the clearcutting of that acreage?

There exist quantitative tools for such analyses, such as Eve, et al., 2014. There is nothing in the EA or supporting documents to indicate the FS is accounting for greenhouse gases in any legitimate, quantitative manner.

It is crucial not only to protect old and mature forests, but to ensure early and mid-seral stands can grow into new those conditions, especially since the FS has admitted, regarding mature forests in Alaska, such forests "likely store considerably more carbon compared to younger forests in this area (within the individual trees themselves as well as within the organic soil layer found in mature forests)." (USDA Forest Service, 2016h.) This is because when a forest is cut, the vast majority of the stored carbon in the forest is released over time as CO_2, thereby converting forests from a sink to a "source" or "emitter." See, e.g., DellaSala, 2021.

Recent studies agree that maintaining forests rather than cutting them down can help reduce the impacts of climate change. E.g., Moomaw, et al., 2019: "Stakeholders and policy makers need to recognize that **the way to maximize carbon storage and sequestration is to grow intact forest ecosystems where possible**." (Emphasis added). Another report (Hudiburg et al., 2019) concludes:

> **Allowing forests to reach their biological potential for growth and sequestration, maintaining large trees** (Lutz et al 2018), reforesting recently cut lands, and afforestation

> of suitable areas **will remove additional CO2 from the atmosphere**. Global vegetation stores of carbon are 50% of their potential including western forests because of harvest activities (Erb et al 2017). Clearly, western forests could do more to address climate change through carbon sequestration **if allowed to grow longer**. (Emphasis added.)

In a literature review from leading experts on forest carbon storage, Law, et al. (2020) reported:

> There is absolutely no evidence that thinning forests increases biomass stored (Zhou et al. 2013). It takes decades to centuries for carbon to accumulate in forest vegetation and soils (Sun et al. 2004, Hudiburg et al. 2009, Schlesinger 2018), and it takes decades to centuries for dead wood to decompose. We must preserve medium to high biomass (carbon-dense) forest not only because of their carbon potential but also because they have the greatest biodiversity of forest species (Krankina et al. 2014, Buotte et al. 2019, 2020).

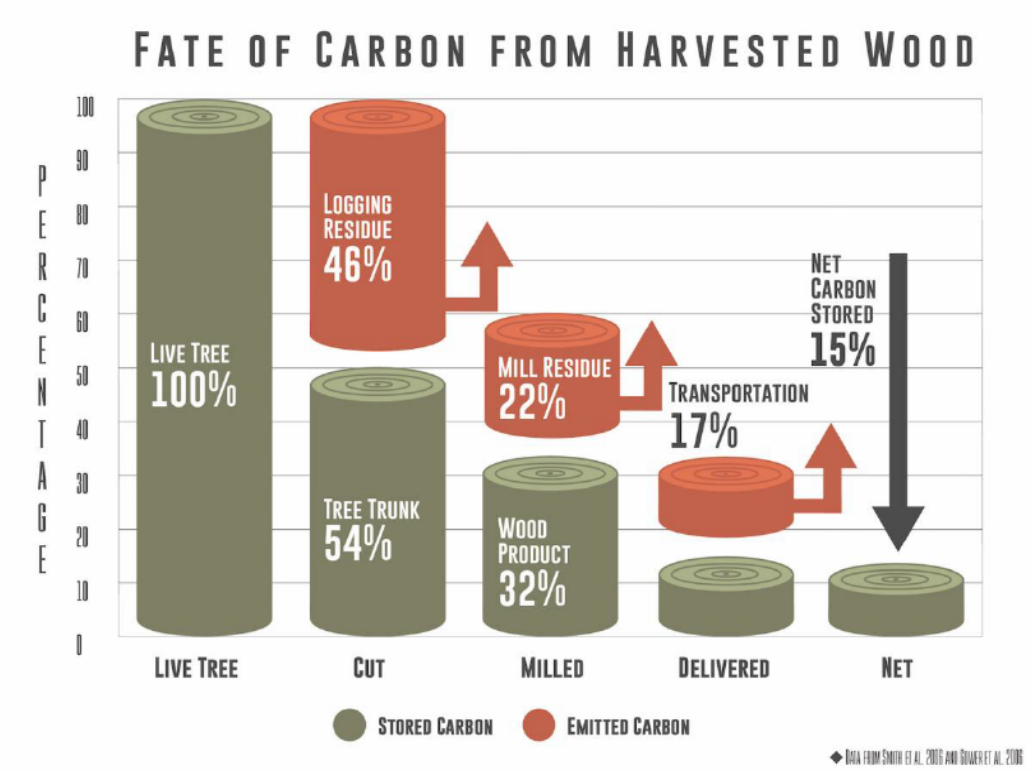
Also *see* Dr. Law explaining these matters in the video, "The Surprising Truth Behind Planting Trees and Climate Change" submitted on data disk as part of this objection.

Law and Moomaw, 2021a recently concluded:

> Recent projections show that to prevent the worst impacts of climate change, governments will have to increase their pledges to reduce carbon emissions by as much as 80%. We see the next 10 to 20 years as a critical window for climate action, and believe that **permanent protection for mature and old forests is the greatest opportunity for near-term climate benefits.** (Emphasis added.)

Logging also doesn't increase carbon storage in the US by reducing future fire emissions. Research has found high carbon losses associated with "fuel treatment" and only modest differences associated with the high-severity fire and low severity fire that fuel treatment is meant to encourage Campbell et al. 2012. And where some disturbances like insects, disease, and fire kill trees and lower carbon sequestration, logging has the greater impact--up to ten times the carbon from forest fires and bark beetles together. *See* Harris et al. 2016. Please do an analysis that recognizes this.

Also, logging does not keep carbon out of the atmosphere. The below graphic is from the Josephine County Democrats Webpage, Forest Defense is Climate Defense (https://josephinedemocrats.org/forest-defense-is-climate-defense/), where the illustrator used the information in Gower et al. 2003 and Smith et al. 2006 to create the following illustration of how carbon is lost into the atmosphere from logging.



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

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

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

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

None of this means that longstanding values such as conservation of old-growth forests are no longer important. Under increasing heat and its consequences, we're likely to get unfamiliar understory and canopy comprised of a different mix of species. This new assortment of plant

species will plausibly entail a new mix of trees, because some familiar tree species on the Forest may not be viable—or as viable—under emerging climate conditions.

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

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

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

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

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

> Forests are changing in ways they've never experienced before because today's growing conditions are different from anything in the past. The climate is changing at an unprecedented rate, exotic diseases and pests are present, and landscapes are fragmented by human activity often occurring at the same time and place.
>
> The current drought in California serves as a reminder and example that forests of the 21st century may not resemble those from the 20th century. "When replanting a forest after disturbances, does it make sense to try to reestablish what was there before? Or, should we find re-plant material that might be more appropriate to current and future conditions of a changing environment?
>
> "Restoration efforts on U.S. Forest Service managed lands call for the use of locally adapted and appropriate native seed sources. The science-based process for selecting these seeds varies, but in the past, managers based decisions on the assumption that present site conditions are similar to those of the past.
>
> "This may no longer be the case."

Westerling, et al. 2006 state:

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

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

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

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

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

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

In March of 2018 the Federal District Court of Montana found the Miles City (Montana) and Buffalo (Wyoming) Field Office's Resource Management Plans unlawfully overlooked climate impacts of coal mining and oil and gas drilling. The case was brought by Western Organization of Resource Councils, Montana Environmental Information Center, Powder River Basin Resource Council, Northern Plains Resource Council, the Sierra Club, and the Natural Resources Defense Council.

Davis et al., 2019 state:

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

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

The EA does not disclose recent restocking monitoring data and analysis.

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

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

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

Respected experts say that the atmosphere might be able to safely hold 350 ppm of CO_2.[3] So when the atmosphere was at pre-industrial levels of about 280 ppm, there was a cushion of about 70 ppm which represents millions of tons of greenhouse gas emissions. Well, now that cushion is completely gone. The atmosphere is now over 400 ppm CO_2 and rising. Therefore the safe level of additional emissions (from logging or any other activity) is negative. There is no safe level of additional emissions that our earth systems can tolerate. We need to be removing carbon from the atmosphere—not adding to it.[4] How? By allowing forests to grow. Logging moves us away from our objective while conservation moves us toward our objective.

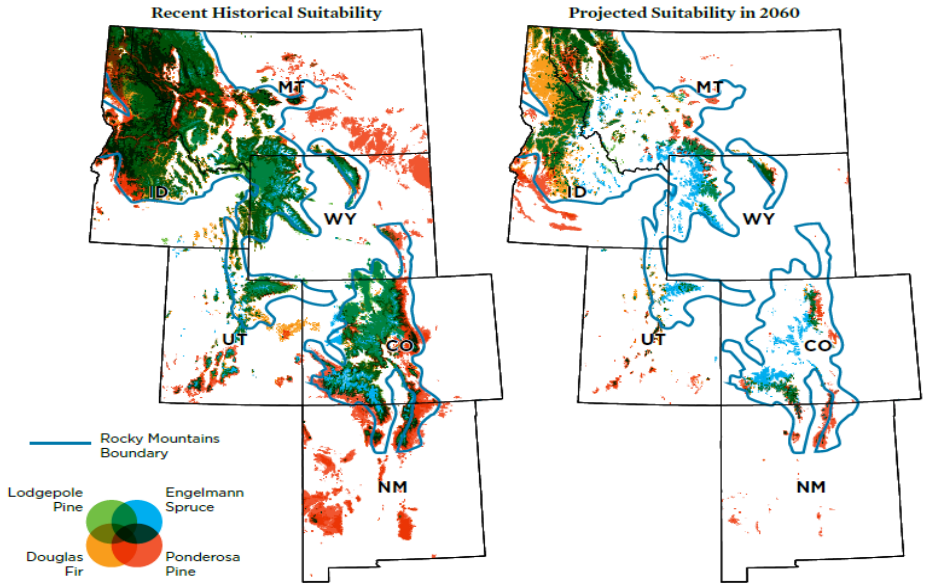
Pecl, et al. 2017 "review the consequences of climate-driven species redistribution for economic development and the provision of ecosystem services, including livelihoods, food security, and culture, as well as for feedbacks on the climate itself." They state, "Despite mounting evidence for the pervasive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

The following figure is from a report by the Union of Concerned Scientists & Rocky Mountain Climate Organization (Funk et al., 2014):

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

[4] "To get back to 350 ppm, we'll have to run the whole carbon-spewing machine backwards, sucking carbon out of the atmosphere and storing it somewhere safely. … By growing more forests, growing more trees, and better managing all our forests…"
(http://blog.cleanenergy.org/2013/11/26/exploringbiocarbon-tools/comment-page-1/#comment-375371)

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



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

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

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

Pecl, et al. 2017 conclude:

> The breadth and complexity of the issues associated with the global redistribution of species driven by changing climate are creating profound challenges, with species movements already affecting societies and regional economies from the tropics to polar regions. Despite mounting evidence for these impacts, current global goals, policies, and international agreements do not sufficiently consider species range shifts in their formulation or targets. Enhanced awareness, supported by appropriate governance, will provide the best chance of minimizing negative consequences while maximizing opportunities arising from species

movements—movements that, with or without effective emission reduction, will continue for the foreseeable future, owing to the inertia in the climate system.

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

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

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

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

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

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

The EA fails to assess and disclose all risks associated with the vegetation manipulation proposed.

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

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

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

The EA doesn't address the question of how lands were determined to be suitable for the type of management ongoing or proposed. It does not cite the specific documentation that supposedly determined that the specific areas proposed for logging with Dead Laundry are suitable for timber production. The Beaver-Cedar Land Exchange FEIS states, "Suitability of the Cedars Area was determined through interpolation of stand exam data obtained from the FS blocks within the checkerboard area." Yet now much of the acquired land is being subject to logging, apparently without the necessary suitability determination.

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

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

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

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

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

Also, Sylvester, 2014 provides data on the amount of fossil fuel being consumed by snowmobiles in Montana, from which one can calculate the carbon footprint. The study finds that resident snowmobilers burn 3.3 million gallons of gas in their snowmobiles each year and a

similar amount of fuel to transport themselves and their snowmobiles to and from their destination. Non-residents annually burn one million gallons of gas in snowmobiles and about twice that in related transportation. So that adds up to 9.6 million gallons of fuel consumed in the pursuit of snowmobiling each year in Montana alone. Multiply that by 20 pounds of carbon dioxide per gallon of gas (diesel pickups spew 22 pounds per gallon) and snowmobiling releases 192 million pounds (96 thousand tons) of climate-warming CO_2 per year into the atmosphere.

For the above reasons, this EA is utterly insufficient. It doesn't recognize or analyze highly relevant information or consider the science that questions the EA's underlying assumptions and therefore reveals scientific controversy. It doesn't disclose high-quality information to the public, and it doesn't take a hard look at this proposed action in the manner needed. This is compounded by the multitude of projects on the NPCNF, which represent cumulative effects that must be analyzed for carbon sequestration and global warming impacts at local and regional levels. This EA violates the National Environmental Policy Act.

The FS must overhaul its land management approach to one prioritizing conservation of carbon pools, long-term and short-term, to preserve the atmosphere, the biosphere, and prospects for the survival of civilization.

The project activities will remove trees across a few thousand acres, which requires the FS to quantify the climate impacts in an EIS. At a minimum, the agency must take a hard look at the science and policy we have presented within our comments and objection that demonstrate significant volumes—in some cases a majority—of carbon stored in trees are immediately lost when trees are logged and milled, and the rest is likely to be returned to the atmosphere sooner than would occur if the trees were left standing, eliminating any alleged benefits from storing carbon in wood products.

SCIENTIFIC INTEGRITY

(We discussed this in EA comments at pp. 49-54.)

GRIZZLY BEAR

(We discussed this in EA comments at pp. 54-59.)

We incorporate our discussion on the grizzly bear from our comments on the Draft Forest Plan and EIS (pp. 193-209) as well as our March 11, 2021 supplemental comments on the 2019 Draft Revised Forest Plan Revised Land Management Plan (Draft Forest Plan) and Draft Environmental Impact Statement Land Management Plan Revision (Draft EIS) for the Nez Perce-Clearwater National Forests.

Since there is solid documentation of recent documented sightings on the NPCNF, grizzly bear occupancy should be considered well established. Formal consultation on the Forest Plan is out of date. And formal consultation with the USFWS is needed for this project.

Grizzly bears once ranged throughout most of western North America, from the high Arctic to the Sierra Madre Occidental of Mexico, and from the coast of California across most of the Great Plains. Prior to European settlement, scientists believed that approximately 50,000 grizzly bears occupied the western United States between Canada and Mexico. With European settlement of the American West and a federally funded bounty program aimed at eradication, grizzly bears were shot, trapped, and poisoned, reducing the population to just 2 percent of their historic range. As a result of its precipitous decline, The USFWS listed the grizzly bear as a "Threatened" species in the lower 48 states under the Endangered Species Act in 1975. Today scientists estimate there are approximately 2,000 grizzly bears left in the lower 48 states, occupying five isolated populations.

One of the main factors hindering grizzly bear recovery is the lack of connectivity between recovery zones due to degraded habitat conditions caused by a variety of factors, but especially roads. Roads can increase risk of mortality, change bear behavior, resulting in habitat loss, habitat alteration, habitat displacement, habitat fragmentation, and population fragmentation. Proctor, et al. 2019; MacHutchon & Proctor 2015. Roads change wildlife habitat in more extreme and permanent ways than other anthropogenic causes of fragmentation. Forman & Alexander 1998; Spellerberg 1998. Roads not only cause striking changes to physical landscapes but also alter the ecosystem's general function and the patterns of wildlife use within these landscapes. Reed et al. 1996; Transportation Research Board 1997; Shirvani et al. 2019. Traffic on roads can create barriers or filters to animal movement and in some cases the leading cause of animal mortality. Chruszcz et al. 2003; Clevenger & Wierzchowski 2006; Northrup et al. 2012. Increased human use on new roads, including legal use during project implementation and illegal public use after project implementation, creates the potential for increased mortality and poaching of grizzly bears—impacts the EA fails to analyze. For these reasons, roads and human activity can negatively impact grizzly bear recovery. Lamb et al. 2018. Therefore, Proctor, et al. 2019 conclude:

> Motorized access management would be most beneficial in threatened populations, in areas where roads occur in the highest quality habitats, within and adjacent to identified linkage areas between population units, and in areas that are expected to exceed motorized route thresholds as a result of resource extraction activities.

Dead Laundry timber sale activities would further reduce grizzly bear connectivity and hinder population recovery in the Bitterroot Ecosystem. The FS fails to analyze how the proposed actions would affect grizzly bear habitat security and areas of demographic connectivity, such as discussed in Sieracki & Bader, 2022. Such an analysis requires discrete geographic parameters in which to measure habitat security, and motorized route densities. Yet, specific bear management units have yet to be identified in the NPCNF by any federal or state wildlife agency. Hence the Sieracki & Bader report, which identifies and displays Bear Management Units (BMUs) throughout the Bitterroot National Forest and Lolo National Forest and parts of the Beaverhead-Deerlodge National Forest. Proposed BMUs for the BE (Mattson 2021) and the secure habitat identified in Sieracki & Bader, 2022 provide a foundation for a more robust grizzly bear analysis both within the project area and considering cumulative effects on demographic connectivity.

Habitat conditions outside of official recovery areas are investigated in Bader and Sieracki, 2022—a report evaluating grizzly bear denning habitat and demographic connectivity in northern Idaho and western Montana.

The proposed road reconstruction, temporary road construction, and new permanent road construction will significantly impact grizzly bear habitat security and connectivity. The proposed permanent road construction would surely decrease grizzly bear habitat security and connectivity. Although 12 of the 14 miles of proposed road construction are supposedly located on previously decommissioned templates, there will be a net increase in open motorized routes and therefore, a decrease in grizzly bear habitat security and connectivity. Furthermore, since the EA fails to disclose the level or degree of accessibility on all the routes it constructs, reconstructs, reconditions, etc. it fails to portray an accurate estimation of the adverse impacts of the project on grizzly bears, other species of conservation concern, and indeed many indicators of ecological integrity.

The proposed road reconstruction would adversely impact grizzly bears. Road reconstruction involves blading, brushing, and other improvements. Reconstruction of impassible roads reintroduces motor vehicle traffic to locations where it had subsided or diminished. Reconstruction of passible roads can increase traffic volumes on roads that were already under some level of motor vehicle use because reconstruction inevitably improves the surface of the road, inviting more public travel.

Although temporary roads are intended to be decommissioned within three years of the completion of logging operations, grizzly bear habitat security and connectivity are decreased when temporary roads and constructed and used. Habitat security and connectivity is not restored until temporary roads are successfully decommissioned. And the science shows that it takes years for resident grizzly bears to realize such benefits. 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 Beaver-Cedar Land Exchange FEIS recognized that "Consolidating high quality suitable habitat under one agency would have a beneficial effect for grizzly bear, wolf, boreal owl, lynx, wolverine, and harlequin duck in the Cedars Area." With the Dead Laundry timber sale, however, the FS would be nullifying any such benefits.

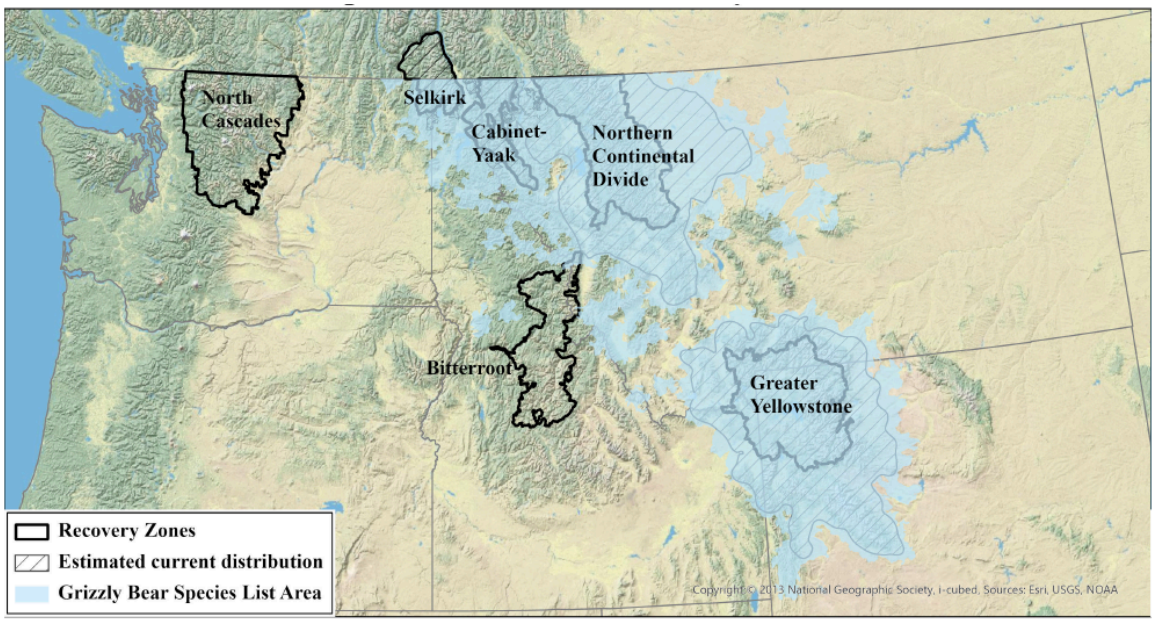
Merrill, et al., 1999 identify seasonal productive grizzly bear habitats in Idaho including the project area. The authors state that grizzly bears have good chances of surviving and reproducing in the BE "if bears in central Idaho are accorded protection from direct mortality comparable to that provided bears in other recovery areas."

The 2023 Final EA makes an "Effect Determination" of "NLAA" for the grizzly bear. This is an update from the 2021 Final EA, which concluded "No Effect." However, the 2022 Wildlife Report persists with the earlier conclusion of "No Effect" and refers to a Biological Assessment (BA) for that rationale. The December 22, 2020 "draft" BA also states "No Effect" on the grizzly bear. We find no more recent BA in the online project website.

Unlike the EA, that draft BA expands on the "NLAA" acronym in the context of other species, to "May affect, Not Likely to adversely affect." When activities authorized by a federal agency "may affect" a listed species, that agency must consult with the U.S. Fish and Wildlife Service (USFWS) to, at minimum, obtain concurrence on from the USFWS with the FS's conclusions such as NLAA for the grizzly bear. Compliance with the Endangered Species Act requires following the proper procedures to assure there is no unauthorized "take" of listed species. Yet we see no Biological Opinion from the USFWS on the project website.

Since grizzly bears have, in the past few years, been documented inside the Bitterroot Ecosystem the FS must undertake ESA Section 7 consultation when actions such as the Dead Laundry project may affect grizzly bears.

In July 2022 the USFWS updated the species list area map of where grizzly bears "may be present." Below is that "May Be Present" map:



The map shows areas in light blue of known recent documentation of grizzly bears. The USFWS grudgingly included some small, isolated areas, only acknowledging them because these recent occurrences are well-documented. The agencies apparently refuse to acknowledge the possibility of grizzly occurrence in areas amongst the blue splotches in northern and north-central Idaho, which is biological nonsense given the known ability of grizzly bears to cover great distances, and the possibility of grizzly bears—known to avoid areas of human activity—existing there but remaining undetected.

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

Since there is solid documentation of recent sightings on the NPCNF, grizzly bear occupancy should be considered well established. Formal consultation on the Forest Plans is out of date. And formal consultation with the USFWS is needed for the Dead Laundry project.

Dead Laundry timber sale activities would further reduce grizzly bear connectivity and hinder population recovery in the BE. The FS fails to analyze how the proposed actions would affect grizzly bear habitat security and areas of demographic connectivity, such as discussed in Sieracki & Bader, 2022. Such an analysis requires discrete geographic parameters in which to measure habitat security, and motorized route densities. Yet, specific bear management units have yet to be identified in the NPCNF by any federal or state wildlife agency. Hence the Sieracki & Bader report, which identifies and displays Bear Management Units (BMUs) throughout the Bitterroot National Forest and Lolo National Forest and parts of the Beaverhead-Deerlodge National Forest. Proposed BMUs for the BE (Mattson 2021) and the secure habitat identified in Sieracki & Bader, 2022 provide a foundation for a more robust grizzly bear analysis both within the project area and considering cumulative effects on demographic connectivity.

Habitat conditions outside of official recovery areas are investigated in Bader and Sieracki, 2022—a report evaluating grizzly bear denning habitat and demographic connectivity in and around the Bitterroot Ecosystem/recovery zone. Bader and Sieracki (2022) "predicted 21,091 km2 of suitable denning habitats" in the BE and connection areas, noting:

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

The 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.

In 2019 the grizzly bear known as 927 spent a good portion of 2019 in the Clearwater National Forest in the vicinity of the upper Lochsa River watershed and Lolo Pass. Referring to this grizzly, the NPCNF's Dead Laundry Biological Evaluation states, "One verified grizzly bear observation was been recorded within the Deadwood-Moose Creek and Elizabeth-North Fork HUCs in 2019.

Still, the FS seems to be in denial that the grizzly bear is a species native to this project area, whose habitat needs must be taken into consideration for project analyses. The agency essentially

treats occurrences of bears in the BE as outliers or otherwise transient, rather than explorers who are important for recovery in the BE.

Hertel et al. (2019) discovered that explorer bears are important to connectivity and persistence of the species: "Bolder individuals seem to be more tolerant towards human encroachment and move more easily through human-modified landscapes (Holtmann et al., 2017, Lowry et al. 2012, Hertel et al. 2019)" which has implications for dispersal and population connectivity. Grizzly bears that are roaming into areas not densely occupied, or thought to be otherwise unoccupied, are highly important and should be recognized as resident.

In summary, the FS still 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.

OLD-GROWTH ECOSYSTEMS AND SPECIES ASSOCIATED WITH OLD GROWTH

(We discussed this in EA comments at pp. 59-87.)

Old growth is important for many reasons. For one, people enjoy visiting these groves, for the mystery it invokes:

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

(Lee, 2009.) We find nothing in the FS's discussion on old growth that recognizes these societal 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 began, "The Forest Service recognizes the many significant values associated with old growth forests, such as biological diversity, wildlife and fisheries habitat, recreation, aesthetics, soil productivity, water quality, and industrial raw material. Old growth on the National Forests will be managed to provide the foregoing values for present and future generations. …Where goals for providing old growth values are not compatible with timber harvesting, lands will be classified as unsuitable for timber production."

The 1989 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.

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.

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

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

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

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

- An old-growth inventory must be designed with a specified degree of reliability. The degree of error and confidence in the statements of amount and distribution should be

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

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

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

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

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.

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

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."

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.

[5] USDA Forest Service 1987b.

The Clearwater Forest Plan states, "Old-growth habitat is a vital component of the vegetative diversity of the Clearwater Forest. Old-growth habitat is vital to the perpetuation of old-growth dependent species of wildlife."

In recognition of the importance of old growth, the Forest Plan includes nondiscretionary direction. 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."

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."

Forest Plan Appendix H includes an "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 says that the majority of the project area is in Management Area (MA) E1. MA 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**." (Emphasis added.)

The EA 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. 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 Committee of Scientists (1999) state, "The presence of suitable habitat does not ensure that any particular species will be present or will reproduce. Therefore, **populations of species must also be assessed and continually monitored**." (Emphasis added.)

The FS has also failed 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.)

We incorporate the discussion of old-growth issues and best available science in our comments on the Draft Forest Plan and its Draft EIS.

Old-Growth Ecosystems

In describing the ecological importance of old growth, the Nez Perce Forest Plan Final EIS at III-35 states:

> 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 part of **old-growth ecosystems** as recognized in the above quote from the Nez Perce Forest Plan Final EIS, as stated in the FS's Green et al, 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.

Consistency with Forest Plan requirements for Old Growth Analysis Units (OGAUs)

The Clearwater Forest Plan includes a "Research Need" to "Develop and validate a methodology for selecting and evaluating old growth habitat." This could be interpreted as creating standardized procedures for conducting field exams for 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 Dead Laundry.

The 2022 "Dead Laundry Project Wildlife Resource Analysis Including Biological Assessment information and Biological Evaluation" (Wildlife Report) states, "OGAUs 338, 341 and 342 exceed the Forest Plan 5%. Forest Plan 5% standard is also exceeded in the other three OGAUs with the addition of step down and recruitment." Similarly, the Dead Laundry Project Vegetation Resource Report includes the following table:

Table 8. Existing Old Growth, Step Down and Recruitment by OGAU in the Dead Laundry Project Area.

Old Growth Status	OGAU 325 (%)	OGAU 338 (%)	OGAU 339 (%)	OGAU 341 (%)	OGAU 342 (%)	OGAU 345 (%)
Existing Old Growth	4.1	9.6	3.3	10.9	14.1	0.4
Step Down	25.8	14.4	31.8	8.4	16.6	8.8
Recruitment	3.4	2.9	1.6	3.2	4.0	0.6

Derived from Old Growth GIS data managed by the Regional Office.

Neither the EA, the Wildlife Report, nor the Vegetation Report disclose if or how the FS used Forest Plan Appendix H criteria in the process of identifying and designating old growth in project area OGAUs. This closely resembles the situation in regards to the Hungry Ridge and End Of The World projects (Case No. 3:21-cv-00189-CWD); in 2022 the Judge's Memorandum Decision And Order enjoined the project in faulting the Forest Service for using the incorrect old growth criteria.

If there was field review as part of this project analysis to assure that unverified old growth or unverified replacement old growth is not targeted for burning or logging, we're unaware of it.

The Forest plan requires the FS to designate replacement old growth (ROG) 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 maintained in a durable, publicly accessible inventory along with old growth. The EA does not explain how "step down" or "recruitment" old growth constitutes ROG.

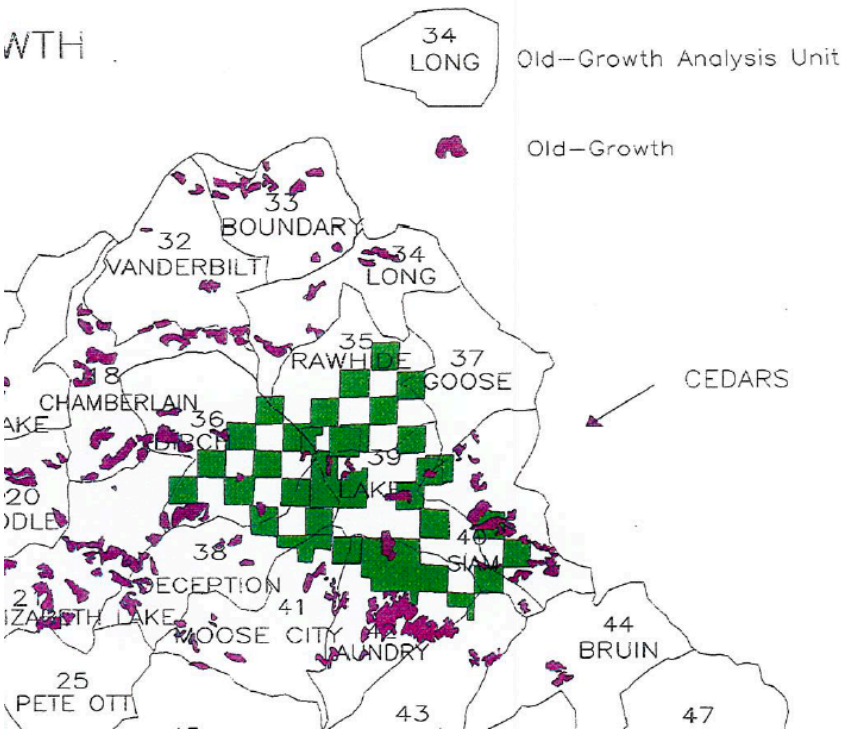
Forest Plan Timber Standard 4.c. requires the FS to "Identify and maintain suitable old-growth stands and replacement habitats for snag and old-growth dependent wildlife species in accordance with criteria in Appendix H." It does not appear that the FS did what Forest Plan Appendix H requires in regards to identifying blocks of contiguous old growth for old-growth dependent wildlife species (e.g., Forest Plan Appendix H Old-Growth Habitat Guidelines 3, 4, and 5). In fact, it appears the FS pretty much ignored Forest Plan Appendix H Old-Growth Habitat Guidelines altogether.

Since the FS doesn't follow Appendix H old-growth habitat requirements, the FS fails to demonstrate the Dead Laundry project is consistent with the Forest Plan in multiple ways.

We assert that up-to-date field survey data are necessary to identify old growth for the purposes of Forest Plan compliance.

How the alleged old growth, step down and recruitment are identified is a mystery, because the FS fails to provide any maps or stand IDs which anyone might use to verify these claimed numbers. There isn't even a map of the old growth in the EA or relevant specialist reports available on the project website.

The Beaver-Cedar Land Exchange FEIS states, "A comprehensive review of the Potlatch lands within the Cedars Area identified 842 acres of potential old-growth habitat." Below is a map from that FEIS:



Yet for Dead Laundry, the FS is apparently unable to identify any specific areas of old growth. No maps at all.

Table 8 in the Vegetation Resource Report says the existing, step down, and recruitment old growth amounts were "Derived from Old Growth GIS data managed by the Regional Office." How that derivation corresponds to the metrics that define old growth according to the Forest Plan is not explained. With the Reilly, 2006 memo the FS commits to performing field exams—not mere database analyses.

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.)

By using old growth amounts "Derived from Old Growth GIS data managed by the Regional Office" the FS is apparently using Forest Inventory and Analysis (FIA) data. That's likely the case because the NPCNF Supervisor's Office—not the Regional Office—would be the repository for data based on up-to-date field surveys on the NPCNF.

However the FIA data is not appropriate nor accurate enough to be utilized for inventorying old growth at the OGAU level. 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 the percentages the FS has derived from FIA data for Dead Laundry OGAUs are inaccurate and inappropriate for use in demonstrating compliance with the 5% Forest Plan OGAU Standard.

The Dead Laundry analysis also does not explain potential discrepancies between its old-growth analyses and results with those from the Beaver-Cedar Land Exchange FEIS. There's no explanation of what has changed.

And whereas the EA claims, "The Proposed Action will not significantly impact existing, step down, or recruitment old growth because regeneration harvests are designed to avoid these areas" that is false. The FS admits as such: "This project proposes …road construction through mapped stepdown and old growth, or approximately 2.3 acres." This violates the Forest Plan's 10% forestwide old-growth standard, simply because the CNF is now less than 10%. The timber sale is **not**, as the EA claims, "…designed to meet Forest Plan Standards for Old Growth …*Clearwater Forest Plan Appendix H; 1993 Clearwater Forest Plan Lawsuit Settlement*".

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."

And the FS claims that the timber sale "will not significantly impact existing, step down, or recruitment old growth" is also not credible simply because the FS hasn't even fully surveyed—applying proper criteria for old growth or replacement old growth to verify or rule out such conditions ("Acres are approximate and are based on coarse scale mapping of old growth GIS layers maintained by the regional office" - Vegetation Resource Report).

The FS lacks any established way of maintaining a publicly accessible inventory of old growth, let alone replacement old growth. The latter …need only meet very lax criteria, and as far as we're aware, in the 34+ years of Forest Plan implementation there's no documentation of the FS ever designating replacement old growth which has eventually/later fully met existing old growth criteria. This is an empty promise to the public, to associated wildlife, and other old-growth values.

In 2020 FOC attempted to meet with the Forest Supervisor and the FS's qualified experts regarding its mysterious 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 notes_6-11-20" and email strings "Re_ Meeting Request_email 6-15-20.pdf" and "RE_ Meeting Request".

The Vegetation Resource Report states, "The Warm Moist PVG represents the majority of the project area…" Its Table 2 ("Existing and desired structure by size class for Warm Moist PVG in the Dead Laundry Project Area") is reproduced below:

Size Class in Diameter at Breast Height (DBH)	Existing (%) *	Desired Range (%) **
Seral Grass/Shrub	7	5 – 15
0 – 4.9"	2	15 – 25
5 – 14.9"	52	20 – 35
15 – 19.9"	32	15 – 25
20+"	7	10 – 35

* Size Class is from Region 1 VMap merged with stand exam data, TreeSize attribute
** Forest Plan Revision Desired Conditions for MA3 (Probert 2017), very similar to E1 MA

Likewise, "The Cool Moist PVG generally represents the higher elevation habitats that still support a majority of the tree species found within the project area. It covers nearly ¼ of the project…" Table 3 ("Existing and desired structure by size class for Cool Moist PVG in the Dead Laundry Project Area") is reproduced next:

Size Class in Diameter at Breast Height (DBH)	Existing (%) *	Desired Range (%) **
Seral Grass/Shrub	10	5-20
0 – 4.9"	5	15-40
5 – 14.9"	54	20-40
15 – 19.9"	29	10-35
20+"	2	5-10

* Size Class is from Region 1 VMap merged with stand exam data, TreeSize attribute
** Forest Plan Revision Desired Conditions for MA3 (Probert 2017), very similar to E1 MA

"The Warm Dry PVG represents **inclusions** within the project area **at only 5%**..." (Id., emphases added.). Table 4 ("Existing and desired structure by size class for Warm Dry PVG in the Dead Laundry Project Area") is shown next.

Size Class in Diameter at Breast Height (DBH)	Existing (%) *	Desired Range (%) **
Seral Grass/Shrub	17	5 – 15
0 – 4.9"	4	10 – 25
5 – 14.9"	48	20 – 40
15 – 19.9"	20	15 – 25
20+"	11	10 – 35

* Size Class is from Region 1 VMap merged with stand exam data, TreeSize attribute
** Forest Plan Revision Desired Conditions for MA3 (Probert 2017), very similar to E1 MA

So the Vegetation Resource Report shows the amount of trees that roughly approximate old-growth character (size class 20+") are below even the FS's "desired" levels. Yet Tables 10 and 11 show the Dead Laundry timber sale would reduce stands of size class 20+" even further below the FS's own "desired" levels. So much for "enhancing" old growth.

The FS's rationale for this is stated in the Vegetation Resource Report: "The Proposed Action will **move dominance types toward desired conditions** with a focus on western white pine in the Warm Moist and Cool Moist PVGs and ponderosa pine in the Warm Dry PVG, with western larch a likely component in most stands." (Emphasis added.) This is shown in, e.g., its Table 12 ("Comparison of the No Action and Proposed Action on composition by dominance type for the Warm Moist PVG"):

Forest Dominance Type	Desired Range (%)	No Action (%)	Proposed Action (%)
Ponderosa Pine	10 – 20	2	-0.1
Douglas-fir	2 – 5	10	-1
Lodgepole Pine	5 – 10	2	-0.2
Western Larch	15 – 30	0.1	-0.1
Grand Fir/ Western Redcedar	10 – 20	74	-11
Western White Pine	25 – 40	0	+13
Subalpine Fir/Englemann Spruce	1 – 2	2	-0.1

What the two yellow highlighted numbers show, in combination with the other tables we cite, is that the Dead Laundry project would replace large trees (20+" dbh) with planted seedlings of the FS's "desired" species (e.g., western white pine) in stands considered to be of the grand

fir/western redcedar "Forest Dominance Type" in order to "move dominance types" in the desired direction as per the DRAFT Revised Forest Plan.

Attachment A includes documents the Nez Perce National Forest produced for NEPA analyses of timber sale projects to comply with that 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 chosen.

We assert that the FS used data that was not gathered in the field for the purposes of comparing the old growth criteria with the given stand under consideration, and which cannot reasonably be claimed to reveal sufficient Appendix H criteria.

A document "Campbell OG analysis note.pdf" in Attachment A explains how the Nez Perce National Forest used queries of existing database and aerial photos to identify "potential oldgrowth" in 1995. Once identified, "The …stands **would need to be field verified** to determine if they could be reallocated to oldgrowth or replacement oldgrowth following the steps outline in Appendix N of the Forest Plan." (Emphasis added.)

For the Dead Laundry EA, the FS did not undertake field surveys to validate old growth, in contradiction to the Forest Plan and NEPA's requirements for scientific integrity.

We offer examples of how proper old-growth surveys have been conducted. Attachment A includes documents the Nez Perce National Forest produced for NEPA analyses of timber sale projects, to comply with the 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 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 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

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

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 Clearwater NF 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 NPNF Forest Plan Appendix N), and includes a blank field form for use by the field surveyor. That form includes a couple lines where the surveyor is to indicate in his or her judgment why the stand meets the old-growth criteria displayed on the form.

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

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

So we know the FS has conducted proper old-growth field surveys in the past, and still can if it wants to. But for the old growth designators for the Dead Laundry process "old growth" is little but an abstraction. They use data too unreliable for making valid conclusions, building no credibility in the process.

Old-growth maps must include important reference details that would help facilitate navigation so the public can survey the designated FPOG and ROG. By navigation details we mean, for

example, roads, trails and streams that are relatively easy to find are juxtaposed on a topographic map along with old-growth polygons.

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

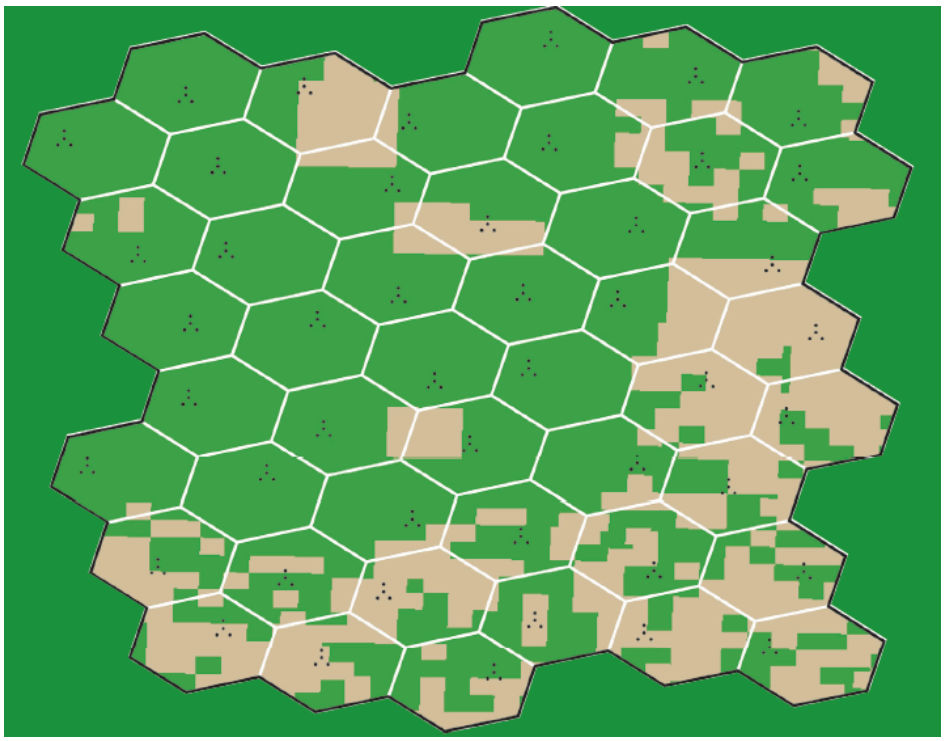
Consistency with Clearwater National Forest forestwide old growth 10% Standard.
The most recent Forest Plan Monitoring and Evaluation Report (Fiscal Year 2009) includes:

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.

Below is the diagram depicted on the cover of Bechtold and Patterson, 2005, which helps to explain the idea of random FIA plot location:



The hexagonal grid 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. That same plot is periodically resampled, typically once every ten years.

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."

So at most each plot samples a maximum of one acre—far smaller than an **old-growth stand**—and thus estimates cannot indicate the capability to meet biological needs of the associated wildlife. Moreover, the location of plots is confidential, and for good reasons—managers are not allowed to know the location of FIA plots within national forests, to prevent skewing of data which would result from intentionally managing differently at plot locations. FIA methodology cannot specify the location of sampled stands within a national forest. Furthermore, the FIA data cannot yield the extent (acreage) of old-growth stands.

FIA statistics thus have no correlation to forest plan minimum old-growth stand sizes, nor to spatial needs of wildlife species' 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. Conclusions of old-growth percentages claimed by FS analyses cannot be verified by independent investigators. This prevents independent peer review—a hallmark of the scientific method.

We would be reasonable to expect the Forest Service to have a fairly complete forest-wide inventory of old growth simply because nearly every Clearwater NF watershed outside Wilderness or Roadless has been logged over the life of the 1987 Forest Plan, and an old-growth inventory is required of project analyses. Our 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" old growth.

As far as we're aware, in the 35 years of Forest Plan implementation there's no documentation of the FS ever designating "replacement" old growth which has eventually/later fully met existing old growth criteria. The "replacement" old growth" is 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 the project area, and basing the goals of this project on such speculation. The FS may be reluctant to discuss the issue because the amount of old growth on the Forest is well below the historic range; and that fact alone shows how the FS is managing inconsistent with best available science in proposing to destroy hundreds of acres of old growth.

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 Forest 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 demonstrated 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, it would undertake an amendment process that would increase its "minimum7" 10% standard (and the 5% distribution standard) up to a level within the natural range of variability, resembling reference conditions.

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:

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

That "Desired Condition" is based upon what the FS believes is the historic range or norm. That document includes the age class of 150+ and except for one or two VRUs, 10% is at the bottom end (or below) the Desired Condition for the 150+ year age class, which is a minimum criteria

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

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 pre-industrial logging when the abundance and distribution range of old growth was much greater than now, the FS has no scientific basis supporting its assumption that merely meeting its Forest Plan old growth percentage standards will maintain viable populations as the Forest Plan requires. Along with climate concerns, this is why facilitating the destruction of old growth is reckless, arbitrary and capricious.

The most recent Forest Plan Monitoring and Evaluation Report (Fiscal Year 2009) states, "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 forest plan revision. It states, "The different stages of succession are often referred to as seral stages and can be described as follows: …Old Growth is a subset of the late-seral communities. Not only are these dominated by larger, older trees, but they have dead and down material present. Old growth in different forest types looks differently. Green et al. (1992) described old growth characteristics for the Northern Rockies."

Also, the draft Revised Forest Plan includes Glossary definitions:

> Old Growth Forests: Are ecosystems distinguished by **old trees and related structural attributes**. Old growth encompasses the **later stages of stand development that typically differ from earlier stages in a variety of characteristics which may include tree size, accumulations of large dead woody material, number of canopy layers, species composition, and ecosystem function**. In the context of the Nez Perce-Clearwater ecosystem the definitions for old growth are those provided within the document titled "Old Growth Forest Types of the Northern Region (Green et al. 1992, and errata 12/11).
>
> Old Growth Associated Species: the group of wildlife species that is associated with old-growth forest plant communities on the Nez Perce-Clearwater.
>
> Old Growth Habitat: A community of forest vegetation characterized by a diverse stand structure and composition along with a significant showing of decadence. The stand structure will typically have multistoried crown heights and variable crown densities. There is a variety of tree sizes and ages ranging from small groups of seedlings and saplings to trees of large diameters exhibiting a wide range of defect and breakage both live and dead, standing and down. **The time it takes for a forest stand to develop into an old-growth habitat condition depends on many local variables such as forest type, habitat type, and climate.** Natural chance events involving forces of nature such as weather, insect, disease, fire, and the actions of man also affects the rate of development of old-growth

> stand conditions. Old-growth habitat may or may not meet the definition for old growth forest.

(Emphases added.) We realize the draft revised Forest Plan is just that—a draft—and isn't currently management direction. However, as the 2012 Planning Rule[8] indicates, the Assessment is intended to help define what the FS believes is best available science.

Old Growth Enhancement

At this point, because of the confusion created by the contradictions between the 2023 Final EA and draft DN, we cannot be sure what the current Proposed Action is. The Final EA states:

> Only intermediate harvests in Old Growth Enhancements units will be conducted. No western redcedar ≥ 25" will be marked for removal. No western larch, western white pine, or ponderosa pine ≥ 21" will be marked for removal. No other remaining trees species present on site ≥21" will be marked for removal unless it is within 50' of another tree with symptoms of root disease, is adjacent to a root disease pocket, or is itself displaying signs of a root disease infection. Harvest prescriptions should attempt to manage stands at a minimum stand density index (SDI) of 25-35% of maximum SDI if existing on site. This equates to a stand somewhere between the onset of crown closure and the lower limit of full site occupancy (as defined by R4 FSH: 2409.17-2016-1; Chapter 9 and Powell 1999)."

In other words, a Douglas-fir tree which might be 250 years old or older, not properly socially distanced from any subjectively determined slight indicator of native root disease, is subject to logging. And that's only one example of old growth abuse. Another is—a 20" dbh western larch, western white pine, or ponderosa pine of any age, exhibiting habitat value for old-growth associated wildlife, could be logged under the FS's "prescriptions."

Furthermore, the FS only weakly commits ("should") to a stand density of ¼ of natural in its logged old growth, which on the face of it isn't consistent with the Forest Plan. And other than the FS's vague commitment as quoted above, the EA fails to disclose an objective definition of "intermediate harvest." Nor does the FS make any commitment to monitoring the efficacy of its Dead Laundry old-growth "enhancement."

On the subject of old growth enhancement, the 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.

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

So on one hand the FS would apparently tweak old growth to favor seral western larch, western white pine and ponderosa pine by retaining mainly those species and opening up the forest canopy to enhance their growth, they would also be helping to establish shade tolerant western redcedar—without reconciling 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 found in the project area do not include what the FS is trying to accomplish with its "enhancement" intent.

"Old growth enhancement" is nothing but a scam—a weak justification for logging large, old trees within 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 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.)

An important fact is that the management paradigm upon which the original, current, 1987 Forest Plan is based doesn't insert itself into the natural processes that create and sustain old growth. Within that paradigm, in contemplating management actions the FS is to insure that the specified percentages of existing old growth are retained in OGAUs and forestwide to meet the other Forest Plan old-growth Standards. There is no direction in the Forest Plan to log old growth anywhere for the purposes of somehow improving it, or that logging can still maintain it. Jahn, 2012 addresses this in his section entitled "Protecting Old Growth Habitat In Excess of Minimums Prescribed In the NPNF Plan." On the last three pages of KNF Forest Plan Old Growth Appendix 17, the FS rejects the notion that logging is consistent with preserving old growth. But as seen from the cites in our previous paragraph, and as found in the draft revised forest plan for the Nez Perce-Clearwater National Forests (NPCNF), the FS is promoting the idea that active management should be the defining relationship between the agency and old growth.

We are incorporating FOC's various comments on the forest plan revision process, one of which includes scientific criticism the old growth active management paradigm (see our April 20, 2020 comments on the Draft Revised Forest Plan for the NPCNF at pp. 134 - 156). In an attempt to sugar coat the habitat destruction logging and road building cause, the FS pretends it can play God in old growth, outperforming the natural processes that are the only known way old growth has ever come to existence in these forest ecosystems. Such hubris does not belong in a context of managing public resources.

In the 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.

The DRAFT Revised Forest Plan includes a Monitoring Plan, with a Monitoring Question (MON-FOR-03): " Are vegetation treatments meeting the stand characteristics of old growth?" The Dead Laundry project assumes the answer is yes, because in jumping the revision gun it doesn't even propose monitoring the results of "enhancement."

Of course, the FS's "enhancement" paradigm also assumes that manipulated/logged old growth would contribute to other old-growth values, without any science 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 MIS or other indicators of old growth.

So the FS is implementing the DRAFT revised forest plan—but illegally, before the revision process has concluded.

Again, a major flaw of the project is that the FS is attempting to implement DRAFT Revised Forest Plan Desired Conditions before the plan revision process is complete. Our comments on the DRAFT Revised Forest Plan recognized on this exact subject stated:

> Next, we see how the DEIS demonizes these "undesirable … types" of old growth: "(T)hese forest types are over-represented compared with historic conditions and often do not long persist as old growth, these old growth types should not be specifically protected by forest plan components." In other words this old growth is taken to be a sign or symptom of a forest out of whack.
>
> Under the Forest Service's skewed "thinking" there are too many of these, vaguely, "forest types" so the way to re-set the balance is clearcut the oldest sectors? When it's known that logging on the NPCNF has resulted in much less late-successional forest as a whole compared to the NRV, and thus fewer habitat opportunities for old-growth associated wildlife? When the agency has the opportunity to re-set this balance by focusing instead on younger, less rare habitats? This is very odd "thinking."

> And this is being promoted in the absence of the DEIS citing any data that actually proves that either these undesirable "forest types" or the subset of them which has the audacity to persist longer on the landscape are in fact out of balance. Where are your numbers?
>
> The DEIS continues, more explicitly identifying the Forest Service's "thinking" that it's best to log old growth:
>
> The current distribution of old growth types across the Nez Perce-Clearwater is considerably outside of natural range of variation for dominance types and should incorporate thinking about forested vegetation as a whole, rather than simply restricting activities within all old growth. To do this, plan components are designed to address our underrepresented dominance types while allowing harvest within overrepresented dominance types.
>
> Again, the wording of this Guideline (MA2 and MA3-GDL-FOR-04) makes it clear **that the intent is to clearcut this old growth**: It "should not be managed using a regeneration harvest prescription if it can be converted to a desired old growth type."
> How many acres of these "over-represented old-growth forest types" exist now on the NPCNF?
>
> What is the NRV, in acres plus other relevant metrics, of these "over-represented old-growth forest types" on the NPCNF, and what is your scientific foundation for the NRV?

We are sill awaiting the FS's responses to those—and all other comments on the DRAFT Revised Forest Plan. In the present (Dead Laundry) case, the FS is implementing flawed old-growth "enhancement". However in additional, the FS is clearcutting stands not identified as old growth, but of size class 20+" which are already transitioning in the direction of old growth. This is because of the FS's arbitrary, unscientific "undesirable" attribution of large Douglas-fir, grand fir, western cedar, and other tree species. Since the FS's allocation of step down old growth and/or recruitment old growth is not transparent, project consistency with the OGAU forest plan standards is not demonstrated, in violation of NFMA.

See Juel, 2021, which comments on FS old-growth policies such as those for the CNF and as would be implemented with the Dead Laundry timber sale.

ACCESS AND TRAVEL MANAGEMENT

(We discussed this in EA comments at pp. 87-103.)

Project purpose and need fails to consider the FS duty to identify the minimum road system.

From multiple maps, the EA and other FS documents it's clear there are "existing road templates" (also called "existing unauthorized routes") of undisclosed extent in the project area. The FS failed to examined those, and other system roads to decide if they are needed or not, as would be determined with a Travel Analysis Process as per FSH 7709.55 Ch. 20, which is the first step towards identifying the minimum road system and complying with the Travel

Management Rule under Subpart A (subpart A). (36 C.F.R. 212.5.) Also, the FS omitted fulfilling its regulatory duties under this rule from the project purpose and need, even though applicable statutory and regulatory requirements should shape a project's statement of purpose and need. When the agency takes an action "pursuant to a specific statute, the statutory objectives of the project serve as a guide by which to determine the reasonableness of objectives outlined in an EIS." *Westlands Water Dist. v. U.S. Dept. of Interior*, 376 F.3d 853, 866 (9th Cir. 2004).

Under subpart A, the FS has a substantive duty to address its over-sized road system. Identifying a resilient future road system is one of the most important endeavors the FS can undertake to restore aquatic systems and wildlife habitat, facilitate adaptation to climate change, ensure reliable recreational access, and operate within budgetary constraints. This underlying substantive duty must inform the scope of, and be included in, the agency's NEPA analysis. It's been 20 years since the FS finalized its subpart A rules, so it can no longer delay in addressing this duty. Yet, the FS fails to incorporate this duty, thereby failing to ensure the road system provides for the protection of national forest lands, reflects long-term funding expectations and minimizes adverse impacts. See 36 C.F.R. 212.5(b).

The FS must update its forestwide Travel Analysis Report for the district to reflect the increased risks to wildlife, specifically grizzly bears and grizzly bear connectivity from areas with high motorized route densities. It must also recognize that roads and motorized trails provide vectors for human wildfire ignitions, which is a risk that should be included in any Travel Analysis Process. The agency fails to consider a major human impact is human-ignited wildfires, which account for more than 90% of fires on national lands, and are five times more likely in areas with roads. Plus, roads can affect where and how forests burn and the vegetative condition of the forest.

Complying with subpart A is a win-win-win approach:

1) It's a win for the FS budget, closing the gap between large maintenance needs and inadequate (and declining) funding through congressional appropriations;
2) It's a win for wildlife and natural resources because it reduces negative impacts from the forest road system; and
3) It's a win for the public because removing unneeded roads from the landscape allows the agency to focus its limited resources on the roads we all use, improving public access across the forest and helping ensure roads withstand strong storms.

The document "K10-00011100917ClearwaterNationalForestMinimumRoadsStrategy .pdf"—a part of the Administrative Record for the CNF Travel Plan—states:

> Considerable progress has been made on the CNF toward the process of Travel Analysis described in Subpart A of the Travel Management Rule. **New projects will be analyzed using the "Travel Analysis Process" (TAP) as detailed in Travel Planning Handbook 7709.55 Chapter 20 in order to determine the minimum road system and opportunities for road decommissioning;** it will also prioritize road maintenance and identify the need for upgrading and reconstruction of roads that will remain a part of the system. (Emphasis added.)

The Dead Laundry project should be considered a "New project() analyzed using the 'Travel Analysis Process' (TAP) as detailed in Travel Planning Handbook 7709.55 Chapter 20." However that process was not used for Dead Laundry. The Dead Laundry Transportation Systems Report instead refers to a "Nez Perce Clearwater National Forests Travel Analysis Report – September 22, 2015 …created from the Travel Analysis Process as outlined in Chapter 20 Travel Analysis, FSH 7709.55." That 2015 Travel Analysis Report (TAR) was not project-specific. The 2015 TAR states:

> The risk and benefit questions were used to determine numeric, consolidated assessment values of specific road segments across the forest. The initial risk and benefit assessment values are used in conjunction with the cost analysis, input from the public and partners, and previous commitments (such as road cost-share agreements or long-term special use permits) to identify opportunities to change the Forest or Grasslands road system. Some of the road-related issues identified by the public and other agencies can be addressed by risk and benefit questions relative to specific road segments, while **others would be more appropriately addressed** during forest plan revision or **during implementation of site-specific projects.**
>
> … Integrated restoration projects and commercial timber **sales represent some of the better opportunities to implement changes to the road system**.

(Emphasis added.) Yet the Dead Laundry EA and the Transportation Analysis Report utterly fail to present a comprehensive assessment of the risks posed by the project area transportation system, or examine opportunities to benefit the environment by reducing the road system—in any manner whatsoever let alone following the procedures outline in Chapter 20 Travel Analysis, FSH 7709.55. In short, during the CNF Travel Plan process (see below) and the 2015 TAR said it would be conducted during project-specific analyses such as for Dead Laundry, but for Dead Laundry the FS says it was already done in the 2015 TAR—even thought that document indicates it wasn't.

The Transportation Analysis Report states:

> Operating and maintaining the existing transportation system is a large portion of the forest budget. The forest operation and maintenance **budget is currently not sufficient to finance maintenance on all the forest roads to the operating maintenance level**. **Resolving the conflict** between the need for access, the cost of associated road maintenance, and the current and expected future road program allocation **will be a significant challenge.**

(Emphases added.) The CNF Travel Plan FEIS states:

> **It is at the project level scale that a site specific analysis of all roads both National Forest System and unauthorized can be studied and pertinent conclusions and recommendations made.** NFS roads that are deemed surplus to current needs and other road like features such as skid trails and old temporary roads can be identified and

> recommended for decommissioning and returned to natural resource production**. This process will continue under the guidance of FSM 7700 – Travel Management and FSH 7709.55 – Travel Planning Handbook to identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands**. (Emphases added.)

The Dead Laundry Transportation Analysis Report says, "The Forest System Roads in the analysis area are almost all 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**. There are a number of existing templates in the analysis area that have not been identified or mapped. Some of these were routes and/or skid trails used for timber harvest in the past and were never decommissioned." (Emphasis added.) Objectors have done a part of the FS's field verification and road survey job, in pointing out, in our comments on the EA, that at least significant portions of "Road" 74528 doesn't currently exist. And since the FS has chosen to not meaningfully respond to comments on the EA, at this juncture we cannot know what the agency is thinking with its flawed project-level transportation analysis.

Furthermore, it is completely non-transparent how the FS had apparently decided to adopt into its inventory of Forest System Roads so many of those the CNF Travel Planning map ("L02-00055080826aquiredNFlandsjbranning.pdf") merely identifies as "road – has a number."

It appears that the FS wants the boundary between its INFRA inventory of Forest System Roads and its accounting of nonsystem roads (e.g., "undetermined") to be highly permeable, so that it can add roads to its Forest System Road inventory without NEPA analysis and public disclosure—or even without conducting field reviews. The FS must carefully consider and document the road management objectives, environmental impacts, and social and economic benefits associated with any proposed addition before adding roads to the system. For roads that were previously identified for decommissioning in a NEPA decision, the FS must assess the Road Management Objectives, environmental impacts, and social and economic benefits associated with that road before identifying it for use as a temporary road and/or later adding it to the system as a closed or stored road. This necessary information is missing from the EA and project Transportation Analysis Report, without which the public is precluded from meaningful comment. The FS's proposal runs contrary to its own policy for assessing and adding roads to the system

One cannot tell if Table 4 of the project Transportation Analysis Report is a comprehensive list of all project area routes as listed in INFRA or any other inventory. It's likely not, because its title is "Proposed Road Work and Access Control Mitigation." (Also see "RE-Dead Laundry project information-Boykin" included with documents submitted as part of this objection.)

The Dead Laundry Project Summary of Determinations for Biological Assessments (BA) states, "Prior to this project development, 112 miles of roads in the project area were previously decommissioned." However this is not substantiated with any map or other reference to pinpoint the location of these former 112 miles of road.

The project Transportation Analysis Report states, "Roads require maintenance and additions to the existing road system add costs. Cost includes any expenditure in the repair or upkeep of a road necessary to perpetuate the road and provide for its safe use." Yet despite identifying dozens of roads "likely not needed" in Table 5, exactly zero of them are to be decommissioned with this project—regardless of their assessed risk factors.

It is rather peculiar that the 2023 Final EA removed the words "road reconstruction" from its description of the Proposed Action. Instead it re-categorizes some activities the 2021 Final EA called "reconstruction" to "maintenance." So where the 2021 Final EA's Proposed Action included 51 miles of "road maintenance" and 99 miles of "road reconstruction" the 2023 Final EA replaces all of that with 104 miles of "road maintenance." The EA doesn't explain the intent or logic behind this shifting categorization. Oddly enough, the balance of the 2023 Final EA still analyzes impacts using the term "road reconstruction" just as the 2021 Final EA did.

Also, the 2021 Final EA included the following language, deleted from the 2023 Final EA: "Road reconstruction would occur on **existing road templates created by legacy transportation routes**. Activities could include the addition of cross drain structures near stream crossings, application of surface aggregate gravel materials, road realignment or reshaping, road blading, and brushing and removal of obstructions." (Emphasis added.) So now the FS wants to deny the existence of "existing road templates created by legacy transportation routes"? Despite the history of previous corporate timberland ownership (subsequently transferred into public ownership national forest), which left a vast network of old road templates in the Dead Laundry project area?

And nowhere does the Dead Laundry EA or Transportation Analysis Report analyze or disclose the risks or environmental impacts of the high-risk roads the FS will leave on the landscape. The EA states, "Roads are a source of chronic sedimentation of stream channels through erosion of fill, cut slopes, and of the driving surface, especially if not adequately maintained. It can be logically inferred that **the continued use of roads within project area RHCAs long after the project is completed will continue to have adverse effects to fish and fish habitat through sediment delivery to streams.**" (Emphasis added.)

And as the Dead Laundry BA indicates:

> Decommissioning roads leads to a decrease in sediment input to area streams, this can lead to improvement of aquatic habitat and a decrease in cobble embeddedness. This can lead to an increase in rearing habitat for bull trout in the project area.
>
> …Forest roads can be chronic sources of sediment because road construction, use, and maintenance compact soils, reduce infiltration, intercept, and concentrate surface and subsurface runoff, and limit the growth of vegetation. Road ditches can alter natural drainage patterns and move sediment directly from roads into streams (Wemple et al., 1996). Also, roads can increase the frequency and magnitude of landslides by undercutting the base of unstable slopes; intercepting, diverting, and concentrating runoff to unstable hillsides; and through damage caused by plugged culverts that cause water to overtop the road.

The CNF Travel Plan FEIS identified a Desired Condition: "All routes available for public motorized travel must be a part of the transportation system and must be designated open for motorized travel, including the type of vehicle and season of use, according to 36 CFR 212." The FS has not demonstrated the project is consistent with that Desired Condition. The project Transportation Systems Report states, "This analysis incorporates by reference the Decision for the Access Travel Management (ATM) in the FEIS of the Clearwater National Forest Travel Planning August 2011."

The EA states, "25 miles of the total temporary road construction would be on **existing unauthorized routes**. Road construction would be conducted on 12 miles of **previously decommissioned and/or unauthorized routes** on the landscape; 2 miles of road construction would occur in areas without a current road template." (Emphases added.)

Road inventory issues

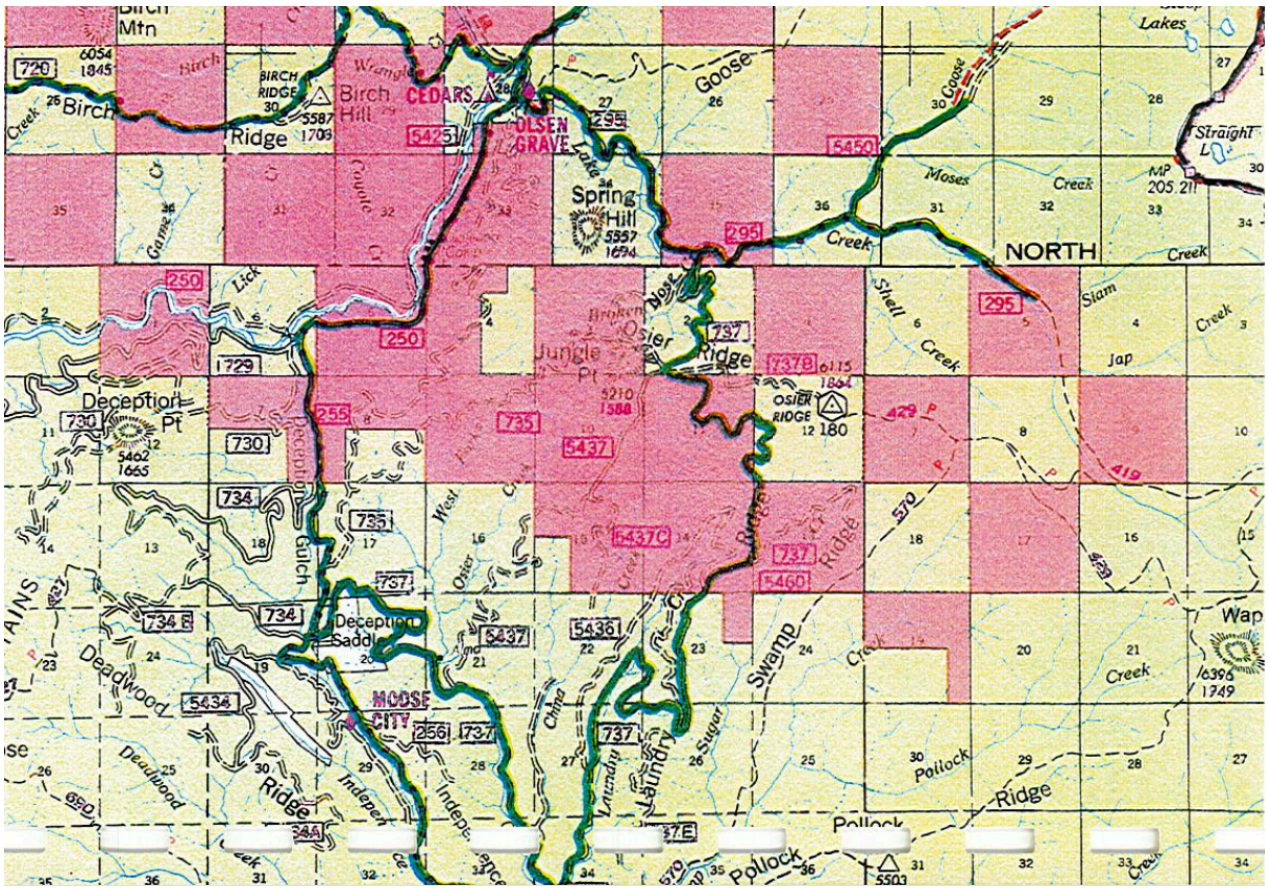
Large portions of the Dead Laundry project area were acquired in a 1996 land exchange with the Potlatch Corporation. In turn, Potlatch had recently acquired the lands from DAW Corporation. The Clearwater National Forest August 2011 Travel Plan FEIS discussed roads in the acquired land:

> Roads on or associated with lands formerly owned by DAW Corporation in the upper North Fork that were acquired in the 1996 Beaver-Cedar land exchange are being evaluated for appropriate designation or restrictions. Since these roads were primarily on lands in private ownership, they have not previously been evaluated in Clearwater National Forest project decisions.
>
> …In 1996 the Clearwater NF acquired 25,067 acres of former DAW Forest Products lands in the upper North Fork Clearwater River under the Beaver-Cedars Land exchange. These parcels had 26 different roads totaling 84.64 miles. Since these roads were totally or primarily on private lands they have not received an interdisciplinary Forest Service travel analysis and are included in the "UND" category in the existing condition.

According to the Travel Plan FEIS, "UND" means "undetermined." Its Glossary definition of "UND" explains:

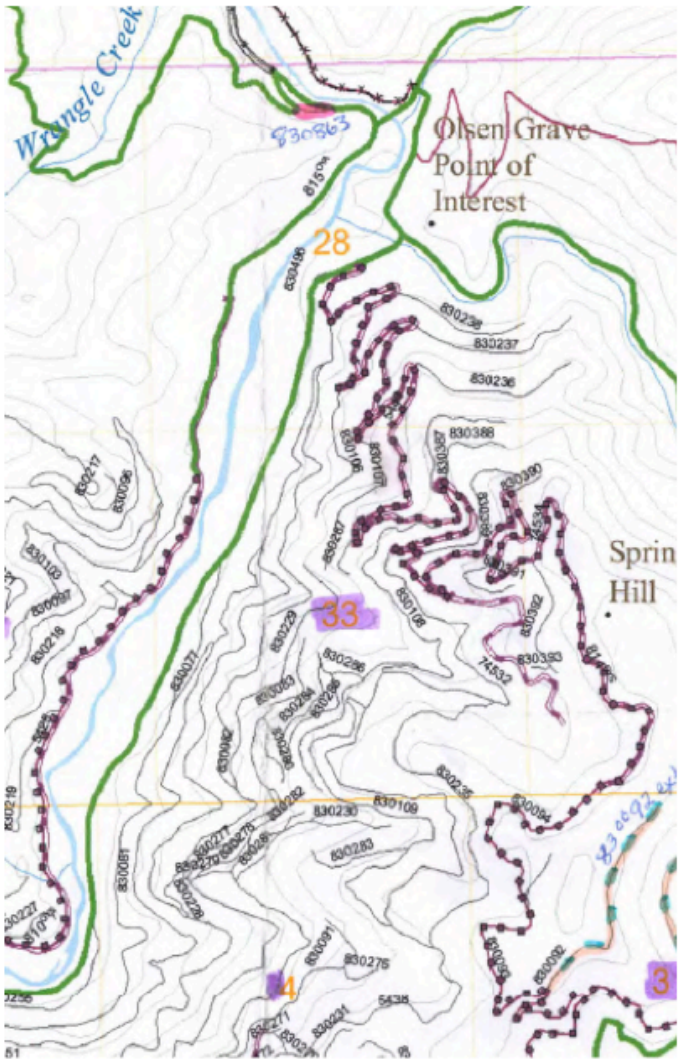
> For roads added to the system after 2005, such as the former DAW lands, the TravCode was listed as UND since no travel decision had been made. UND also includes some additional routes that were suggested as part of the Travel Planning process, roads that have long been overgrown and are not travelable with vehicles, and storage trails that are still considered part of the trail system but have not been maintained and are generally not travelable with vehicles.

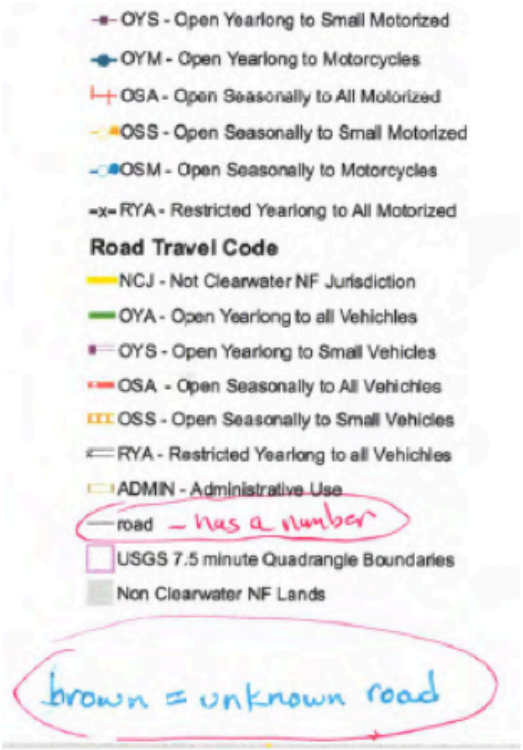
The 1996 Beaver-Cedars Land Exchange Final EIS did not include a detailed analysis of the environmental liabilities of the roads on the lands acquired in the exchange. Below is a portion of a map from the Beaver-Cedar Land Exchange FEIS, covering the Dead Laundry project area. The sections colored red are the lands acquired from Potlatch in the exchange.



Obviously that map doesn't show anywhere near the 84.64 miles of road that existed on the acquired lands at the time of the exchange, according to the Travel Plan Final EIS.

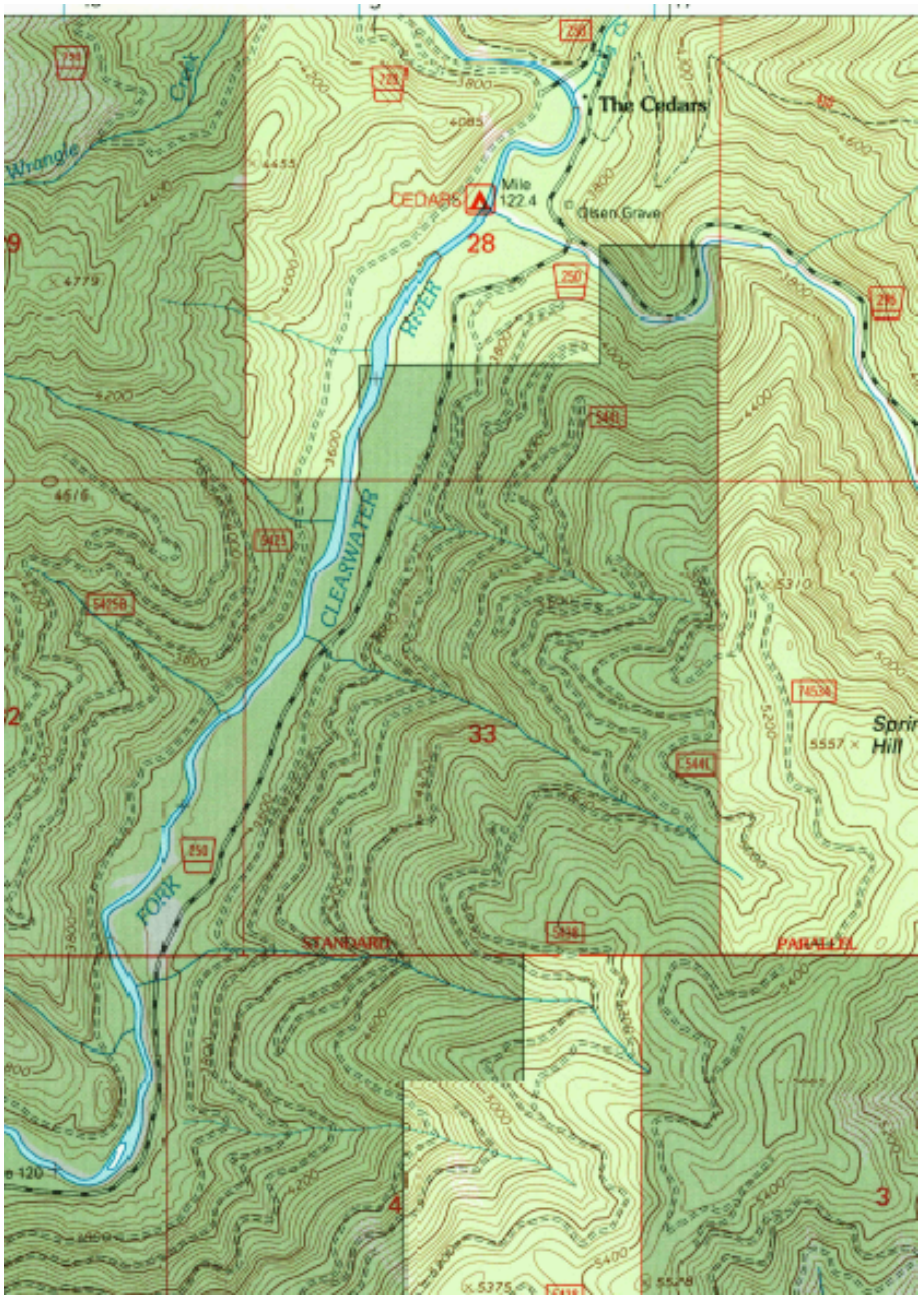
During the above-mentioned Clearwater National Forest (CNF) travel planning process, the FS did begin to examine roads in the acquired lands, producing more details of the road situation. We refer to a CNF Travel Planning map ("L02-00055080826aquiredNFlandsjbranning.pdf"). A portion of that map is pasted below, followed by its key. It shows a portion of the Dead Laundry project area—the Cedars Campground near the confluence of the North Fork and Lake Creek is near the top.



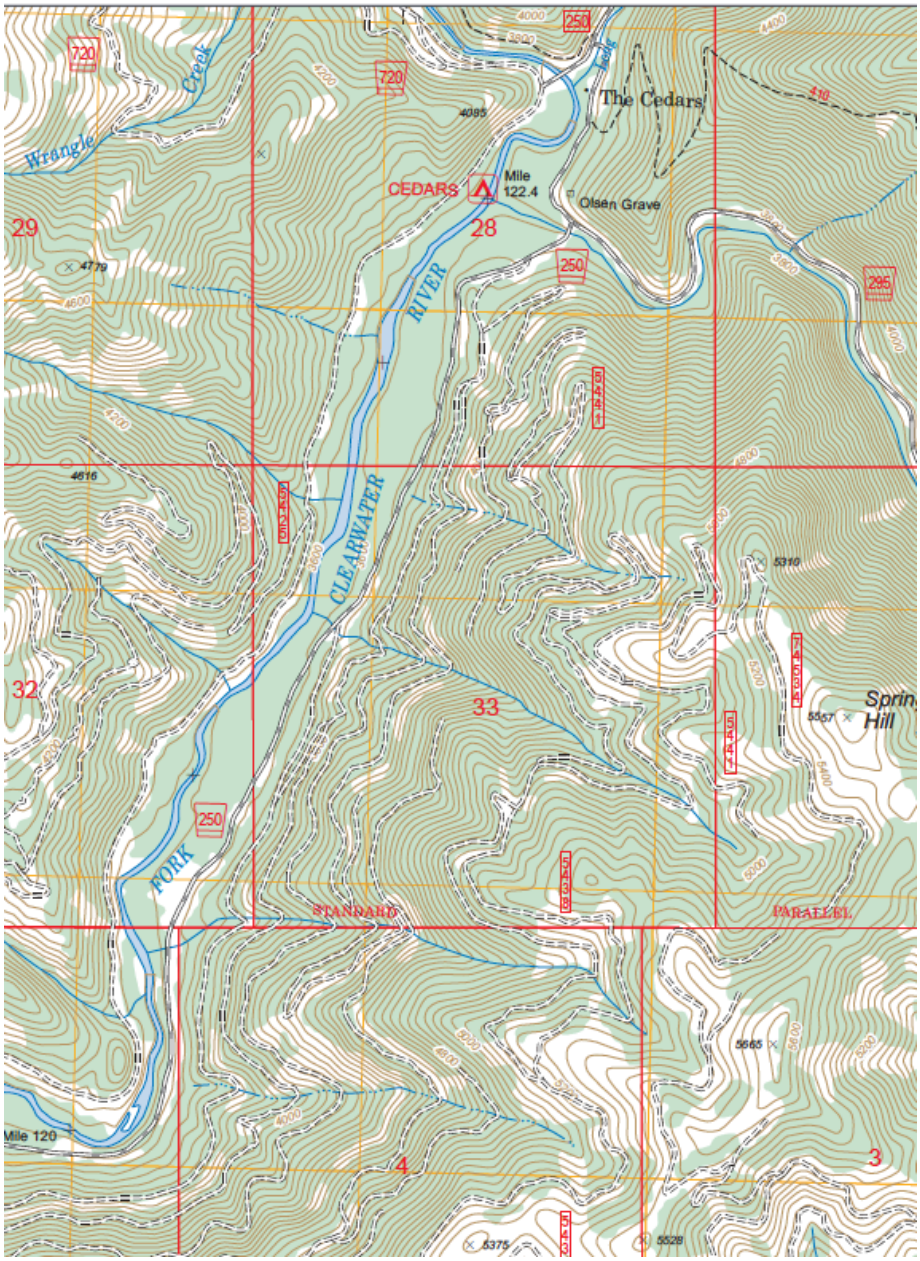


With the exception of a sliver of land near the Cedars Campground, the above area was part of the acquired lands. This reveals the high road density left over from the days of DAW ownership/management.

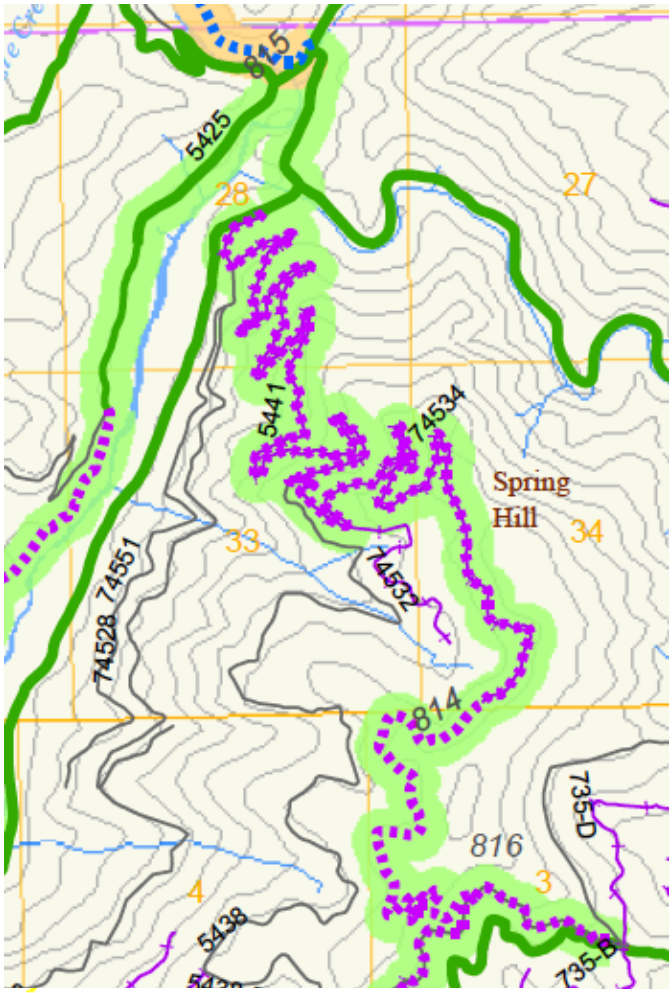
Below is a portion of the 7.5 minute Osier Ridge Quadrangle map (dated 1994) showing the same area, also showing a high road density. There's a stream shown on that map, under the word "Standard" near the bottom. That map shows up to nine road crossings of that tributary of the North Fork. The FS apparently has no inventory data on the conditions of those road/stream crossings.



Next is the very same portion of the 7.5 minute Osier Ridge Quadrangle map currently downloadable from the FS website at: https://data.fs.usda.gov/geodata/rastergateway/states-regions/states.php ("Updates to Transportation 1994, Updates to Boundaries 2015") showing the same extensive road network.



A portion of another CNF travel planning map ("090604northforkeast36x48.pdf") is pasted next, and it displays the same portion of the Dead Laundry Project Area, along with parts of its key.



Legend

- Administrative Forest Boundary
- Administrative Districts
- Highways
- border_routes
- USGS 7.5 minute Quadrangle Boundaries
- 200 foot contour intervals

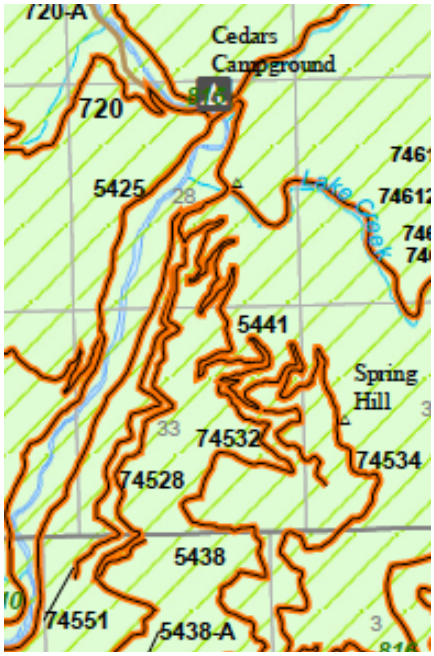
Roads - Alternatives B, C and D

- Open Yearlong to Vehichle, ATV and Motorcycle
- Open Seasonally to Vehichle, ATV and Motorcycle
- Open Yearlong to ATV and Motorcycle
- Open Seasonally to ATV and Motorcycle
- Restricted Yearlong to Vehicle, ATV and Motorcycle
- Administrative Use
- Non Clearwater Jurisdiction

Trails Alternative B

- Open Yearlong to Vehicle, ATV and Motorcycle (Coincident with Roads)
- Open Seasonally to Vehicle, ATV and Motorcycle (Coincident with Roads)
- Open Seasonally to Motorcycles
- Open Seasonally to ATV and Motorcycle
- Open Yearlong to Motorcycles
- Open Yearlong to ATV and Motorcycle
- Restricted Yearlong to Vehicle, ATV and Motorcycle

The above map displays motorized summer use contemplated—and later adopted by the CNF Travel Plan Record of Decision (ROD). It doesn't display the same extent of the road network as the previous map. And inexplicably, it has some roads labeled "Non Clearwater Jurisdiction" even though the map was produced approximately ten years after the land exchange. We now refer to roads 74528 and 74551, labeled on the western part of this map. For the purpose of helping to identify which road is 74528 and which is 74551, below we paste a portion of another map, "North Fork Snow1" which is the CNF's Over Snow Vehicle Use Map 2014. This is a map created following from the CNF Travel Plan ROD. The portion of that map shown is once again of this same area.



From the above maps, it is clear that the CNF's Travel Planning process allowed over-snow use on Roads 74551 and 74528, whereas the CNF Travel Plan ROD did not authorize summer motorized use.

Further, CNF Travel Planning map ("L02-00055080826aquiredNFlandsjbranning.pdf") we display above does not attribute a Road Travel Code to either 74551 or 74528, however the key ambiguously identifies them (and many others) as simply "road – has a number." (Emphases in the key are the FS's.)

Next, we observe the project Transportation Systems Report Table 4 lists those two roads:

Road	BMP	Length	Road Work	Status	ATM	OPML	Access Control
74528	0.000	2.100	Reconstruction	EXISTING	OYS	ML-1	No Issue
74528	4.300	1.376	Reconstruction	EXISTING	RYA	ML-1	No Issue
74528	5.676	0.675	Reconstruction	EXISTING	RYA	ML-1	No Issue
74551	4.781	1.440	Reconstruction	EXISTING	RYA	ML-1	No Issue

RYA means "Restricted Yearlong to All Vehicles" and OYS means "Open Yearlong to Small Vehicles." This means all segments are supposedly restricted at all times from motorized use, except for the first 2.1 miles of 74528, which is open yearlong to small vehicles. However, this is inconsistent with the CNF Travel Plan ROD, as shown in map "090604northforkeast36x48.pdf" (above), which authorized none of those segments open—at least not 2.1 miles of 74528. The project Transportation Systems Report[9] includes incorrect information. In fact except for saying the report incorporates the CNF Travel Planning ROD, it—along with the Dead Laundry EA itself—fails to demonstrate project consistency with the 2011 Travel Plan ROD.

Our EA comments included observations we made in the project area, specifically concerning several roads specified in the Project Proposal for "reconstruction" as part of the Dead Laundry Project. The very first road evaluated, as discussed on pages 1-4 of our EA comments Appendix A, was discussed in detail. Because no map in the EA or specialists reports displayed road numbers in enough detail, our comments did not mention the official FS number identification of that route. Only from later inspection of other maps (discussed above, from other sources) were we able to discern that this route was 74528. The gist of the concerns we expressed in our EA comment is: the FS was treating 74528 as an "existing road" that needed "reconstruction" but our on-the-ground survey of that segment revealed that it was a road that had been decommissioned. Therefore if the FS were to access timber via this route as proposed in the Dead Laundry EA, the work needed would be—for all intents and purposes—road **construction**. In addition, our field survey in 2021 found that Road 74551 is also in a decommissioned condition, in contrast to the "existing" status claimed by the FS.

The FS's own documents make our point, if only partially. The Travel Plan record document "K1-0-00004-070530-dgober070529RoadCoreData.pdf" indicates that about 2.1 miles or Road 74528 had been decommissioned:

ROAD NO	NAME	BMP	EMP	SYSTEM	JURISDICT	STATUS	DISTRICT MGT	DISTRICT ADM
74528	CEDARS 1	0	2.1	NFSR - NATIONA	FS - FOREST SE	EX - EXISTING	010503	010503
74528	CEDARS 1	2.1	2.3	NFSR - NATIONA	FS - FOREST SE	DE - DECOMMIS	010503	010503
74528	CEDARS 1	2.3	4.3	NFSR - NATIONA	FS - FOREST SE	DE - DECOMMIS	010503	010503
74528	CEDARS 1	4.3	6.6	NFSR - NATIONA	FS - FOREST SE	EX - EXISTING	010503	010503

(We are assuming that for these documents BMP is beginning mile post and EMP is ending mile post) The Dead Laundry Travel Systems Report **omits that decommissioned segment**:

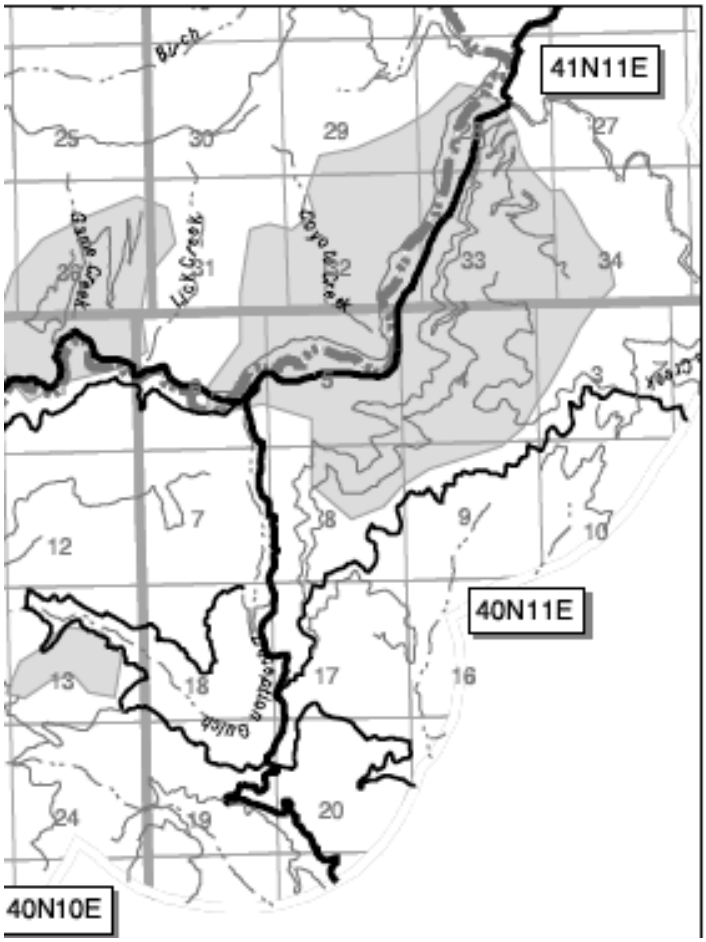
Road	BMP	Length	Road Work	Status	ATM	OPML	Access Control
74528	0.000	2.100	Reconstruction	EXISTING	OYS	ML-1	No Issue
74528	4.300	1.376	Reconstruction	EXISTING	RYA	ML-1	No Issue
74528	5.676	0.675	Reconstruction	EXISTING	RYA	ML-1	No Issue

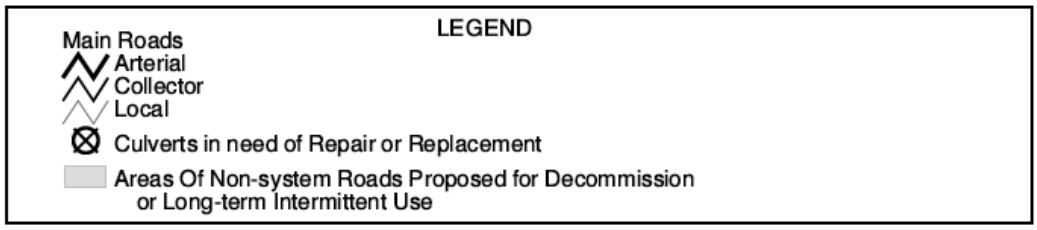
[9] The Dead Laundry Transportation Systems Report states, "This analysis incorporates by reference the Decision for the Access Travel Management (ATM) in the FEIS of the Clearwater National Forest Travel Planning August 2011.

What our EA comments Appendix A points out is, even that "K1-0-00004-070530-dgober070529RoadCoreData.pdf" spreadsheet does not accurately represent the current road condition. Whereas the spreadsheet indicates the decommissioned part begins at about two miles along, our observations show at least two major RHCA crossings had been entirely removed well before two miles, and the old road surface had been outsloped to at least partially conform to the former contour of the natural slope.

Nowhere does the FS admit what's obvious to us—to use the decommissioned segment as proposed, work fitting the definition of **new construction—including many tons of road fill and culvert installations**—would be necessary. (See our EA comments Attachment A, first road discussed pp. 1-4.) Our EA comments Appendix A also identifies flaws of FS assumptions for "reconstruction" of other project area routes.

The early 2000s Middle-Black project FEIS included a map of "Middle-Black Watershed Restoration, and below we've reproduced part of it and its key:





Source: USFS - R1 - Clearwater NF Oct 31, 2002 S.Grubb

The above reveals that a portion of what has now become the Dead Laundry project area was one of the "Areas Of Non-system Roads Proposed for Decommission". Might that explain the decommissioned status of roads the FS says would merely be "reconstructed" FOC has observed on the ground?

And while the project Transportation Systems Report has no map, the EA map (Figure 5: Transportation detail of the Dead Laundry Project Area) and the 3/12/2020 Dead Laundry Road Map issued with the Project Proposal fail to recognize these facts.

FOC monitored areas where the FS proposes various levels of road work. We photographed some of these sites and mapped their GIS location where available, also using the FS road system inventory provided to FOC in response to a previous Freedom of Information Act request. Among FOC staff's observations were road templates that the FS maps as "reconstruction" require such significant work that it rises to the level of road construction. Also, some proposed "maintenance" would more accurately be described as reconstruction. Also, some sites places were on a road template where the FS had not mapped any road template. We also found road prisms of previous roads that now are essentially wetlands—they have soggy soils, plants that thrive in soggy soils, and standing water—or sometimes even running water—on the old template, where roadwork would mean filling a small wetland. Such information did not appear in the Environmental Assessment and other reports. These findings are addressed in the folder **FOC 2021 Dead Laundry monitoring_Bilodeau report**, which contains the report, pictures taken, an excel spreadsheet that explains and contains GPS information from the pictures, and various maps.

Our 2020 road surveys as documented in our EA comments Appendix A, and our September 8-9, 2021 surveys as documented in "Dead Laundry Monitoring_FOC Sept 8-9_2021.pdf", were not a fully comprehensive survey of road conditions in the project area. But they reveal that the EA presents an extremely inadequate picture of the existing conditions of project area roads.

This contradictory and confusing situation persists with the 2023 Final EA. Its Figure 4 map encompasses the area of the above discussion we write to exemplify FS confusion and inconsistency. Unlike its deletion of the category "road reconditioning" from the description of the Proposed Action, the Figure 4 map keeps the "Reconstruction" category. (It also keeps "Reconditioning" which is much discussed in both versions of the EA.) It seems that the Figure 4 map reflects the reduction in logging the 2023 draft DN describes in contrast to the 2023 Final EA's description of the Proposed Action. Yet that same Figure 4 map displays many, many miles of road reconstruction the EA denies elsewhere. On top of that, much of this road reconstruction would improve or create access for apparently no reason. Dead Laundry Project management actions such as logging units depicted in the map key aren't found along many of those

reconstructed roads. This is disconcerting in the context of the statement below the Final EA's Table 6 (Road Activities proposed with the Dead Laundry Project): "Mileage is approximate and subject to change **as project is modified**." (Emphasis added.)

The FS has had numerous analysis opportunities, including with Dead Laundry and others described above, to determine what road system exists, what roads should be open for which users, which roads should be decommissioned, which should be converted to trails, and which should be kept and maintained, so that the known ecological impacts of roads and other travelways can be estimated, minimized or managed to a situation approaching sustainability. Yet as the 2023 Dead Laundry Final EA indicates, the FS continues to fail.

Deception OHV Trail

A "decision to construct an off-highway vehicle (OHV) trail in the vicinity of Deception Gulch was made on July 19, 1999 in the Decision Memo for the "DECEPTION GULCH ROAD OBLITERATION / OHV TRAIL" project." (August 2003 Decision Memo 814.doc, obtained under FOIA from the FS.) Decision Memo 814.doc further states:

> The original proposed location of the OHV trail involved crossing a number of drainages on mid-slope locations where large fills were to be removed during road obliteration. Building an OHV trail across these locations would involve considerable soil disturbance and/or construction of structures to avoid fording the creeks with OHVs. These structures are expensive to construct and maintain.
>
> …During survey and design of the OHV trail, several potential construction and maintenance problems were identified that would be costly to resolve during construction and involve long-term maintenance costs. Alternative routes were located that would avoid the problem areas, but would result in essentially the same 30-mile OHV trail. These changes would be consistent with the findings in the original project Decision Memo.

In response to FOIA, the FS told us that Decision Memo 814.doc was never signed and we assume never implemented. Furthermore, they told us they had destroyed the original July 19, 1999 Decision Memo for the Deception Gulch Road Obliteration / OHV Trail project, so it was not provided to us in response to our FOIA. So we are unable to determine which roads the 1999 DM had designated for obliteration (decommissioning)—and according to the FS, they don't know either because they have erased this chapter of history from their Forest Plan implementation record of the project area. Again, this is an example of unresolved and undisclosed cumulative environmental impacts.

In 2015 or 2016, the FS further altered another portion of the Deception OHV Trail system (see "Deception OHV DM 2015.pdf"), which utilizes some a mix of old roads and trails. The Dead Laundry analysis does not discuss that project's BMP implementation or completion.

EA FAILS TO DISCLOSE EXISTING CONDITIONS

(We discussed this in EA comments at pp. 103-104.)

ROCKY MOUNTAIN ELK

(We discussed this in EA comments at pp. 104-105.)

Elk are a management indicator species (MIS) under the Forest Plan. Forest Plan Wildlife and Fish Standards include:

> a. Provide the proper mix of hiding and thermal cover, forage, and protection from harassment during critical periods on big-game summer range (primarily elk), in accordance with criteria contained in the "Guidelines for Evaluating and Managing Summer Elk Habitat in Northern
> Idaho."
> b. Rehabilitate key big-game winter range to meet elk population goals. (Also see Management Areas C3 and C4).
> e. Manage use of motorized vehicles off roads, on roads, and on trails in areas of key wildlife habitat features such as elk licks, wallows, and calving areas to accomplish habitat objectives.

Forest Plan timber Standard 7.j. is:

> Manage tree openings created by even-age timber harvest as follows:
> (1) Size of openings - Openings created will normally be 40 acres or less, see Regional Guide for exceptions:
>
> (2) Dispersal - The objective is to disperse openings so that adjacent stands will represent at least three size classes, see Regional Guide;
>
> (3) Duration of openings - consider an opening no longer an opening when the density and height of the vegetation and watershed conditions meet the resource management objectives of the area.
>
> Big-Game Summer Range/Timber - In proposed El and E3 Management Areas, the minimum standard is to provide 25 percent elk habitat potential. New openings (regeneration cuts) can be planned adjacent to former openings as long as the former opening is certified as stocked and the area meets a minimum of 25 percent elk habitat potential after implementation of the proposed activity.
>
> The ID Team must assure that unit design optimizes wildlife objectives, both short-and long-term, within the overall objectives of the management area. Other resource requirements and objectives such as visual, watershed, silvicultural, etc., also must be met as applicable. The dispersal of timber size class objectives in the Regional Guide must be met.

Elsewhere the Forest Plan states:

> (I)n the El Management Area in Chapter III, the minimum standard for summer elk habitat

> is to maintain 25 percent of potential habitat capability. In areas where current potential is less than 25 percent, the plan provides direction to increase potential to at least minimum standards as new activities are planned. It recognizes in Chapter IV, Section B, that not all areas will meet minimum standards due to past management practices. However, as we make new entries in those areas, activities should be designed and access managed to bring the potential back to a minimum of 25 percent.

Forest Plan Wildlife and Fish Standards for Management Area E1 include:

> 2. b. Manage for a minimum of 25 percent maximum elk potential habitat effectiveness. During Plan implementation and further analysis, determine whether remaining areas of El have potential for providing elk habitat. When analysis shows elk potential is limited by factors other than National Forest management, determinations may be made not to manage for elk. When habitat conditions warrant, managers are urged to exceed the 25 percent habitat standard. See Forestwide General Standards, in Chapter II.
>
> 8. Design and develop road systems in accordance with area transportation plan procedures.

The fact that the project area road inventory is in such a shambles is one reason the FS cannot demonstrate consistency with Forest Plan direction for elk.

Since the FS admittedly has not utilized a comprehensive and accurate road inventory for the project area, it cannot possibly conduct a cumulative effects analysis in compliance with NEPA or forest plan direction for elk. And we note here that the FS represents its forest plan direction for elk as being its proxy for grizzly bear habitat analysis.

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

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

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

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

> Optimum size for thermal cover on summer and spring-fall range is 12 to 24 ha (30 to 60 acres). Areas less than 12 ha (30 acres) are below the size required to provide necessary internal stand conditions and to accommodate the herd behavior of elk.
> …Cover requirements on winter ranges must be considered separately and more carefully. Animals distributed over thousands of square miles in spring, summer and fall are forced by increasing snow depths at higher elevations to concentrate into much restricted, lower-elevation areas in mid- to late-winter. Winter range, because of its scarcity and intensity of use, is more sensitive to land management decisions.

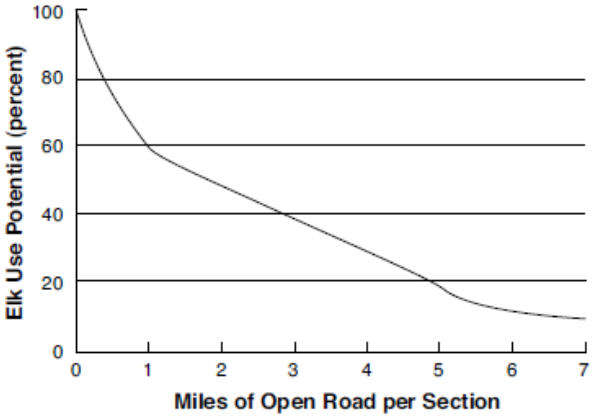
Regarding Black et al. (1976) conclusions, Thomas et al., 1988a state, "We concur. New research on elk use of habitat on summer and winter ranges has become available, however (Leckenby 1984). Land-use planning requirements indicate that a model of elk winter-range habitat effectiveness is required."

Thomas et al., 1988a also state:

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

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

5. Levels of habitat effectiveness:



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

The Forest Plan included a "Data Requirement": "Field Verification and Mapping of Elk Winter and Summer Range Habitat" to be accomplished by 1989. It also includes "Research Needs" for wildlife including elk. The FS has not properly prioritized most of this forest plan direction.

The Forest Plan reads:

> 5. Wildlife and Fish
> a. Provide the proper mix of hiding and thermal cover, forage, and protection from harassment during critical periods on big-game summer range (primarily elk), in accordance with criteria contained in the "Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho."
>
> b. Rehabilitate key big-game winter range to meet elk population goals. (Also see Management Areas C3 and C4).
>
> Big-Game Summer Range/Timber - In proposed El and E3 Management Areas, the minimum standard is to provide 25 percent elk habitat potential. New openings (regeneration cuts) can be planned adjacent to former openings as long as the former opening is certified as stocked and the area meets a minimum of 25 percent elk habitat potential after implementation of the proposed activity.
>
> For example, in the El Management Area in Chapter III, the minimum standard for summer elk habitat is to maintain 25 percent of potential habitat capability. In areas where current potential is less than 25 percent, the plan provides direction to increase potential to at least minimum standards as new activities are planned. It recognizes in Chapter IV, Section B, that not all areas will meet minimum standards due to past management practices. However, as we make new entries in those areas, activities should be designed and access managed to bring the potential back to a minimum of 25 percent.

It is also recognized that there are areas within El that have quality elk habitat currently higher than 25 percent. In these cases, Rangers are encouraged to maintain this quality through judicious planning and road closures.

The same basic philosophy will be applied to water quality standards, visuals, T & E habitat, old growth, and other resource areas where the Plan specifies minimum acceptable standards.

For Management Area E1 the Forest Plan requires:

Manage for a minimum of 25 percent maximum elk potential habitat effectiveness. During Plan implementation and further analysis, determine whether remaining areas of El have potential for providing elk habitat. When analysis shows elk potential is limited by factors other than National Forest management, determinations may be made not to manage for elk. When habitat conditions warrant, managers are urged to exceed the 25 percent habitat standard. See Forestwide General Standards, in Chapter II.

Design and develop road systems in accordance with area transportation plan[10] procedures.

Forest Plan forestwide standards require:

Manage tree openings created by even-age timber harvest as follows:
(1) Size of openings - Openings created will normally be 40 acres or less, see Regional Guide for exceptions:
(2) Dispersal - The objective is to disperse openings so that adjacent stands will represent at least three size classes, see Regional Guide;
(3) Duration of openings - consider an opening no longer an opening when the density and height of the vegetation and watershed conditions meet the resource management objectives of the area.

The ID Team must assure that unit design optimizes wildlife objectives, both short-and long-term, within the overall objectives of the management area. Other resource requirements and objectives such as visual, watershed, silvicultural, etc., also must be met as applicable. The dispersal of timber size class objectives in the Regional Guide must be met.

Design timber sales to consider cost-effectiveness while maintaining the long-term sustained yield and protecting the soi1 and water Resources.

Guide vegetation management by the Vegetation Management Practices and Habitat Type Guidelines (Appendix A), and the Northern Regional Guide.

Eliminate the watershed restoration backlog by 2000.

[10] Where is the "area transportation plan"? The project Transportation Systems Report doesn't mention it.

The Wildlife Report states, "Motorized route densities are calculated by motorized route miles/access as designated in Travel Plan **and on-the-ground existing conditions**." (Emphases added.) It is these on-the-ground existing conditions that the FS has inadequate knowledge of, even admittedly, making compliance with the Forest Plan impossible.

The Wildlife Report states, "However, given the current consensus of local big-game biologists with IDFG that the lack of forage is limiting the herds and the ongoing studies on fitness and summer nutrition (Cook and Wisdom 2018), the benefits of creating additional high-quality forage appear to outweigh the potential negatives associated with openings not being adjacent to a full 800 feet width of cover."

The Wildlife Report misrepresents this unpublished, non-peer reviewed Cook and Wisdom report as "consensus." It fails to note such statements in the report as, "We note that these results are preliminary…" The Wildlife Report also fails to reconcile this statement: "Nutritional value of habitat was highest in the North Fork Clearwater Study Area…"

FISHER

(We discussed this in EA comments at pp. 105-109.)

The Wildlife Report acknowledges a high degree of Dead Laundry project impact on fisher:

> The combination of a decrease in mature habitat and an increase in openings would result in a decreased probability of fisher occupancy. … Harvest and mechanical hand treatments will also create fragmentation and loss of connectivity between some suitable habitat stands in the project. Post-harvest fuels reduction would remove downed wood and potentially remaining snags, further reducing suitability for fishers.
>
> The concentration, amount, and type of vegetative treatment would create a large landscape area of greater than 10% openings with a reduction in complex mature forest. Sauder and Rachlow (2014) found that an increase in the amount of open area from 5% to 10% reduces the relative probability of occupation by fishers by 39%. It is possible fishers will abandon this area or these territories until the converted habitat returns. Fishers in the harvested areas would be expected to displace to areas with suitable habitat. The timeframe for the converted habitat to return to a state utilized by fishers is not known with certainty and would depend on multiple natural and human factors but would likely involve multiple decades. The timeframe for the converted habitat to areas mature and develop denning and resting suitable habitat may be 80 to 100 years. …Although access management within the project area will not change, some areas will be more easily accessed making them more appealing to some forest users.

Still the FS downplays such impacts, relying upon an outdated and scientifically invalid assessment to claim viability is still assured: "However, critical habitat viability threshold would remain met and sufficient fisher habitat would remain on the overall landscape to sustain the Forest fisher population. …Despite the potential effects of the Dead Laundry project on suitable fisher habitat and the cumulative effects of the adjacent vegetative treatments, the critical habitat viability threshold would remain met far above Samson (2006a) estimate of approximately

74,378 acres of habitat is required to maintain minimum viable population of marten on the Forest."

This also exemplifies the FS's unwillingness to respond to public concerns timely expressed during the NEPA process. Our EA comments provided detailed critiques of the EA's reliance on Samson assessments. In their responses to comments—nothing is written regarding those specific criticisms. The FS ignores what it cannot refute.

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

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

The FS selected the fisher as one of the Species of Conservation Concern (SCC) under forest plan revision. The revision document on Species of Conservation Concern admits that the FS 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.

Since well before adoption of the Forest Plan, impacts from trapping have been accumulating. In response to an information request from Western Watersheds Project, Idaho Department of Fish and Game (IDFG) reported that traps set for wolves had caught 56 fisher (20 of which died in the traps) since 2012. *See* IDFG Non-target wolf trapping LICYEAR2013-2019 spreadsheet. The year that the FS drafted the assessment, in the 2013-2014 season, IDFG reported that 22 fisher were trapped that season, ten of which died in traps. While the trappers reporting these numbers indicated the rest were released, we don't know if trapping contributed to mortality shortly thereafter. Also, these are just the numbers reported, so we don't know if there were more unreported, either because trappers chose not to or did not check their traps. While we don't know where this trapping occurred, the FS has recognized that the NPCNF contains a lot of fisher habitat, so it follows that at least some of these numbers were likely from this Forest. Also,

it is very reasonably foreseeable that trapping is going to increase. Idaho Fish and Game Commission has liberalized wolf trapping, which includes a longer trapping season. *See* Idaho Fish and Game Commission (2020), compare with IDFG hunting units map (2020). Also, a projected increase of roads would provide increased access for trappers.

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.

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.

The EA cites no scientifically-based analysis on the spatial and structural requirements for fisher survival and successful reproduction, comparing forestwide conditions with habitat metrics required to insure fisher viability. The analyses for other wildlife show these same flaws.

CANADA LYNX

(We discussed this in EA comments at pp. 110-113.)

The EA fails to analyze the direct, indirect, and cumulative effects of the state of Idaho's new trapping laws on Canada lynx. This is also true of the FS's analyses for grizzly bears, wolverine, fisher, and marten. We incorporate the Complaint and Memorandum In Support Of Motion For Temporary Restraining Order And Preliminary Injunction in Case No. 2:21-cv-00479-DCN as part of this Objection.

WOLVERINE

(We discussed this in EA comments at pp. 113-116.)

On May 26, 2022 a federal court vacated the USFWS's withdrawal of a proposed ESA-listing rule for the wolverine. Later in 2023 a new final listing determination is due to meet the Court's deadline. As part of the process, the USFWS issued a request for new information (Federal Register Vol. 87, No. 225, November 23, 2022) to update the Species Status Assessment (SSA) for the North American Wolverine leading to a final determination to list this species under the Endangered Species Act (ESA). We incorporate FOC's submission to the USFWS in response to the USFWS solicitation, within this objection. Please note the maps on page two of those comments, identifying the Dead Laundry project area as being a part of the "Current Potential Extent" and 1827 - 2017 "Maximum Extent Occurrences." Those come from USFWS maps.

BLACK-BACKED WOODPECKER

(We discussed this in EA comments at pp. 116-122.)

PILEATED WOODPECKER

(We discussed this in EA comments at pp. 123-128.)

The pileated woodpecker was selected by the FS as a management indicator species (MIS) with special provisions to insure viable populations will be maintained. One of the provisions is for population trend monitoring, which implies monitoring of population numbers over time as habitat changes in response to management and other factors. The FS has failed to gather and report on pileated woodpecker population data over the duration of the Forest Plan, threatening viability of not only the pileated woodpecker, but also other wildlife species relying on the diversity naturally found in old growth habitat, as the Forest Plan explicitly recognizes.

Other provisions are found in Forest Plan Appendix H, which a Forest Plan standard identifies as nondiscretionary management actions:

> 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.

As our comments on the EA pointed out, both the EA and Wildlife Report ignored these portions of the Forest Plan Standard. And the FS's responses to comments indicates the FS continues to ignore this Forest Plan direction.

Our EA comments also pointed out similar spatial habitat standards existed in the 1987 IPNF Forest Plan, which cites the biological basis. The FS also ignored many other biologically-based comments we provided in advocating for the pileated woodpecker, and in advocating for Forest Plan compliance.

If the FS genuinely cared about viability of old-growth associated wildlife, it would have a detailed inventory, including mapping, of a vast network of the required 300-acre stands ("at least 200 yards wide at any one point") identified and designated as part of the process of project design, across the nonwilderness portion of the Clearwater NF. Apparently there is no such inventory, or else the FS would be explicitly citing it as demonstrating they are complying with the Forest Plan and assuring viability.

Forest Plan Appendix H includes a requirement to "provide habitat for 40 percent of potential population of cavity dependent species." This is yet another quantitative standard the EA ignores.

NORTHERN GOSHAWK

(We discussed this in EA comments at pp. 128-130.)

PINE MARTEN

(We discussed this in EA comments at pp. 130-131.)

VIABILITY

(We discussed this in EA comments at pp. 131-134.)

We incorporate the discussion on viability from FOC's comments on the Draft Forest Plan and EIS (pp. 131-133).

The Forest Plan defines "Viable Population" as "A population which has adequate numbers and dispersion of reproductive individuals to ensure the continued existence of the species population in the planning area." This is a restatement of the 1982 NFMA regulations at 36 CFR § 219.19:

> Fish and wildlife resource. § 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.

The Forest Plan defines "Minimum Management Requirements (MMR)" as "Standards for resource protection, vegetative manipulation, silviculturist practices, even-aged management, riparian areas, soil and water and diversity, to be met in accomplishing National Forest System goals and objectives (see 36 CFR 219.27)." The 1982 NFMA regulations at 36 CFR 219.27 the Forest Plan cites include the requirement to "(6) Provide for adequate fish and wildlife habitat to maintain viable populations of existing native vertebrate species and provide that habitat for

species chosen under § 219.19 is maintained and improved to the degree consistent with multiple-use objectives established in the plan;"

The Forest Plan at IV-13 requires the FS to monitor population trends of indicator species, citing the 1982 NFMA regulations ("NFMA Requirement") at 36 CFR 219.19(6), which states, "Population trends of the management indicator species will be monitored and relationships to habitat changes determined. This monitoring will be done in cooperation with State fish and wildlife agencies, to the extent practicable."

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 that "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).

The Clearwater Forest Plan requires population trend monitoring for its management indicator species (MIS). By including MIS population trend monitoring requirements the forest plan, the agency acknowledged that it needed to verify its assumption that allowing old-growth habitat to be reduced to 10% forestwide (a level well below the NRV)—assures viability of such species. However the FS has failed to meet its MIS monitoring commitments. FS has not verified its minimum old-growth MIS habitat assumption.

Schultz, 2010 criticizes Forest Service 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, the USDA's 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 FS 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 FS 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."

Our comments on the Dead Laundry EA provided this same detailed critique of the 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.

INSUFFICIENT ANALYSIS OF EFFECTS ON AQUATIC SPECIES, RIPARIAN AREAS, AND WATER QUALITY

(We discussed this in EA comments at pp. 134-152.)

As discussed above under ACCESS AND TRAVEL MANAGEMENT, the FS fails to analyze and disclose the full and accurate condition of system and nonsystem roads, which results in an inaccurate baseline for ESA consultation purposes. Also, the fisheries Biological Assessment (BA) itself presents an inaccurate description of both the existing conditions of roads and of roads to be constructed. For example: "Stream crossings and culvert replacements will also not be analyzed in detail but will be mentioned in this report." The BA also discloses that the FS apparently has no idea how many culverts need replacing: "During project implementation while road reconstruction and reconditioning are being conducted, there could be culverts identified as needing replacement."

The EA states**:**

> For this proposed project, activities within the stream channel that have the potential for direct injury to individual fish include excavation of or for culverts and other stream crossings on road prisms.
>
> … Culverts (especially undersized culverts) can fail during high flow events, resulting in the rapid erosion of large amounts of road fill and surface into both fishbearing and non-fishbearing stream channels.

The draft DN cannot reasonably arrive at a conclusion of no significant impacts, since the impacts have not even been quantified in the EA, BA, or specialists reports. The FS fails to take the hard look NEPA requires.

The EA states, "The proposed road activities …results in a total of 46.7 miles of roads within the RHCAs in the project area upon completion of project activities." This statement also appears in the BA and Fisheries Report. However the latter (but not the EA) also states, "There are ~91 miles of gravel or native surface (dirt) roads within RHCAs." The Watershed Resource report's Figure 1 (USGS HUC12 subwatersheds in the Dead Laundry project) implies that the 91 miles includes portions outside the "project area."

The BA states, "Road density is sometimes used as a surrogate for impacts to streams and watersheds and is related to reduced fisheries composition and persistence at higher densities. Desired conditions for RHCA road density based on the NOAA Matrix of Pathways and Indicators (NOAA, 1998) are less than 1 mi/mi^2." NOAA, 1998 is "Matrix of Pathways and Indicators of Watershed Condition for Chinook, Steelhead and Bull Trout. Local Adaptation for the Clearwater Basin and Lower Salmon." That document explains it is "Local adaptation of Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale, National Marine Fisheries Service, Environmental and Technical Services Division, Habitat Conservation Branch, August 1996. Local adaptation and use by Cottonwood BLM, Clearwater NF, and Nez Perce NF, November 1997, through the level 1 streamlining process."

So what the BA refers to as "desired conditions" for RHCA road density is found in the column of "high habitat conditions" shown in NOAA, 1998. The BA doesn't say why the FS only chose a single "indicator" out of the entire set of habitat indicators in NOAA, 1998 and why the other indicators were omitted from analysis. Others include: Watershed Road Density, Landslide Prone Road Density, Riparian Vegetation Condition, Change in Peak/Base Flow, Water Yield (ECA), Sediment Yield, Width/Depth Ratio, Streambank Stability, Floodplain Connectivity, Temperature, Suspended Sediment, Chemical Contamination/Nutrients, Physical Barriers-Adult, Physical Barriers-Juvenile, Cobble Embeddedness, Percent Surface Fines, Percent Fines By Depth, Large Woody Debris, Pool Frequency, Pool Quality, Off-Channel Habitat, Habitat Refugia, Harassment, Redd Disturbance, Juvenile Harvest, Subpopulation Size, Growth and Survival, Life History Diversity and Isolation, and Persistence and Genetic Integrity.

The EA and BA do not utilize the indicator "Landslide Prone Road Density" to analyze project area watershed risks and current conditions. Again, it is one of those indicators from NOAA, 1998. The 1996 Beaver-Cedar Land Exchange FEIS evaluated erosion metrics in the Cedars Area, and one was Mass Wasting Potential ("the relative potential for mass soil movement caused by gravitational forces. Activities such as timber harvest, road construction, and fire have the potential to accelerate mass movement.") Cedar Land Exchange FEIS Table 3.1 is displayed below.

Table 3.1 - Mass Wasting Potential

	Beaver Block (%)	Cedars Area (%)
Low	68.5%	27.8%
Moderate	24.5%	43.8%
High	6.0%	24.4%
Very High	0.3%	3.9%
Talus/Rock	0.8%	0.2%

The simple table above is not sufficient for analyzing the NOAA, 1988 metric of Landslide Prone Road Density. Yet it is more landslide risk analysis than appears in the entire EA, BA, or Water Resource Report. The Beaver-Cedar Land Exchange FEIS recognized, "Major erosion events within the Cedars Area may have significant changes to fish habitat and populations dependent upon the location of the impacts." Yet now the FS ignores such risks in their Dead Laundry analyses.

The Middle-Black FEIS included maps[11] "…with 1995 -1996 Landslide Locations and High Mass Wasting and Debris Avalanche Potential Areas", "Landtype Associations", and "Watersheds - Hydrological Units Level 5, 6, 7, 8 with 1995 -1996 Landslide Locations." The FS can do this but now refuses.

We include the document "Road Closure Changes on the North Fork Ranger District 2021" in our submissions as part of this objection. It documents road repairs due to landslides.

The Water Resource Report states: "GRAIPLite modeling … does not consider sediment produced from land management, or sediment produced from landslides." Also, "Disturbed WEPP … does not consider road-related sediment, sediment produced from land management, or sediment produced from landslides." Id.

The Water Resources report adds the NOAA, 1988 metrics of overall watershed road density and Equivalent Clearcut Area (ECA) omitted by the BA, yet it still ignores most of the metrics.

Furthermore, since the FS has obviously not included the legacy roads from DAW management days in its road density analyses, the values presented in the EA and resource reports are gross underestimates. (See the Osier Ridge and Moose Mountain topographic maps.)

The BA states: "All management activities must be designed to have no adverse effect to the designated Riparian Management Objectives (RMOs) which are large instream woody material, stream temperature, width to depth ratios, bank stability, and pool frequency." Yet instead of presenting data on conditions and trends of project area RMOs, the BA instead states:

[11] We included the Middle-Black FEIS documents, maps and ROD on a data disk submitted as part of our first objection.

> Preliminary monitoring results from the PACFISH/INFISH Biological Opinion (PIBO) monitoring across the Upper Columbia River Basin overall indicate an improving trend in residual pool depth, wood frequency, bank stability, and undercut banks at managed and unmanaged sites between 2001 and 2012 (USDA, 2012).

That cite is about ten years old; and given its extremely large geographic focus, cannot reasonably be expected to reflect project area RMO trends and conditions—especially in a project area with very high residual road densities from DAW timber management prior to the land exchange.

The Water Resources Report states, "New road construction would cross one small, headwater streams." As we've pointed out under ACCESS AND TRAVEL MANAGEMENT, this statement is false and misleading.

Our comments on the EA raise the issue of cobble embeddedness data in relation to forest plan consistency. But as far as we can tell, the FS chose to ignore our comment entirely, and so the FS hasn't disclosed anything further in regards to this critical direction in the CNF forest plan.

The FS's analyses have improperly excluded or minimized sediment generated by motorized trails. One of the FS's analytical assumptions in its use of the GRAIP Lite model (Water Resource Report) is that all routes listed as ATV (OHV) trails in the travel Plan, all new construction routes, and all Maintenance Level 1 routes are assumed to be placed into storage after project implementation. The exclusion of trails from the FS's sediment models is important because there are many miles of motorized trails in the project area. Some of these trails are open to ATVs and motorcycles only, but some of them are also open to highway legal vehicles. By not including trails in the sediment modeling, the FS underestimates the amount of sediment generated. This is important because there is a need to reduce erosion and sediment in the project area in order to meet Forest Plan direction for water quality and aquatic habitat and comply with the Clean Water Act.

The Idaho Department of Environmental Quality has approved a Total Maximum Daily Load (TMDL) for Deception Gulch, which mandates a reduction in sediment. From Idaho Department of Environmental Quality, 2003:

> The real concern for Deception Gulch comes from the sediment source data and information which indicate the sediment loading poses a real threat to water quality. Road density in Deception Gulch is about twice of what the [Clearwater National Forest] considers acceptable for water quality. Of these roads, some 50 percent are on high-risk landtypes, which is a very high percentage. The result is that Deception Gulch has a very high mass failure rate, and most of the mass failures are associated with the roads…The real threat in terms of sediment loading is sediment from the mass failures, most of which have occurred in the past during rain-on-snow events.
>
> All of this together indicates that the sediment problems in Deception Gulch are of a nature and magnitude that reductions in event-based loading should and can be reduced. Analysis of the roads and geology of the watershed indicates that mass failures will continue to

> occur and degrade the stream. The road system on the west side of the drainage is built on geologic dip slopes that will continue to fail. Forest Service Road 734 shows numerous signs of fill slope slipping. Forest Service Roads 255 and 730 cross the contact between Wallace gneiss and the Revett quartzite where most of the large mass failures have occurred. It is likely that this unstable area will continue to fail...

This North Fork TMDL notes that about half of the ~42 miles of roads in Deception Gulch are located on high hazard landtypes. IDEQ recommends obliterating these roads to achieve the sediment load reduction target for Deception Gulch, which has not yet been achieved but could be pursued in the Dead Laundry Project. The FS has not demonstrated that Dead Laundry project activities are consistent with this TMDL, which is required under the Clean Water Act.

The Transportation Analysis Report states there are 297 miles of known roads in the project area. However nonsystem roads were apparently not considered in modeling estimates of sediment delivery. The FS also incorrectly models ATV trails as stored roads, when in fact they receive and create many of the same impacts as open roads. Thus, the FS cannot demonstrate compliance with the Forest Plan.

The FS has not managed the Forest consistent with Forest Plan standard 8.j.: "Eliminate the watershed restoration backlog by 2000."

Foltz et al., 2009 is relied on by the FS to validate claims of minimal effects. It's not as clean as the FS represents. For example:

> Turbidity exceeded the regulatory limits during culvert removal at all locations monitored in this study and remained above the limits beyond the monitoring periods of 24 h at four of the locations. Sediment concentrations 100m downstream of the culvert outlet were reduced by an order of magnitude, but **did not change the turbidity values sufficiently to meet regulatory limits**. (Foltz et al., 2009; emphasis added.)

The EA fails to demonstrate timber sale consistency with the Forest Plan Standards found in Appendix K. The applicable Objectives (which are actually Forest Plan **Standards** according to the Forest Plan) are not being met. The EA fails to analyze and disclose cumulative impacts from all past management actions, consistent with NEPA's purpose for taking a "hard look."

Demonstrating that the FS is unaware of its own direction, the Water Resources Report shows the incorrect Water Quality Objective (standard) for Deception Gulch, reporting it as "Low Fishable" when in fact the Middle-Black Record of Decision included a forest plan amendment that raised it to "Moderate Fish":

Page K-9, List of Specific Stream Systems and Water Quality Criteria, Forest Plan

The following change (in bold) would be made to Deception Gulch:

Watershed (& critical reach)	Channel Type	Indicator Species Objective	Water Quality	Allowable Yrs in 30 Exceeding Threshold
Deception Gulch	B	Cutthroat Trout	**Moderate Fish**	**10**

Appendix B - 1

This amendment is also seen at the CNF forest plan webpage:
https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5400638.pdf

Reducing sediment is also a key strategy of the Bull trout Recovery Plan. The plan calls for the following actions, which include streams in the Dead Laundry Project Area:

> **Restore areas degraded by historical timber harvest**. Legacy impacts from timber harvest include lack of riparian trees and vegetation, high road densities, large areas of clearcuts, altered hydrologic regimes including increased peak flows, and other impacts that have created excessive fine sediment sources for watersheds. Potential restoration treatments include channel stabilization, riparian and upland plantings, placement of instream woody debris, etc. The following drainages have been degraded by historic timber harvest and have embedded and de-stabilized streams: Quartz, Cold Springs, Skull, Deception, Beaver, Isabella, and Moose Creeks within the North Fork Clearwater.
>
> **Compensate for legacy timber harvest and associated roading practices**. Continue to mitigate for the legacy of intensive timber harvest and poor silvicultural and road construction practices in steep and highly erosive canyon breaklands. Past practices and road systems have resulted in mass wasting events and continued erosion and sediment introduction into bull trout habitat. Actions including: replanting, obliterating roads, and improving road maintenance should be continued and new techniques implemented. Priority areas include…Lake, Moose, Osier, Quartz, Skull, Orogrande, Sheep Mountain, Beaver Block, Floodwood, and Breakfast Creek drainages in the North Fork Clearwater

Given the Forest Plan, the North Fork Clearwater TMDL, and the Bull Trout Recovery Plan, there is a clear case that the FS should be reducing the impacts of the road network in the project area—not increasing them. Permanently reducing the road network in areas listed in these documents and plans should have been a part of the project's purpose.

The BA's determination that the Dead Laundry timber sale is "Not likely to adversely affect" bull trout and bull trout critical habitat is arbitrary and capricious, and in violation of the Endangered Species Act. The FS hasn't even examined its roles and responsibilities under the Bull Trout Recovery Plan.

The Water Resources Report states, "Multiple studies demonstrate the ability of WEPP to accurately estimate runoff and sediment delivery from management activities and fire (Dun et al., 2009; Elliot, 2004; Laflen, Flanagan, & Engel, 2004)." The FS doesn't analyze and disclose the amount of error inherent with the WEPP model. The significance of such omissions is discussed in our objections in the SCIENTIFIC INTEGRITY section. Error is disclosed in another FS hydrologist report, the North Fork Mill Creek A to Z Hydrologist report (USDA Forest Service, 2015c):

> The documentation for the WEPP:Road model indicates that sediment delivery estimates are within +/- 50% of predicted values (Elliott et al. 1999). As a result, and like for the WEPP:FuME estimates, model-predicted sediment delivery values are best used to compare relative differences between alternatives and modeling scenarios. Error estimates

> for the average annual sediment load are not provided by the WFPB watershed analysis manual (WFPB 2011).

Elliot et al. 1999 is cited in the Dead Laundry Water Resource Report. The FS assumes a level of precision in the model that simply does not exist. This violates NEPA.

Nothing in the Water Resources Report analysis actually refers to sediment going into any particular stream, from any particular source. The analysis it too vague to make any conclusions on what sediment increases might or might not be "measurable" to demonstrate forest plan compliance.

The EA doesn't disclose the existing conditions of site-specific stream reaches and project effects on water quality, fish and other aquatic resources. The EA doesn't disclose information regarding the existence and effects of bedload and accumulated sediment. The EA doesn't analyze and disclose channel stability for specific stream reaches. The EA doesn't disclose the amount of existing accumulated fine and bedload sediment that remains from the previous logging and road construction.

The FS doesn't take a hard look at the condition of all streams and water bodies in the affected watersheds, and explain how those conditions contribute to fish population and trends. The FS doesn't disclose populations of fish species in the project area, and compare those numbers to minimum viable populations. The Beaver-Cedar Land Exchange FEIS included this section:

> In 1990, Lake Creek and portions of two tributaries, Goose Creek and Shell Creek, were surveyed; data indicated that westslope cutthroat trout populations were lower than other streams and no bull trout were observed in the surveyed reaches. Although no bull trout were observed during the survey, the Lake Creek drainage is considered a potential bull trout refuge. Depressed westslope cutthroat trout populations in the lower drainage may be a result of habitat conditions below desired conditions for the high fish standard in the Forest Plan. Survey information does indicate strong westslope cutthroat trout populations within Goose Creek. Strong cutthroat populations are also expected in the upper Lake Creek drainage near Fish Lake, which supports a strong adfluvial stock of westslope cutthroat trout. Fish Lake supports a population of adfluvial cutthroat. There is little information about the habitat and requirements of this stock on the district. Adfluvial fish are affected by fishing pressure and habitat quality, and their populations may be reduced from historic conditions.

The rivers and streams in the Dead Laundry project area support bull trout, Westslope cutthroat trout, and redband trout. (Fisheries Specialist Report). Yet the Dead Laundry EA and Fisheries Report do not provide an analysis for westslope cutthroat trout. The FS explains in the Fisheries Report that westslope cutthroat trout and redband rainbow trout were not included in the analysis because of "their wider range of habitat requirements than bull trout." This rationale is insufficient. The two species do not share the exact same distribution in the Dead Laundry Project Area, nor are their life histories the same. Use of bull trout as a proxy for other native trout species is not biologically defensible.

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

> ABSTRACT: Analysis of 60-year records of daily streamflow from eight paired-basin experiments in the Pacific Northwest of the United States (Oregon) revealed that the

conversion of old-growth forest to Douglas-fir plantations had a major effect on summer streamflow. Average daily streamflow in summer (July through September) in basins with 34- to 43-year-old plantations of Douglas-fir was 50% lower than streamflow from reference basins with 150- to 500-year-old forests dominated by Douglas-fir, western hemlock, and other conifers. …. Young Douglas-fir trees, which have higher sapwood area, higher sapflow per unit of sapwood area, higher concentration of leaf area in the upper canopy, and less ability to limit transpiration, appear to have higher rates of evapotranspiration than old trees of conifer species, especially during dry summers. Reduced summer streamflow in headwater basins with forest plantations may limit aquatic habitat and exacerbate stream warming, and it may also alter water yield and timing in much larger basins. Legacies of past forest management or extensive natural disturbances may be confounded with effects of climate change on streamflow in large river basins. ...

Discussion - This study showed that, relative to mature and old-growth forest dominated by Douglas-fir and western hemlock or mixed conifers, forest plantations of native Douglas-fir produced summer streamflow deficits within 15 years of plantation establishment, and these deficits have persisted and intensified in 50-year-old forest stands . … This finding has profound implications for understanding of the effects of land cover change, climate change, and forest management on water yield and timing in forest landscapes. The size of canopy opening explained the magnitude and duration of initial summer streamflow surpluses and subsequent streamflow deficits, consistent with work on soil moisture dynamics of canopy gaps. … Together, the paired basin and experimental gap results indicate that even-aged plantations in 8 ha or larger clearcuts are likely to develop summer streamflow deficits, and these deficits are unlikely to be substantially mitigated by dispersed thinning or small gap creation. Relatively high rates of summer evapotranspiration by young (25 to 45 years old) Douglas-fir plantations relative to mature and old-growth forests apparently caused reduced summer streamflow in treated basins. Young Douglas-fir trees (in AND 1) had higher sapflow per unit sapwood area and greater sapwood area compared to old Douglas-fir trees (in AND 2; Moore, Bond, Jones, Phillips, & Meinzer, 2004). In summer, young Douglas-fir trees have higher rates of transpiration (sapflow) compared to old Douglas-fir trees, because their fast growth requires high sapwood area and because their needles appear to exercise less stomatal control when vapor pressure deficits are high. Leaf area is concentrated in a relatively narrow height range in the forest canopy of a forest plantation, whereas leaf area is distributed over a wide range of heights in a mature or old-growth conifer forest. In summer, these factors appear to contribute to higher daily transpiration rates by young conifers relative to mature or older conifers, producing pronounced reductions in streamflow during the afternoons of hot dry days (Bond et al., 2002). At sunset, transpiration ceases, and streamflow recovers. Hence, daily transpiration produces large diel variations in streamflow in AND 1 (plantation) relative to AND 2 (reference). … Reduced summer streamflow has potentially significant effects on aquatic ecosystems. Summer streamflow deficits in headwater basins may be particularly detrimental to anadromous fish, including steelhead and salmon, by limiting habitat, exacerbating stream temperature warming, and potentially causing large-scale die-offs … Reductions in summer streamflow in headwater basins with forest plantations may affect water yield in much larger basins. Much of the Pacific Northwest forest has experienced conversion of mature and old-growth forests to Douglas-fir

> plantations over the past century. Climate warming and associated loss of snowpack is expected to reduce summer streamflow in the region (e.g., Littell et al., 2010). Declining summer streamflows in the Columbia River basin may be attributed to climate change (Chang, Jung, Steele, & Gannett, 2012; Chang et al., 2013; Hatcher & Jones, 2013), but these declines may also be the result of cumulative forest change due to plantation establishment, … Despite summer streamflow deficits, young forest plantations in the Andrews Forest yield more water in winter, contributing to increased flooding (Harr & McCorison, 1979; Jones & Grant, 1996; Beschta, Pyles, Skaugset, & Surfleet, 2000; Jones, 2000; Jones & Perkins, 2010).
>
> Conclusions … Long-term paired-basin studies extending over six decades revealed that the conversion of mature and old-growth conifer forests to plantations of native Douglas-fir produced persistent summer streamflow deficits of 50% relative to reference basins, in plantations aged 25 to 45 years. This result challenges the widespread assumption of rapid "hydrologic recovery" following forest disturbance …

The FS does not consider the fact that roads increase the efficiency of water transport during storm or snowmelt events, elevating water yields well above natural, with damaging effects. The EA ignores water yield and peak flows as factors. FS hydrologist Johnson, 1995 discusses many forms of road-related and other cumulative impacts the EA fails to consider.

The IPNF's Camp Robin timber sale Hydrology Report (USDA Forest Service, 2018c) explains why this is important: "Runoff from rain falling on snow has been associated with increased risk of damage to stream banks and flooding. Available data indicates that rain falling on snow in open areas produces more water available for runoff than rain falling in forested areas. Much of the project area (~80%) falls in the rain-on-snow zone based on elevation (between 3500' and 4500')."

Lacking any analysis of trends or measures for RMOs for bank stability, width to depth ratio, instream large woody debris, and pool frequency we can only surmise that RMOs are not being met. But there's no analysis that discusses current conditions in relation to RMOs. Apparently it's the FS's position that never achieving RMOs is okay.

The EA fails to present a sufficient analysis to determine if RMOs would be retarded by project and cumulative impacts. The EA fails to conduct a proper analysis of water flow alteration effects on stream bank erosion and channel scouring during spring runoff and/or rain-on-snow (ROS) events. Most segment altering and channel forming events occur during instantaneous flows.

Openings accumulate much more snow than in a forested areas that are not as "open," thus provide a significant contribution to water yield especially during ROS and spring runoff events. The number, mileage and proximity of the roads to the proposed logging units and streams are important because they will also have a significant effect on peak flows and the resultant impact on fish, steam channels and possible flooding.

SOIL

(We discussed this in EA comments at pp. 153-174.)

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 complete omission of any consideration of mycorrhizal networks is a symptom of a single minded vision of the future that is inconsistent with the unpredictability of climate-driven change. Instead, 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^{12} 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.)

Over 25 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 fungal networks) state, "resource fluxes though ectomycorrhizal (EM) networks are sufficiently large in some cases to facilitate plant establishment and growth. Resource fluxes through EM networks may thus serve as a method for interactions and cross-scale feedbacks for development of communities, consistent with complex adaptive system theory." Simard et al., 2013 state, "Disrupting network links by reducing diversity of mycorrhizal fungi… can reduce tree seedling survivorship or growth (Simard et al, 1997a; Teste et al., 2009), ultimately affecting recruitment of old-growth trees that provide habitat for cavity nesting birds and mammals and thus dispersed seed for future generations of trees." Also, Gorzelak et al., 2015:

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

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

[12] Nitrogen

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 et al. 2009, Simard et al. 2012 & Simard et al. 2018.

What Dr. Simard and an expanding body of scientific research show 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 "A powerful and underappreciated ally in the climate crisis? Fungi" by scientists Toby Kiers and Merlin Sheldrake:

> 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.

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.

Project inconsistency with Forest Plan and Region 1 Soil Quality Standards

The FS fails to demonstrate consistency with Forest Plan direction and the Region 1 Soil Quality Standards (R1 SQS). The EA and Soil Report don't accurately disclose current, foreseeable, and cumulative detrimental soil disturbance (DSD) within activity areas.

Table 2 of the Soil Report fails to take the "Existing % DSD", add it to the Direct/Indirect % DSD attributable to Dead Laundry logging and associated activities, to arrive at a total % DSD. This failure to disclose is misleading and results in false conclusions.

So for unit 42, adding Existing % DSD (4%) plus Direct/Indirect % DSD (15%) = 19%, which violates the Standards. But Table 2 doesn't do the math correctly. Instead, under column "Cumulative % DSD" a total of only 8% is displayed. There is no explanation for why 4+15 doesn't equal the conventional 19, and instead equals 8. Apparently the FS subtracts 11, but one cannot discern why. There is some suggestion in the Soil Report, where it says, "Soil decompaction activities as required by design features…" but that doesn't explain how the FS can reasonably attribute negative DSD in doing its math.

Also, the EA states, "Decommissioning temporary roads and skid trails from both past and present activities will occur under the action alternative. This includes decompacting, recontouring, and recovery of excavated and displaced topsoil, and is expected to initiate and facilitate the recovery of soil productivity." However, because the FS essentially is saying existing DSD is zero ("there is very little detrimental soil disturbance in the project area")—how can one recover from zero? The FS doesn't explain this self-contradiction.

Using correct grade school a + b = c mathematics, twenty of 104 logging units and one fuels unit in Table 2 would result in cumulative DSD exceeding the 15% Standard. But the Soil Report doesn't disclose that. It does say, "In the project record, Soil Appendix 1 Calculating DSD details the formulas and assumptions used to estimate the cumulative effects from project design feature implementation." But that document is not on the project website. Instead the Soil Report states, "None of the proposed units will exceed Regional Soil Quality Standards."

Furthermore, all old and existing road templates, such as those shown on the on 7.5 minute topo maps, must be included in DSD calculations. This is necessary, absent any bulk density (as per Forest Plan direction) measurements indicating compaction has recovered. However, since the Soil Report lacks sufficient detail, and because the FS has told us that they are not conducting a comprehensive inventory of nonsystem roads with this project (RE-Dead Laundry project information-Boykin.pdf), we can assume this is a key detail being ignored in Dead Laundry analyses. Forest Plan soil standards are being brushed aside.

Flawed Soil Quality Standards

FS soil scientists Miller et al., 2010 critiqued the DSD methodology:

> Protecting the productive capacity of soil is a paramount goal of sustainable forest management. To support this goal, controlling or restricting forestry activities that could detrimentally reduce onsite productivity and quality of water for drinking or for aquatic habitat is critical. **Current science and knowledge, however, do not enable us to reliably predict which, where, and when specified forest activities cause "substantial and permanent impairment of the productivity of the land" (NFMA 1976).** Inadequate knowledge limits (1) reliability of prescriptions for activities, practices, and methods; (2) interpreting results of after-activity "effectiveness" monitoring, including severity and areal

extent of soil disturbance; (3) developing cost-effective prescriptions for restorative or rehabilitative efforts; and (4) assessing the tradeoffs in risks to soil capacity between activities to reduce fuels and wildfire hazard compared to consequences of wildfire. (Emphasis added.)

…Existing regional standards and guidelines for avoiding loss of soil quality focus on recognizing and classifying hazard of soil disturbance, and tacitly assume consequences to productivity based on general principles of soil science and **outdated and inconsistent empirical evidence**. (Emphasis added.)

Also (*Id*.):

Simple walkthroughs can be criticized because they provide no protection against seriously biased estimates of soil damage within the activity area. Greater rigor and confidence can be obtained by applying a protocol that specifies how the activity area is to be assessed to ensure a probability-based sampling that avoids biased selection.

…Although, making biological linkages with visual and quantitative changes in soils is difficult and time-consuming, such linkages are necessary to reduce uncertainty about the practical consequences of soil disturbance.

In our opinion, (1) current regional soil-quality numerical standards and guidelines are too general to apply to all sites and situations; (2) current numerical standards and disturbance classes are generally poor predictors of subsequent consequences to tree growth after soil disturbance; (3) site-specific guidelines, preferably based on risk analysis, are needed to address interactions among soil, climate, and other site factors that strongly influence response of trees to soil disturbance; (4) similar risk analyses would be useful for other values potentially affected by soil disturbance.

…Our current state of knowledge, however, does not allow us to make scientifically supportable generalizations about the effects of varying degrees of soil disturbance on tree growth.

…In conclusion, new standards for judging "detrimental" compaction and other types of soil disturbance are needed. Concerted research will be required because response of trees and other vegetation to soil disturbances is conditioned by both macro- and micro-climate and silvicultural practices like thinning and vegetation control. We suspect that a given severity of soil disturbance will be more detrimental to plant growth at locations with harsh rather than moderate climatic stress. Solutions to the dilemma are clear. Based on current knowledge and professional experience, we acknowledge current uncertainties and complexity of biological variation and relationships and recommend more research to set realistic thresholds that are clearly and consistently detrimental to plant growth. Until further validation research has occurred, only classification or description of soil disturbance is justified. Conversely, general predictions about tree response based simply on such visual classes are not justified.

Essentially, Miller et al., 2010 admit that the FS is in the dark as far assessing, predicting, and monitoring changes in soil qualities in relation to its management activities. Over four decades after its enactment, the agency is unable to meet one of the core mandates of the National Forest Management Act.

VISUAL QUALITY

(We discussed this in EA comments at p. 174.)

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