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Organization: Friends Of The Clearwater
Title: Montana Policy Director
Comments: Attached are comments on the Dead Laundry Draft Environmental

Assessment, on behalf of Friends of the Clearwater, WildEarth Guardians,

and Alliance for the Wild Rockies.

I will be transmitting the comment Appendix A separately, because it is

too big to email. I will also be sending one or more separate emails

with some attachments and a reference or two, as mentioned in the comments.

Please acknowledge timely receipt of these comments.

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Jeff Juel

Montana Policy Director

Friends of the Clearwater

June 28, 2021

Sent via email to: comments-northern-clearwater-north-fork@usda.gov and also amy.boykin@usda.gov and andrew.skowlund@usda.gov

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Orofino, ID 83544 Ms. Boykin:

These are comments on the Dead Laundry Draft Environmental Assessment and Draft FONSI, on behalf of Friends of the Clearwater (FOC), Alliance for the Wild Rockies (AWR) and WildEarth Guardians (Guardians). Within these comments we incorporate the FOC/AWR scoping comment letter dated April 15, 2020, and the comments of Harry Jagemon including his March 24, 2020 comments.

Please note: In these comments, text within quotation marks or in indented paragraphs are taken directly from the above named Environmental Assessment unless indicated otherwise.

ENVIRONMENTAL ASSESSMENT DOES NOT COMPLY WITH NEPA

The Dead Laundry Draft Environmental Assessment and Draft FONSI (collectively, [ldquo]draft EA[rdquo] or simply [ldquo]EA[rdquo]) fails in its mandated role to provide the public and decisionmaker sufficient information to understand the scope and environmental implications of what is proposed. It utterly fails to provide sufficient disclosure, analysis, and discussion of the environmental impacts of the Dead Laundry timber sale. Thus, the Forest Service (FS) violates NEPA by presenting the EA as the document upon which the public is asked to comment.

The EA states, [ldquo]Impacts to resources by the Proposed Action are analyzed in detail and described in the specialist reports which reside in the project record and are incorporated by reference in this environmental assessment. Summarized effects are presented below by resource.[rdquo]

The author of this letter requested a paper copy of the EA shortly after the FS announced it was available. The FS mailed a 65-page document, but none of the documents the EA says it has [ldquo]incorporated by reference.[rdquo] If a member of the public likewise requested and received the EA

but had no access to the internet, and unlike this author did not possess empirically-based skepticism to doubt it provided a reasonable [ldquo]summarized effects[rdquo] as the EA claims, they would be largely misled and under-informed about a multitude of timber sale details and impacts discussed in the incorporated reports.

The EA does not adequately represent discussion, analysis and evidence from the project file documents. Rather, the FS simply incorporates the project documents themselves in place of providing the necessary scientific analysis NEPA requires in the EA, thereby precluding meaningful and informed public comment in violation of NEPA.

Further, directing readers to project file documents exceeds the meaning of what is reasonably available to the public. The FS assumes that all interested members of the public have sufficient internet access and technical ability to view the project website. This is incorrect. Many people have inconsistent and unreliable internet access, and the FS cannot assume that all interested stakeholders utilize computers to obtain and respond to agency documents, especially those the FS typically considers internal. Further, the FS does not provide a reasonable method to obtain project files for those without reliable internet access.

The vast majority of the EA, contrary to the claim of it being [ldquo]summarized effects[rdquo] is little but generic template language having no relation to the specific Dead Laundry timber sale proposal, with hardly any indication of the degree of direct, indirect, and cumulative effects.

For example, the entire EA section analyzing and disclosing direct effects of the Action Alternative 2 on Soil Resources reads:

For the Proposed Action, road construction will have the greatest direct impacts to soil resources. Permanent damage to soils in the Dead Laundry project area could result from the loss of the volcanic ash cap due to erosion or topsoil removal by excavation for temporary roads. On a landscape scale, the amount of road construction associated with this project would not rise to a level of significance. Temporary roads would be constructed, used, and immediately decommissioned upon completion of proposed activities.

Temporary roads are considered detrimental disturbance with reduced soil productivity until vegetation, organic matter, and hydrologic function are eventually restored.

Equipment and techniques used for vegetation management will cause measurable increases in soil disturbance through alteration of soil structure, slope gouging, and modification of soil infiltration capacities. Most of the harvest in the Dead Laundry project area will be with skyline logging systems, so direct impacts to soil from machinery will be minimal and recovery will be relatively extensive and rapid. Depending on habitat type, 7- 33 tons/acre of down coarse woody debris would be retained following completion of harvest and fuel reduction activities (Graham 1994). The coarse woody debris will provide ground cover as well as contribute to the soil organic matter and soil structure that are essential for soil nutrient cycling and long-term productivity.

Fuels treatments included may be mulched, chipped, or masticated on site, or piled and burned on site. Prescribed jackpot burning or underburning would occur in some treatment

areas. Broadcast prescribed burning is expected to emulate an overall low-intensity and low-severity surface fire where consumption is primarily low shrubs, needle cast, and the upper duff component. Isolated incidences of moderate or high severity fires may occur at pile burns. However, the prescribed burning is designed to emulate an overall low-intensity and low-severity surface fire which minimizes impacts to soils.

The only text pertaining to this proposal, for this specific timber sale is highlighted in yellow[mdash] and even that is hardly site-specific for the project area.

Similarly, under Water Resources the EA[rsquo]s only mention of any of the many named creeks in the project area is this statement: [ldquo]The Proposed Action would increase cumulative equivalent clearcut area (ECA) in all project area subwatersheds, with the largest increases in Deadwood Creek-Moose Creek and Osier Creek subwatersheds.[rdquo]

For Noxious Weeds we note there is no corresponding specialist report on the project website. That section of the EA includes no discussion of current noxious weed situation in the Dead Laundry project area. It appears the FS merely cut-and-pasted a report for another timber sale, because it states, [ldquo]The map of the White Pine project boundary shows the polygons of the noxious weeds along with the chart above stating the acreage, please note that the acreage may be skewed to show more than present due to overlap of polygons.[rdquo] Other than that, it[rsquo]s pretty much generic template language.

NATIONAL ENVIRONMENTAL POLICY ACT REGULATIONS

The Council on Environmental Quality ([ldquo]CEQ[rdquo]) recently revised its regulations implementing NEPA. 85 Fed. Reg. 43,304 (July 16, 2020) (codified at 40 C.F.R. Part 1500). Here, the FS does not clearly indicate which version of the CEQ NEPA regulations it is applying to this analysis (previous, 1978 rules, or 2020 rules). Because the NEPA process for this timber sale started before Sept. 14, 2020, the FS should exercise its discretion to apply long-standing, pre-2020 NEPA regulations and policy. 40 C.F.R. [sect] 1506.13 (2020) (giving discretion to agencies regarding effective date for ongoing NEPA processes). The 1978 regulations codified early judicial opinions based on language of the statute, provided the basis for a substantial body of judicial precedent spanning over four decades, and have formed the foundation for more specific regulations and policies enacted by individual agencies to implement their particular missions.

See, e.g., 36 C.F.R. Part 220 (2008), Forest Service Manual 1950, and Forest Service Handbook 1909.15.

The 2020 CEQ revised rules upend virtually every aspect of NEPA and its longstanding practice, contradicts decades of court interpretations of NEPA[rsquo]s mandates, and undercuts the reliance placed on NEPA by the public, decision-makers, and project proponents. It does so by limiting the scope of actions to which NEPA applies, eviscerating the thorough environmental analysis that lies at the heart of the statute, reducing the ability of the public to participate in federal agency decision-making, and seeking to limit review of agency NEPA compliance. The legality of the final rule is being challenged in a number of federal lawsuits brought by organizations that rely on NEPA to protect their varied interests in human health and the environment. See Alaska Community Action on Toxics v. CEQ, No. 3:20-cv-05199 (N.D. Cal. July 19, 2020); see also

Wild Virginia v. CEQ, No. 3:20-cv-00045-NKM (W.D. Va. July 29, 2020); Environmental Justice Health Alliance v. CEQ, No. 1:20-cv-06143 (S.D.N.Y. Aug. 6, 2020).

Given the highly uncertain fate of the CEQ[rsquo]s 2020 rules [ndash] including pending legal challenges and a new administration set to begin in 2021 [ndash] the FS would be wise to not inject additional and unnecessary uncertainty. In short, continuing to apply the CEQ[rsquo]s 1978 regulations is the path to greater certainty, given the agency[rsquo]s clear discretion to do so with respect to this process, which was initiated before September

14, 2020.

AN ENVIRONMENTAL IMPACT STATEMENT IS REQUIRED

The FS attempts to justify not preparing and Environmental Impact Statement, stating: [ldquo]Effects were analyzed to determine if the context and intensity of the impacts would be significant and require preparation of an Environmental Impact Statement. [hellip]The impacts of the Proposed Action on the human environment were found to be negligible and limited to the scope and duration.[rdquo] Then the EA indicates public concerns are to be considered irrelevant and that a decision has already been made, because [ldquo]An Environmental Analysis and Finding of No Significant Impact are appropriate.[rdquo]

In addition to the analysis concerns we discuss in above and below sections, there is the sheer size of the total proposed activities. 3,837 acres of logging would be [ldquo]regeneration harvest[rdquo][mdash] meaning clearcuts or clearcuts modified by leaving a few trees. This totals nearly six square miles of national forest, with eight of the cut areas to exceed 100 acres[mdash]one alone would be 460 acres.

The FS also proposes to experiment with 196 acres of [ldquo]old-growth enhancement[rdquo] which has not previously been attempted during implementation of the 1987 Forest Plan for the Clearwater National Forest. This would involve logging off many trees[mdash]some 200 years old or older[mdash]from existing old-growth stands. The FS cites no scientific support for this [ldquo]enhancement[rdquo] notion and in fact there is plenty of scientific evidence challenging the notion, which the EA ignores.

Because of past logging on the Clearwater National Forest (CNF), old growth is already too scarce. Forestwide minimums are not being met. Old growth is not a place for the FS to conduct risky experiments involving off logging large, old trees under the assumption of [ldquo]no significant impacts.[rdquo]

All this logging is claimed to be necessary to [ldquo]restore[rdquo] the health and [ldquo]resilience[rdquo] of the Forest, but again these notions lack scientific support and are fraught with scientific controversy. The agency[rsquo]s real priority is understood by considering the projected timber volume expected to be stripped from steep mountain slopes[mdash]about 40 million board feet, enough to fill something in the neighborhood of 8,000 log trucks ripping up roads which are already bleeding sediment into important fisheries streams.

The timber sale would degrade fish habitat in tributaries to Kelly Creek and the North Fork Clearwater River, including crucial habitat for the westslope cutthroat trout and critical habitat for the Threatened bull trout.

The proposal would degrade roadless characteristics by slashing of trees and burning within the Moose Mountain Inventoried Roadless Area (IRA). The timber sale would also degrade roadless characteristics by logging 59 acres of forest within an uninventoried roadless area right next to the Hoodoo IRA, in an area with Wilderness character but for which the agency refuses to consider for wilderness recommendation, including in its 2020 draft revised forest plan.

Wildlife species that have already experienced severe habitat loss in this vicinity, which was logged heavily by industrial timberland owners in recent decades, according to the EA. The native species that would experience further habitat loss and fragmentation by this timber sale include fisher, marten, wolverine, gray wolf, moose, northern goshawk, pileated and black- backed woodpeckers, moose, flammulated owls, white-headed woodpeckers, boreal toads, long- eared myotis, long-legged myotis, fringed myotis, Townsend[rsquo]s big-eared bats and the Threatened Canada lynx. And the industrial treatment of this Forest will harm the already tenuous process of recovery for the Threatened Bitterroot Ecosystem grizzly bear population.

The FS violates NEPA by attempting to implement the Dead Laundry timber sale without first preparing an EIS to take a [ldquo]hard look[rdquo] under NEPA. The FS is also not required to provide written responses to our comments on an EA, unlike as required by NEPA for an EIS. So we see another reason for the FS[rsquo]s avoidance of an EIS[mdash]it wants to largely nullify public involvement.

FOREST SERVICE IS ILLEGALLY IMPLEMENTING THE DRAFT REVISED FOREST PLAN

The EA claims there is a need to [ldquo]improve overall forest health and ecological function toward desired future conditions as identified in the Clearwater National Forest Plan (USDA 1987)[rdquo], however the EA[rsquo]s proposed vegetation conditions do not match those in the Forest Plan.

Then the EA states, [ldquo]The majority of the Dead Laundry project area is identified by the Forest Plan as Management Area (MA) E1, Timber Management (see Forest Plan, p. III-57).[rdquo] There are no [ldquo]desired future conditions[rdquo] expressed there, however similarly it sets a Goal to [ldquo]Provide optimum, sustained production of wood products.[rdquo] The Forest Plan then provides qualifications to what is meant by [ldquo]optimum, sustained production[rdquo] stating:

Timber production is to be cost effective and provide adequate protection of soil and water quality. Manage viable elk populations within areas of historic elk use based on physiological and ecological needs. Manage a range of water quality and fish habitat potential from high fishable in several of the key anadromous and resident fish streams[hellip]

The Forest Plan is no more specific than that in terms of its or the EA[rsquo]s [ldquo]desired[rdquo] vegetation conditions relating to the project purpose and need.

In this same context, the EA makes reference to the1987 Forest Plan:

Specifically, the desired future conditions for the Clearwater National Forest by 2037 (USFS 1987, pg II-18) include long-term sustained yield of 440 million board feet of harvest, a forest-wide drop in the mature timber age class to 30%, an increase in the

immature age class to 70%, reforestation on those harvested acres, developing over 90% of the 509,000 acres of roadless land available for development, and adding 2,750 miles of road to the forest road system (USFS 1987, pg II-18). As part of meeting these desired future conditions and to address forest health issues the following specific needs for change have been identified for the Dead Laundry project area. (Emphasis added.)

The EA provides no analysis or disclosures of FS accomplishment or progress over the 34 years of Forest Plan implementation, nor of any problems it has discovered in trying to carry out all of this industrialization of this National Forest. So for example, as part of this snapshot of [ldquo]The Forest in 2037[rdquo] (Forest Plan), how far along is the FS toward accomplishment of [ldquo]Streams in existing developed areas (as of 1987) that were below standards established in the Plan will have been improved by the fifth decade to meet Forest water quality standards[rdquo]? The FS is apparently no longer curious or concerned about that Forest Plan goal.

In short, the FS is cherry-picking a few portion of the Forest Plan to claim the plans [ldquo]desired future conditions[rdquo] are directing the Dead Laundry EA [ldquo]Purpose and Need[rdquo] when in fact they really aren[rsquo]t. What the FS IS using, however, are metrics and concepts it has concocted in writing its draft revised forest plan. Not surprising, this is not revealed in the EA. However the Vegetation Resource Report states:

To help define a [ldquo]natural[rdquo] range of patch sizes, recent science is using a concept called the Natural Range of Variation (NRV) to describe the natural processes that occur on the landscape from various ecological factors. This concept is being used to develop and analyze the new Nez Perce-Clearwater National Forests Plan (Probert 2017) and is addressed later in this document.

Part of what is [ldquo]later in this document[rdquo] (and also found in Probert 2017) is evidence the FS is, with the Dead Laundry timber sale, attempting to implement its draft Revised Forest Plan (RFP) before it has even been finalized and properly authorized. In describing Project [ldquo]desired[rdquo] vegetation conditions, no less that six times this Report states, [ldquo]Forest Plan Revision Desired Conditions for MA3 (Probert 2017), very similar to E1 MA[rdquo]. The claim of [ldquo]similar[rdquo] is not based upon any genuine comparison of the existing Forest Plan and the draft RFP. The Report also heavily relies upon [ldquo]Potential Vegetation Type Groups [hellip]as described in Milburn et al. 2015[rdquo] which is a document entitled [ldquo]Region 1 Existing and Potential Vegetation Groupings used for Broad Level Analysis[rdquo] (emphasis added). [ldquo]Broad level analysis[rdquo] means at the planning level.

In addition, the EA mentions the word [ldquo]resilient[rdquo] (in one or another of its forms) 18 times, including in the Purpose and Need where it states, [ldquo]Improve forest health and resiliency in concurrence with desired conditions and objectives identified in the Forest Plan.[rdquo] We note the 1987 Forest Plan has zerouses of the word [ldquo]resilient[rdquo] (in any form) however the draft RFP uses it in one or another form 59 times.

We commented in great detail on the NPCNF[rsquo]s draft revised forest plan, including a critique on the use of Milburn et al. 2015 for planning purposes. The FS has yet to release any responses to comments on draft RFP. Absent FS responses, we cannot be adequately informed by the FS[rsquo]s response to our critique or responses to any of the rest of our comments.

The FS[rsquo]s proposal to [ldquo]enhance[rdquo] old growth is also derived from the way the FS views old growth in draft RFP, which is unlike anything in the 1987 Forest Plan. This is discussed in more detail in a later section of these comments.

For the FS to be implementing its draft RFP during the revision process and before the revised plan is finalized is illegal. The EA[rsquo]s reliance upon the analysis in the draft RFP[rsquo]s draft EIS is likewise inappropriate. The FS violates both NEPA and NFMA.

Furthermore, as we discuss below, the FS[rsquo]s use of [ldquo]NRV[rdquo] is based upon historic conditions and fails to take into consideration the impacts on the Forest from the ongoing and imminent profound impacts of climate change, further delegitimizing the EA[rsquo]s [ldquo]desired conditions[rdquo] approach.

The FS states that the timber sale [ldquo]will move dominance types toward desired conditions with a focus on western white pine in the Warm Moist and Cool Moist Potential Vegetation Groups (PVG) and ponderosa pine in the Warm Dry PVG[hellip] .[rdquo] As of the release of this EA, this has only been proposed in the draft revised forest plan (RFP) and has not undergone the environmental review process[mdash]specifically, the agency has only started digesting the public[rsquo]s comments on this.

The assumptions behind this dominance type moving, which you haven[rsquo]t vetted with science, suffer from the same problems as the draft RFP, which reflect an overriding bias favoring vegetation manipulation and resource extraction via [ldquo]management[rdquo] to [ldquo]move toward[rdquo] a narrowly selected set of Desired Conditions. Along the way, it deemphasizes the ecological processes driving these ecosystems, so it ignores the best science. Essentially this rigs the game, since the draft RFP[rsquo]s desired conditions (which you shouldn[rsquo]t be using at all in this EA) can only be achievable by resource-extraction activities. Since the Desired Conditions must be maintained through repeated management/manipulation, the management paradigm conflicts with natural processes[mdash]the evolutionary drivers of the ecosystem. This is evident by the habitat types identified by Cooper et al. 1991, which identify the climax vegetation when climate drives the ecological process and the Forest Service doesn[rsquo]t set arbitrary static numbers.

Fire, insects & tree diseases are endemic to these forests and are natural processes resulting in a self-regulating forest. This provides for greater diversity of plant and animal habitat than management/manipulation can achieve. In areas that have been logged there is less diversity of native plants, more invasive species, and less animal diversity.

In any case, these processes also provide benefits. For example, cavity-nesting birds rely on insects in forests. Just as cavities excavated by woodpeckers provide benefits for other birds and wildlife, there are benefits from mistletoe, bark beetles, root rot fungi and other pathogens. The EA provides too little information about benefits of insects and tree diseases and even promotes a bias with its no-action alternative.

The draft RFP claims to [ldquo]move toward[rdquo] the natural range of variation (NRV) by focusing on achieving static conditions, instead of allowing the natural dynamic characteristics of ecosystems

to provide ecosystem services. An abundance of scientific evidence indicates the draft forest plan[rsquo]s static desired conditions, which you are unlawfully using here, should be replaced by desired future dynamicsto align with best available science. Hessburg and Agee, 2003 emphasize the primacy of natural processes for management purposes:

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

(Emphasis added.) Sallabanks et al., 2001 state:

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

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

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

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

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

Hayward, 1994 states:

Despite increased interest in historical ecology, scientific understanding of the historic abundance and distribution of montane conifer forests in the western United States is not sufficient to indicate how current patterns compare to the past. In particular, knowledge of patterns in distribution and abundance of older age classes of these forests in not available. [hellip]Current efforts to put management impacts into a historic context seem to focus almost exclusively on what amounts to a snapshot of vegetation history[mdash]a documentation of forest conditions near the time when European settlers first began to impact forest structure. [hellip]The value of the historic information lies in the perspective it can provide on the potential variation[hellip] I do not believe that historical ecology,

emphasizing static conditions in recent times, say 100 years ago, will provide the complete picture needed to place present conditions in a proper historic context. Conditions immediately prior to industrial development may have been extraordinary compared to the past 1,000 years or more. Using forest conditions in the 1800s as a baseline, then, could provide a false impression if the baseline is considered a goal to strove toward.

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

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

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

Composition includes the kinds of species present in an ecosystem and their relative abundances, as well as the composition of plant associations, floras and faunas, and habitats at broader scales. We might describe the composition of a forest, from individual stands to watersheds and regions.

Structure is the architecture of the forest, which includes the vertical layering and shape of vegetation and its horizontal patchiness at several scales, from within stands (e.g., treefall gaps) to landscape patterns at coarser scales. Structure also includes the presence and abundance of such distinct structural elements as snags (standing dead trees) and downed logs in various size and decay classes.

Function refers to the ecological processes that characterize the ecosystem. These processes are both biotic and abiotic, and include decomposition, nutrient cycling, disturbance, succession, seed dispersal, herbivory, predation, parasitism, pollination, and many others. Evolutionary processes, including mutation, gene flow, and natural selection, are also in the functional category.

Hutto, 1995 also addresses natural processes, referring specifically to fire:

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

Noss and Cooperrider (1994) state:

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

The Environmental Protection Agency (1999) recognizes the primacy of natural processes:

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

Frissell and Bayles (1996) state:

[hellip]The concept of range of natural variability [hellip]suffers from its failure to provide defensible criteria about which factors ranges should be measured. Proponents of the concept assume that a finite set of variables can be used to define the range of ecosystem behaviors, when ecological science strongly indicates many diverse factors can control and limit biota and natural resource productivity, often in complex, interacting, surprising, and species-specific and time-variant ways. Any simple index for measuring the range of variation will likely exclude some physical and biotic dimensions important for the maintenance of ecological integrity and native species diversity. (Emphases added.)

Forest Service researcher Everett (1994) states:

To prevent loss of future options we need to simultaneously reestablish ecosystem processes and disturbance effects that create and maintain desired sustainable ecosystems, while conserving genetic, species, community, and landscape diversity and long-term site productivity.

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

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

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

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

One often hears that because humanity[rsquo]s impact has become so great, the rest of life on this planet now relies on us for its succession and that we are going to have to get used to managing natural systems in the future[mdash]the idea being that since we now threaten everything on earth we must take responsibility for holding the fate of everything in our hands. This bespeaks a form of unreality that takes my breath away[hellip] The cost of just finding out enough about the environment to become proper stewards of it[mdash]to say nothing of the costs of acting in such a way as to ameliorate serious problems we already understand, as well as problems about which we haven[rsquo]t a clue[mdash]is utterly prohibitive. And the fact that monitoring must proceed indefinitely means that on economic grounds alone the only possible way to proceed is to face the fact that by far the cheapest means of continuing life on earth as we know it is to curb ourselves instead of trying to take on the proper management of the ecosystems we have so entirely disrupted. (Emphasis added.)

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

[ldquo](E)cological integrity[rdquo]: Angermeier and Karr (1994), and Karr (1991) define this as:

The capacity to support and maintain a balanced, integrated, and adaptive biological system having the full range of elements and processes expected in a region[rsquo]s natural habitat.

[ldquo][hellip]the ability to support and maintain a balanced, integrated, adaptive community of organisms having

a species composition, diversity, and functional organization comparable to that of the natural habitat of the region.[rdquo] That is, an ecosystem is said to have high integrity if its full complement of native species is present in normal distributions and abundances, and if normal dynamic functions are in place and working properly. In systems with integrity, the [ldquo][hellip]capacity for self-repair when perturbed is preserved, and minimal external support for management is needed.[rdquo] (Emphasis added.)

That last sentence provides a measure of resilience the draft RFP and its DEIS don[rsquo]t acknowledge. In their conclusion, Hessburg and Agee, 2003 state [ldquo]Desired future conditions will only be realized by planning for and creating the desired ecosystem dynamics represented by ranges of conditions, set initially in strategic locations with minimal risks to species and processes.[rdquo]

(Resiliency means different things to different resources at different scales. How does the forest define resilient and handle instances where [ldquo]resilient[rdquo] for one resource or wildlife species is not resilient for another? Old growth is a perfect example of this, as trees need to die and fall and decompose[mdash]while not good for timber production, this is necessary for wildlife like the fisher and the pileated woodpecker.)

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

This EA, like the forest plan revision draft EIS, considers no alternative that genuinely emphasizes this best tool[mdash]allowing the natural processes to maintain ecological integrity[mdash]for which we strongly advocate.

We provide a lot of science which conflicts with the FS[rsquo]s arbitrary goal of maintaining a set percentage from a draft RFP that hasn[rsquo]t been approved. Where is the data upon which your percentages are based? And why haven[rsquo]t you considered forest succession that does not utilize human intervention? See Cooper et al. 1991 for definitions of succession. Also, how are trees that are 70-120 years old inconsistent with dominance types on this forest, what is the conflicting scientific basis for that conclusion, and why are you adopting this uncited science over the overwhelming scientific consensus of allowing ecosystems to govern? See Cooper et al. 1991 for the science. On pages 137 to 143, the Forest Service scientists mapped habitat types and phases for stand sampled in North Idaho since 1980. The habitat types that Cooper et al. mapped are [ldquo]named for the potential climax community type or plant association.[rdquo] Cooper et al. p. 5. The climax community is [ldquo][t]he culminating stage in plant (forest) succession for a given habitat...[rdquo] The attributes of habitat type classification are useful because [ldquo]they provide a permanent and ecologically based system of land stratification referenced to vegetation potential[rdquo] and they even help with succession modeling.

The FS implies Douglas-fir is undesirable by aiming for trees with other species dominance. Douglas-fir has co-evolved with fire and is very adapted to it. See Tepley et al. 2013. And in this part of the country, stand-replacing fires are part of the regime. See Fire Ecology section. The FS is concluding[mdash]with little evidence[mdash]that landscape-level replanting will work. See Johnson 2016.

The desired conditions you list in the purpose and need section of this EA also doesn[rsquo]t account for climate change. Also, former US Forest Service Chief Abigail Kimbell and Hutch Brown (in USDA Forest Service, 2017b) state:

Even if global greenhouse gas buildups were reversed today, global temperatures would continue to rise for the next hundred years, bringing regional warming, changes in precipitation, weather extremes, severe drought, earlier snowmelt, rising sea levels, changes in water supplies, and other effects. As it is, global greenhouse emissions are still rising, exacerbating all of these long-term effects. The capacity of many plant and animal species to migrate or adapt will likely be exceeded. Ecosystem processes, water availability, species assemblages, and the structure of plant and animal communities and their interactions will change. 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. (Emphasis added.)

For the above reasons, this purpose and need is based on shaky science. The FS hasn[rsquo]t taken a hard look at the science, has largely omitted it from any discussion or disclosure the public, and is not using high-quality information. As a result, the project would very unlikely achieve this stated purpose and need[mdash]even if it were legitimate.

We incorporate, within these comments, all of our comments and other submissions we[rsquo]ve written as part of our participation in the NPCNF forest plan revision process, including all of their cited scientific references and other attachments.

CUMULATIVE EFFECTS AND MONITORING

The EA[rsquo]s cumulative effects analysis ranges from non-existent to perfunctory. It evades any analysis of how existing conditions have arrived at the place they are. If FS management is in any way the cause of [ldquo]undesirable[rdquo] conditions, the FS won[rsquo]t disclose it.

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

[middot] A list of all past projects (completed or ongoing) implemented in the analysis area.

[middot] A list of the monitoring commitments made in all previous NEPA documents covering the analysis

area.

[middot] The results of all that monitoring.

[middot] A description of any monitoring, specified in those past project NEPA for the analysis area, which has yet to be gathered and/or reported.

[middot] 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.

[middot] A cumulative effects analysis that includes the results from the monitoring required by the Forest Plan.

The EA lacks an analysis of how well past FS projects met the goals, objectives, desired conditions, etc. stated in the corresponding NEPA documents, and how well the projects conformed to forest plan standards and guidelines. Such an analysis is critical for validating the FS[rsquo]s current proposal. Without analyzing the accuracy and validity of the assumptions used in previous NEPA processes one has no way to judge the accuracy and validity of the current proposal. The predictions made in previous NEPA processes also must be disclosed and analyzed because if these were not accurate, and the agency is making similar decisions, then the process will lead to failure. For instance, if in previous processes the FS said they were going to do a certain monitoring plan or implement a certain type of management and these were never effectively implemented, it is important for the public and the decisionmaker to know. If there have been problems with FS implementation in the past, it is not logical to assume that implementation will be proper this time. If prior logging, prescribed fire and other [ldquo]forest health treatments[rdquo] have not been monitored appropriately, the FS lacks support for this latest proposal.

NEPA requires that high-quality information is available to the public and that NEPA documents concentrate on issues truly significant to the action in question. One highly significant issue is cumulative effects, including fostering understanding of how past actions may have led to the current conditions (good or bad), and therefore the next steps for management as laid out in the EA.

From our reading of the EA, the FS apparently has no idea how well past management actions met the goals, objectives, desired conditions, etc. stated in their respective NEPA documents, and how well the projects conformed to forest plan standards and guidelines. The EA did not include an analysis of how well the statements of Purpose and Need in those NEPA documents were served. Does the FS ever consider such information in proposing new management actions?

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

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

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

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

environmental analyses is used in the monitoring process to determine when changes should be made in the Forest Plan.

Older FS NEPA documents support this as well; they set out project-specific monitoring. Because there has apparently been no evaluation of past monitoring, there is just no support for a lot of assumptions in this EA. The FS violates NEPA by failing to disclose high-quality information to the public, use the best science, and take a hard look at the impacts of its project. The FS also fails to follow the Clearwater Forest Plan in violation of NFMA.

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

The failure to conduct the required Forest Plan implementation monitoring, evaluation and reporting, together with the failure to undertake the kind of hard look under NEPA at the project level, makes it impossible for the decisionmaker and public to grasp the cumulative impacts of this new timber sale. Clearly, the FS is operating in the dark, which is perhaps why it is so seductive for the agency to prepare and EA for this project to be able to proclaim [ldquo]no significant impacts.[rdquo] The FS must stop pretending there[rsquo]s nothing to be discovered where it doesn[rsquo]t want to look, and get on with preparing an EIS.

Forest Plan Chapter V mandates, [ldquo]The Forest Supervisor shall review the conditions on the land covered by the Plan at least every 5 years to determine whether conditions or demands of the public have changed significantly.[rdquo] Another aspect of planning leading to informed decisionmaking[mdash]ignored by the FS.

The EA fails to provide sufficient analysis of other projects in the project area or in proximity. By not disclosing high-quality information upfront, the agency violates NEPA. Overall, the EA downplays or ignores such cumulative impacts. Specialist reports also do not adequately address cumulative effects from those projects. Determining significance requires consideration of context[mdash]given there are contiguous projects in this area, the significance of this action must be analyzed within the long-term and short-term contexts of the area(s) impacted. Significance also addresses intensity, which includes whether the action, in combination with other actions, might have cumulatively significant effects.

ROADLESS AREAS

The Dead Laundry timber sale activities would degrade roadless characteristics by slashing of trees and burning within the Moose Mountain Inventoried Roadless Area (IRA). The timber sale would also degrade roadless characteristics by logging 59 acres of forest within an uninventoried roadless area right next to the Hoodoo IRA, in an area with Wilderness character but for which the agency refuses to consider for wilderness recommendation, including in its 2020 draft revised forest plan.

We incorporate within these comments the discussion on the roadless resource from the

FOC/AWR comments on the Draft Forest Plan and EIS (pp. 271-286).

Dead Laundry project impacts on roadless areas, along with impacts on the East Saddle project, would be cumulative on the Moose Mountain and Hoodoo IRAs. The East Saddle project involves prescribed burning of a few thousand acres in these IRAs along with adjacent uninventoried roadless areas. The Dead Laundry EA does not adequately analyze and disclose cumulative effects, including the timing of both projects, their combined impacts on various resources connected to the IRAs and unroaded areas. A decision on the Dead Laundry timber sale would also nullify assumptions of [ldquo]no extraordinary circumstances[rdquo] found in the East Saddle Decision Memo. We incorporate FOC[rsquo]s June 12, 2016 and March 24, 2020 comments on East Saddle, within these comments.

The USFS Northern Region explains the concept of [ldquo]Roadless Expanse[rdquo] in a document entitled [ldquo]Our Approach to Roadless Area Analysis of Unroaded Lands Contiguous to Roadless Areas[rdquo] (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 [ldquo]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.[rdquo] (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).

The Kootenai National Forest[rsquo]s Lower Yaak, O[rsquo]Brien, Sheep Draft Environmental Impact Statement explains the concept of [ldquo]roadless expanse[rdquo] as explained in USDA Forest Service, 2010e:

Northern Region (Region 1) Direction for Roadless Area Analysis Region 1 provides additional guidance for roadless area analysis in a draft document titled [ldquo]Our Approach to Roadless Area Analysis of Unroaded Lands Contiguous to Roadless Areas[rdquo] (12/2/10). In summary this paper is based on court history regarding the Roadless Area Conservation Rule. The [ldquo]Our Approach[rdquo] document states, [ldquo]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.) The FS is obligated to analyze and disclose impacts on the Roadless Characteristics and Wilderness Attributes of each roadless expanse as a whole. The public must be able to understand if the project would cause irreversible and irretrievable impacts on the suitability of any portion of a roadless expanse for future consideration for Recommended Wilderness designation under forest planning.

The Idaho Roadless Rule provides some definitions of roadless character that have implications for the analysis in this NEPA document:

Resources or features that are often present in and characterize Idaho Roadless Areas, including:

(1) High quality or undisturbed soil, water, and air;

(2) Sources of public drinking water;

(3) Diversity of plant and animal communities;

(4) Habitat for threatened, endangered, proposed, candidate, and sensitive species, and for those

species dependent on large, undisturbed areas of land;

(5) Primitive, semi-primitive nonmotorized, and semi-primitive motorized classes of dispersed

recreation;

(6) Reference landscapes;

(7) Natural appearing landscapes with high scenic quality;

(8) Traditional cultural properties and sacred sites; and

(9) Other locally identified unique characteristics.

See also, Friends of the Clearwater, 2020 for an examination of the way roadless rules are being exploited to downgrade the wilderness values and roadless characteristics of IRAs.

It seems the FS, in its incoherent policy, identifies roadless areas as only those areas covered under one of the roadless rules. FSH 1920.12, Chapter 71.2 specifically states, [ldquo]The primary function of the inventory step is to efficiently, effectively, and transparently identify all lands in the plan area that may have wilderness characteristics as defined in the Wilderness Act.[rdquo] The discussion in the EA reveals that even the FS is confused about artificial distinctions it established for various categories of roadless areas.

It seems that only areas the agency terms [ldquo]roadless areas[rdquo], which are apparently a subset of what is truly roadless, are the only ones the FS believes [ldquo]meet(s) the minimum criteria for wilderness,[rdquo] thereby eliminating or downgrading the portions of the larger roadless area in the project vicinity.

Areas the FS often calls [ldquo]unroaded[rdquo] or [ldquo]uninventoried roadless[rdquo] are usually the result of the fact that many are part of a larger roadless area/expanse, because they are contiguous to recognized or inventoried roadless areas (IRAs), existing Wilderness, or roadless land administered by another agency. In most or all of these cases, that the so-called [ldquo]unroaded[rdquo] lands were not part of formal roadless inventories is the result of FS failure in properly identifying roadless boundaries in past inventories. There has been a history of the FS doing this since the 1970s.

The inconstancy in the way the FS has evaluated and considered what kinds of actions negatively affect roadless areas so that boundaries should be redrawn to remove recently completed development activities (usually timber sales) has created a policy quagmire. For example, a portion of one inventoried roadless area[mdash]the West Fork Crooked River Roadless Area[mdash]was recently logged even though the agency claims this area still has roadless and wilderness characteristics.

This contrasts with areas that may show little or no evidence of past development the agency claims still lack these characteristics. These failures at adequate analysis of logging and roadbuilding on wilderness and roadless characteristics have been documented in Friends of the Clearwater, 2020.

Scientific literature emphasizes the importance of unroaded areas greater than 1,000 acres as strongholds for the production of fish and other aquatic and terrestrial species, as well as sources of high quality water. (Henjum et al., 1994.) A growing number of scientific studies indicate the significant value of roadless areas smaller than 5,000 acres and larger than 1,000 acres. (Strittholt and DellaSala, 2001; DeVelice and Martin, 2001; Loucks et al, 2003; Crist et al., 2005; Nott et al., 2005.) In a Nov. 14, 1997 letter to President Clinton urging the protection of roadless areas, 136 scientists noted:

There is a growing consensus among academic and agency scientists that existing roadless areas[ndash]irrespective of size[ndash]contribute substantially to maintaining biodiversity and ecological integrity on the national forests. The Eastside Forests Scientific Societies Panel, including representatives from the American Fisheries Society, American Ornithologists[rsquo] Union, Ecological Society of America, Society for Conservation Biology, and The Wildlife Society, recommended a prohibition on the construction of new roads and logging within existing (1) roadless regions larger than 1,000 acres, and (2) roadlessregions smaller than 1,000 acres that are biologically significant[hellip]. Other scientists have also recommended protection of all roadless areas greater than 1,000 acres, at least until landscapes degraded by past management have recovered[hellip]. As you have acknowledged, a national policy prohibiting road building and other forms of development in roadless areas represents a major step towards balancing sustainable forest management with conserving environmental values on federal lands. In our view, a scientifically based policy for roadless areas on public lands should, at a minimum, protect from development all roadless areas larger than 1,000 acres and those smallerareas that have special ecological significance because of their contributions toregional landscapes.

(Emphases added.) Anderson et al., 2012 compared watershed health in Wilderness, roadless, and roaded forest lands:

The Watershed Condition Framework data identifies 54 percent of all NFS land in properly functioning watersheds, 43 percent in watersheds functioning at risk, and just 3 percent in impaired watersheds. However, these proportions are not evenly distributed across the three land designation categories.

Designated Wilderness areas are most frequently spatially coincident with healthy watershed conditions. Eighty percent of the land within designated Wilderness is located in properly functioning watersheds, while 18 percent is in at7risk watersheds and just 1 percent is in impaired watersheds. Watershed conditions in Inventoried Roadless Areas are not as healthy as in designated Wilderness, but almost two-thirds of their area is still in properly functioning condition. Sixty7four percent of the IRA acreage is in properly functioning watersheds, 34 percent is in at7risk watersheds, and 2 percent is in impaired watersheds. Finally, other Forest Service lands [ndash] which make up slightly more than half of the National Forest System [ndash] tend to have the least healthy watershed conditions. While 38 percent of the managed landscape is in properly functioning watersheds, most of the roaded lands are in watersheds that are either functioning7at7risk (58 percent) or impaired (5 percent).

FIRE POLICY AND FIRE ECOLOGY

One purpose for the Dead Laundry timber sale is to [ldquo]Reduce hazardous fuel loading within the project area to provide protection for the wildland urban interface areas associated with private inholdings within the project area.[rdquo] The FS is taking the position that [ldquo]hazardous fuel[rdquo] arrangement is the overriding threat to private property and structures. This runs counter to best available scientific information. The EA fails to disclose that fuel moisture, weather, and topography are by far the factors with the most influence on fire behavior and spread.

Also, during hot, dry, and/or windy conditions, no amount of [ldquo]fuel reduction[rdquo] would significantly alter any of the EA[rsquo]s ill-defined metrics and fire concepts (see below). It is during those occasions when wildland fires cover the most acres, most quickly[mdash]largely nullifying all [ldquo]fuel reduction[rdquo] and suppression efforts.

The COVID-19 pandemic exposed the U.S. economy as a system where a significant portion of the citizenry could essentially be immediately bankrupted by job loss. The EA fails to explain why the vast majority of American taxpayers, many millions of them still struggling to recover, should be at all willing to subsidize the perceived safety of those few of us lucky enough to live in the vicinity of forests and other natural places1. We say [ldquo]perceived[rdquo] because, as we discuss herein, the fire protection for homeowners guaranteed by the EA is pretty much imaginary. As scientists have demonstrated, and as we explain below, responsibility for reducing risk of fire burning private structures rests squarely on the shoulders of the owners of those structures[mdash]not on U.S. taxpayers.

The EA completely omitted any discussion around well-documented uncertainty of the strategy of 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. Because there is scientific controversy surrounding this issue, the FS must prepare an EIS.

See [ldquo]A New Direction for California Wildfire Policy[mdash]Working from the Home Outward[rdquo] dated February 11, 2019 from the Leonard DiCaprio Foundation. It criticizes policies from the state of California, which are essentially the same FS fire policies on display in the CNF. From the Executive Summary: [ldquo]These policies try to alter vast areas of forest in problematic ways through logging, when instead they should be focusing on helping communities safely co-exist with California[rsquo]s naturally fire-dependent ecosystems by prioritizing effective fire-safety actions for

1 The EA states, [ldquo]There are approximately 30 structures across these three remote areas of private inholdings that are primarily used as summer recreation homes. Few residences have year-round occupants.[rdquo]

homes and the zone right around them. This new direction[mdash]working from the home outward[mdash] can save lives and homes, save money, and produce jobs in a strategy that is better for natural ecosystems and the climate.[rdquo] It also presents an eye-opening analysis of the Camp Fire, which destroyed the town of Paradise.

We also incorporate the John Muir Project document [ldquo]Forest Thinning to Prevent Wildland Fire

[hellip]vigorously contradicted by current Science[rdquo] (Attachment 2).

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

And also see [ldquo]Land Use Planning More Effective Than Logging to Reduce Wildfire Risk[rdquo] (Attachment 4).

The EA does not disclose if actions have been taken to reduce fuels near the summer homes the FS supposes will be somehow protected by this timber sale or how those activities (or lack of) will impact the efficacy of the activities proposed for this Project.

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

The nine-part Wildfire Research Fact Sheet Series was produced by the National Fire Protection Association (NFPA)[rsquo]s Firewise USA[reg] 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[mdash]why isn[rsquo]t the LNF implementing an aggressive outreach and education program to assist homeowners living in and near project areas, and elsewhere in the Wildland-Urban Interface (WUI)?

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

Research findings indicate that a home[rsquo]s characteristics and the characteristics of a home[rsquo]s immediate surroundings within 30 meters principally determine the potential for wildland- urban fire destruction. This area, which includes the home and its immediate surroundings, is termed the home ignition zone. The home ignition zone implies that activities to reduce the potential for wildland-urban fire destruction can address the necessary factors that determine ignitions and can be done sufficiently to reduce the likelihood of ignition.

Wildland fuel reduction outside and adjacent to a home ignition zone might reduce the potential flame and firebrand exposure to the home ignition zone (i.e., within 30 m of the home). However, the factors contributing to home ignition within this zone have not been mitigated. Given a wildfire, wildland fuel management alone (i.e., outside the home ignition zone) is not sufficient nor does it substitute for mitigations within the home ignition zone
(I)t is questionable whether wildland fuel reduction activities are necessary

and sufficient for mitigating structure loss in wildland urban fires.

[hellip](W)ildland fuel management changes the [hellip] probability of a fire reaching a given location. It also changes the distribution of fire behaviors and ecological effects experienced at each location because of the way fuel treatments alter local and spatial fire behaviors (Finney 2001). The probability that a structure burns, however, has been shown to depend exclusively on the properties of the structure and its immediate surroundings (Cohen 2000a). (Emphasis added.)

Our take from Finney and Cohen (2003) is that there is much uncertainty over effects of fuel reduction, which the EA fails to acknowledge or recognize. The authors point out:

Although the conceptual basis of fuel management is well supported by ecological and fire behavior research in some vegetation types, the promise of fuel management has lately become loaded with the expectation of a diffuse array of benefits. Presumed benefits range from restoring forest structure and function, bringing fire behavior closer to ecological precedents, reducing suppression costs and acres burned, and preventing losses of ecological and urban values. For any of these benefits to be realized from fuel management, a supporting analysis must be developed to physically relate cause and effect, essentially evaluating how the benefit is physically derived from the management action (i.e. fuel management). Without such an analysis, the results of fuel management can fail to yield the expected return, potentially leading to recriminations and abandonment of a legitimate and generally useful approach to wildland fire management.

Finney and Cohen, 2003 recognize: [ldquo]To reduce expected loss from home ignition, it is necessary and often sufficient to manage fuels only within the home ignition zone [hellip]and abide by fire resistant home construction standards[hellip][rdquo] (Emphasis added).

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

We strongly support government actions that facilitate cultural change towards private landowners taking the primary responsibility for mitigating the safety and property risks from fire, by implementing firewise activities around their property. Indeed, the best available science supports such a prioritization. (Kulakowski, 2013; Cohen, 1999a) Also, see Firewise Landscaping2 as recommended by Utah State University, and the Firewise USA website by the National Fire Protection Association3 for examples of educational materials.

A recent article in Phys.org reports on results of a study by DellaSala and Hanson, 2019:

2https://extension.usu.edu/ueden/ou-files/Firewise-Landscaping-for-Utah.pdf

3http://www.nfpa.org/Public-Education/By-topic/Wildfire/Firewise-USA/The-ember-threat-and-the-home-ignition-zone

They found no significant trend in the size of large high-severity burn patches between 1984 and 2015, disputing the prevailing belief that increasing megafires are setting back post-fire forest regeneration. "This is the most extensive study ever conducted on the high- severity fire component of large fires, and our results demonstrate that there is no need for massive forest thinning and salvage logging before or after a forest fire," says Dr.

Dominick A. DellaSala, lead author of the study and Chief Scientist at the Geos Institute. "The perceived megafire problem is being overblown. After a fire, conditions are ideal for forest re-establishment, even in the interior of the largest severely burned patches. We found conditions for forest growth in interior patches were possible over 1000 feet from the nearest low/moderately burned patch where seed sources are most likely."

DellaSala, et al. (1995) state:

Scientific evidence does not support the hypothesis that intensive salvage, thinning, and other logging activities reduce the risk of catastrophic fires if applied at landscape scales ... At very local scales, the removal of fuels through salvage and thinning may hinder some fires. However, applying such measures at landscape scales removes natural fire breaks such as moist pockets of late-seral and riparian forests that dampen the spread and intensity of fire and has little effect on controlling fire spread, particularly during regional droughts.

... Bessie and Johnson (1995) found that surface fire intensity and crown fire initiation were strongly related to weather conditions and only weakly related to fuel loads in subalpine forest in the southern Canadian Rockies............................................................. Observations of large forest fires during

regional droughts such as the Yellowstone fires in 1988 (Turner, et al. 1994) and the inland northwest fires of 1994....................... raise serious doubts about the effectiveness of intensive fuel

reductions as [ldquo]fire-proofing[rdquo] measures.

[ldquo]Only treating fuels in the immediate vicinity of the homes themselves can reduce risk to homes, not backcountry fuel reductions projects that divert scarce resources away from true home protection.[rdquo] DellaSala et al. 2015 (Chapter 13), p. 384 (citing Cohen, 2000; Gibbons et al. 2012; Calkin et al. 2013; Syphard et al, 2014).

Veblen (2003) states:

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

The EA lacks any detailed discussion on fire ecology, instead choosing to demonize wildland fire even though it is a vital natural process on this landscape.

Furthermore, the EA[rsquo]s analysis of [ldquo]hazardous fuels[rdquo] is overly limited in scope, examining only a tiny snapshot in time. Reality includes durations of time, not just a single instance represented immediately post-action/treatment, etc. So the implications of the fact that re-treatment or other maintenance of treated areas will be necessary for continued effectiveness are not analyzed.

The FS must analyze and disclose the temporal effectiveness of the effects of proposed [ldquo]fuel[rdquo] reductions. It[rsquo]s unlikely the area will see unplanned wildland fire the moment the fuel [ldquo]treatments[rdquo] are finished.

The EA assumes that if proposed treatments were not to occur and with continued fire suppression, increases in fuel loadings would result in more intense fires. However there is no genuine analysis of the No Action alternative.

Westerling et al. 2006 state that fires in this region, the Northern Rockies, has not been impacted from previous land-use effects; the ecosystem feature of stand-replacing fire is part of the reason why fire suppression has had minimal impact on the fire regime in the Northern Rockies. Noss et al. 2006 agree that fire suppression has very likely not impacted the historical variability of fires in the Northern Rockies. The FS must acknowledge this science and discuss that in relation to the agency[rsquo]s assertion that fire suppression leads to and has caused high-severity fires. Wildfire suppression has little impacted this region because the natural range of variability includes high- severity fires on the order of centuries. See, e.g., Brunelle and Whitlock 2003; Westerling et al.

2006; Eaton 2017.

Fuel treatments are unlikely to be effective. Rhodes & Baker (2008) studied fire records and found that, over the 20-year period that fuel reduction is assumed to be effective, approximate 2.0-4.2% of untreated areas would be expected to burn at high or high-moderate severity. This, considered with the science above, renders the FS[rsquo]s assumption that logging can satisfy the fuel- reduction purpose and need or that logging won[rsquo]t make a fire risk worse controversial at best.

Riggers, et al. 2001 state:

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

Those FS biologists emphasize, [ldquo]the importance of wildfire, including large-scale, intense wildfire, in creating and maintaining stream systems and stream habitat............................................................................ (I)n most cases,

proposed projects that involve large-scale thinning, construction of large fuel breaks, or salvage logging as tools to reduce fuel loading with the intent of reducing negative effects to watersheds and the aquatic system are largely unsubstantiated.[rdquo]

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

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

Noss et al. (2006) state:

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

High-severity fire is ecologically important. (Bond et al. 2012.) Snag forest habitat [ldquo]is one of the most ecologically important and biodiverse forest habitat types in western U.S. conifer forests (Lindenmayer and Franklin 2002, Noss et al. 2006, Hutto 2008).[rdquo] (Hanson 2010.)

Even if there is scientific legitimacy to the claims that fuel reductions reduce ecological damage from subsequent fire[mdash]a claim that is scientifically controversial and unproven for the long term, and left not quantified for any defined short term[mdash]the area affected by such projects in recent years is miniscule compared to the entire, allegedly fire-suppressed forest.

It may be that fire suppression in the project area has not, in reality, caused a significantly elevated risk of abnormal fire in the project area. We believe the agency is playing this fire-scare

card largely to justify logging as restoration. However, playing the fire scare card is not just a project area issue[mdash]it's forestwide. The agency puts the joker in the deck, changing the whole game[mdash]not just for one hand as the FS pretends.

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

Also, [ldquo]Substantial changes in disturbance regimes[mdash]especially changes resulting from fire suppression, timber management practices, and livestock grazing over the past 100 years[mdash]have resulted in moderate to high departure of vegetation composition and structure and landscape mosaic patterns from historical ranges.[rdquo] (USDA FS & USDI BLM 2000, Ch. 4. P. 18.)

If they are significant at all, the effects of fire suppression are not unique to the Dead Laundry project area[mdash]similar language has been included in NEPA documents for all logging projects on this Forest for at least a decade. If fire suppression effects as described in the EA are occurring, it means that, as forestwide fire suppression continues, the results of this management include continuing increases in these adverse effects across the entire forest. So multiply the above list of effects times the extent of the entire forest, and what the agency tacitly admits is, forestwide fire suppression is leading to stand-replacing fires outside what is natural, and that alternation of fire regimes results in wide-scale disruption of habitats for wildlife, rare plants, tree insect and disease patterns and increases the occurrence of noxious weeds. Such analyses and disclosures are not found in the Forest Plan FEIS.

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

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

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

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

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

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

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

[ldquo]We were surprised to see how significant the differences were between protected areas managed for biodiversity and unprotected areas, which our data show burned more severely,[rdquo] said lead author Curtis Bradley, with the Center for Biological Diversity.

The study focused on forests with relatively frequent fire regimes, ponderosa pine and mixed-conifer forest types; used multiple statistical models; and accounted for effects of climate, topography and regional differences to ensure the findings were robust.

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

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

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

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

In his testimony before Congress, DellaSala, 2017 discusses [ldquo][hellip]how proposals that call for increased logging and decreased environmental review in response to wildfires and insect outbreaks are not science driven, in many cases may make problems worse, and will not stem rising wildfire suppression costs[rdquo] and [ldquo]what we know about forest fires and beetle outbreaks in relation to climate change, limitations of thinning and other forms of logging in relation to wildfire and insect management[rdquo] and gives [ldquo]recommendations for moving forward based on best available science.[rdquo]

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

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

Also in claiming and implying departures from historic conditions, the FS does not provide a spatial analysis, either for the true reference conditions or of current project area conditions. The

FS has no scientifically defensible analysis of the project area landscape pattern departure from HRV.

Churchill, 2011 points out:

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

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

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

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

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

If the predictions of uncharacteristically severe fire were accurate, one might think that the results of scientific validation of such assumptions would have been conducted in the CNF by now, and cited in the EA. We find no data or scientific analysis of those fires[rsquo] effects validating the FS[rsquo]s predictions of uncharacteristically severe or intense fire effects if the [ldquo]fuel reduction[rdquo] is not conducted.

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

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

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

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

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

Baker, 2015 writes: [ldquo]Management issues[hellip] The evidence presented here shows that efforts to generally lower fire severity in dry forests for ecological restoration are not supported.[rdquo]

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

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

development, which have generally increased flammability and ignition at a time when the climate is warming and more fire is coming.[rdquo]

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

Schoennagel et al., 2004 state:

(I)t is unlikely that the short period of fire exclusion has significantly altered the long fire intervals in subalpine forests. Furthermore, large, intense fires burning under dry conditions are very difficult, if not impossible, to suppress, and such fires account for the majority of area burned in subalpine forests.

Moreover, there is no consistent relationship between time elapsed since the last fire and fuel abundance in subalpine forests, further undermining the idea that years of fire suppression have caused unnatural fuel buildup in this forest zone.

No evidence suggests that spruce[ndash]fir or lodgepole pine forests have experienced substantial shifts in stand structure over recent decades as a result of fire suppression. Overall, variation in cli-mate rather than in fuels appears to exert the largest influence on the size, timing, and se-verity of fires in subalpine forests []. We conclude that large, infrequent stand replacing fires are [lsquo]business as usual[rsquo] in this forest type, not an artifact of fire suppression.

Contrary to popular opinion, previous fire suppression, which was consistently effective from about 1950 through 1972, had only a minimal effect on the large fire event in 1988 []. Reconstruction of historical fires indicates that similar large, high-severity fires also occurred in the early 1700s []. Given the historical range of variability of fire regimes in high- elevation subalpine forests, fire behavior in Yellowstone during 1988, although severe, was neither unusual nor surprising.

Mechanical fuel reduction in subalpine forests would not represent a restoration treatment but rather a departure from the natural range of variability in stand structure.

Given the behavior of fire in Yellowstone in 1988, fuel reduction projects probably will not substantially reduce the frequency, size, or severity of wildfires under extreme weather conditions.

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

The proposed action will result in increased fire severity and more rapid fire spread. This common sense is recognized in a news media discussion of the 2017 Eagle Creek fire in Oregon:

Old growth not so easy to burn:

Officials said the fire spread so rapidly on the third and fourth days because it was traveling across lower elevations.

The forests there aren't as thick and as dense as the older growth the fire's edge is encountering now - much of it in the Mark O. Hatfield Wilderness, Whittington said.

Whittington said because there's more cover from the tree canopy, the ground is moister -- and that's caused the fire to slow. Also, bigger trees don't catch fire as easily, he said.

(Emphasis added.) The FS also likes to trot out the premise that tree mortality from native insect activity and other agents of tree mortality increase risk of wildfire. Again, this is not supported by science. Meigs, et al., 2016 found [ldquo]that insects generally reduce the severity of subsequent wildfires. [hellip] By dampening subsequent burn severity, native insects could buffer rather than exacerbate fire regime changes expected due to land use and climate change. In light of these findings, we recommend a precautionary approach when designing and implementing forest management policies intended to reduce wildfire hazard and increase resilience to global change.[rdquo] [Also see Black, 2005; Black, et al., 2010; DellaSala (undated); Kulakowski (2013); Hanson et al., 2010; Hart et al., 2015.] And for an ecological perspective from the FS itself, see Rhoades et al., 2012, who state: [ldquo]While much remains to be learned about the current outbreak of mountain pine beetles, researchers are already finding that beetles may impart a characteristic critically lacking in many pine forests today: structural complexity and species diversity.[rdquo] (Emphasis added.)

Frissell and Bayles (1996) state:

[hellip]The concept of range of natural variability [hellip]suffers from its failure to provide defensible criteria about which factors ranges should be measured. Proponents of the concept assume that a finite set of variables can be used to define the range of ecosystem behaviors, when ecological science strongly indicates many diverse

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

George and Zack, 2001 [ldquo]recommend that managers: (1) identify the wildlife species they want to target for restoration efforts, (2) consider the size and landscape context of the restoration site and whether it is appropriate for the target species, (3) identify the habitat elements that are necessary for the target species, (4) develop a strategy for restoring those elements and the ecological processes that maintain them, and (5) implement a long-term monitoring program to gauge the success of the restoration efforts.[rdquo] (Emphasis added.) None of this is found in any Dead Laundry analysis of restoration needs.

See Attachment 5, which is a collection of news media articles, quoting experts including those in the FS, who do understand the high value of severely burned forest for wildlife and other resources.

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

Huff et al., 1995 state:

In general, rate of spread and flame length were positively correlated with the proportion of area logged (hereafter, area logged) for the sample watersheds. [hellip]The potential rate of spread and intensity of fires associated with recently cut logging residues is high, especially the first year or two as the material decays. High fire-behavior hazards associated with the residues can extend, however, for many years depending on the tree.

Logged areas generally showed a strong association with increased rate of spread and flame length, thereby suggesting that tree harvesting could affect the potential fire behavior within landscapes. In general, rate of spread and flame length were positively correlated with the proportion of area logged in the sample watersheds.

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

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

As far as the [ldquo]restoration[rdquo] being alleged to address the impacts of long-term fire suppression, there is no coherent plan for integrating wildland fire back into this ecosystem. Nothing is being changed to learn from the admitted suppression ecological damage. The war against wildland fire, i.e., nature, is ongoing.

The proposed and ongoing management are all about continuing a repressive and suppressive regime, however the FS has never conducted an adequate cumulative effects analysis of forestwide fire suppression despite the vast body of science that has arisen since the Forest Plan was adopted. The [ldquo]plan[rdquo] is clearly to log now, suppress fires continuously, and log again in the future based on the very same [ldquo]need[rdquo] to address the ongoing results of fire suppression.

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

The FS has never conducted consultation with the USFWS on its forestwide fire management plan, which has clear ramifications for species listed under the Endangered Species Act.

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

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

Hutto et al., 2016 urge [ldquo]a more ecologically informed view of severe forest fires[rdquo]:

Public land managers face significant challenges balancing the threats posed by severe fire with legal mandates to conserve wildlife habitat for plant and animal species that are positively associated with recently burned forests. Nevertheless, land managers who wish to maintain biodiversity must find a way to embrace a fire-use plan that allows for the presence of all fire severities in places where a historical mixed-severity fire regime creates conditions needed by native species while protecting homes and lives at the same time.

This balancing act can be best performed by managing fire along a continuum that spans from aggressive prevention and suppression near designated human settlement areas to active [ldquo]ecological fire management[rdquo] (Ingalsbee 2015) in places farther removed from such areas. This could not only save considerable dollars in fire-fighting by restricting such activity to near settlements (Ingalsbee and Raja 2015), but it would serve to retain (in the absence of salvage logging, of course) the ecologically important disturbance process over

most of our public land while at the same time reducing the potential for firefighter fatalities (Moritz et al. 2014). Severe fire is not ecologically appropriate everywhere, of course, but the potential ecological costs associated with prefire fuels reduction, fire suppression, and postfire harvest activity in forests born of mixed-severity fire need to considered much more seriously if we want to maintain those species and processes that occur only where dense, mature forests are periodically allowed to burn severely, as they have for millennia.

Ultimately the EA reflects an overriding bias favoring vegetation manipulation and resource extraction via [ldquo]management[rdquo] needed to make the forest resemble some selected desired conditions, along the way neglecting the ecological processes driving these ecosystems.

Essentially the FS rigs the game, as its desired conditions would only be achievable by resource extractive activities. But since desired conditions must be maintained through repeated management/manipulation the management paradigm conflicts with natural processes[mdash]the real drivers of the ecosystem.

Since the FS[rsquo]s Desired Conditions must be maintained through repeated management/manipulation, the management paradigm conflicts with natural processes[mdash]the evolutionary drivers of the ecosystem.

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

See David Erickson[rsquo]s news article [ldquo]Experts: more logging and thinning to battle wildfires might just burnt taxpayer dollars[rdquo]. It cites testimony to Congress from scientist Tania Schoennagel (Schoennagel, 2017.)

We likewise incorporate Scientists Letter-Wildfire, 2018, signed by over 200 scientists.

The EA fails to present an analysis of the cumulative effects of livestock grazing on fire regimes. USDA Forest Service 2012c states:

Fire regime condition class ... is used to describe the degree of departure from the historic fire regimes that results from alterations of key ecosystem components such as composition, structural stage, stand age, and canopy closure. One or more of the following activities may have caused this departure: fire exclusion, timber harvesting, grazing, introduction and establishment of nonnative plant species, insects or disease (introduced or native), or other past management activities. (Id., emphasis added.)

The EA primarily discusses fuel conditions only in the areas proposed for treatment, yet wildland fire operates beyond artificial ownership or other boundaries. In regards to the proper cumulative effects analysis area for fire risk, Finney and Cohen (2003) discuss the concept of a

[ldquo]fireshed involving a wide area around the community (for many miles that include areas that fires can come from).[rdquo] In other words, for any given entity that would apparently have its risk of fire reduced by the proposed project (or affected cumulatively from past, ongoing, or foreseeable actions on land of all ownerships within this [ldquo]fireshed[rdquo])[mdash]just how effective would fuel reduction be? The EA fails to include a thorough discussion and detailed disclosure of the current fuel situation within the fireshed within and outside the proposed treatment units, making it impossible to make scientifically supportable and reasonable conclusions about the manner and degree to which fire behavior would be changed by the project.

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

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

In order to be ultimately effective at helping to restore natural fire regimes, fuel treatments must be part of wider efforts to address the root causes of the alteration in fire behavior. At best, MFT can only address symptoms of fire regime alteration. Evidence indicates that primary causes of altered fire regimes in some forests include changes in fuel character caused by the ongoing effects and legacy of land management activities. These activities include logging, post-disturbance tree planting, livestock grazing, and fire suppression.

Many of these activities remain in operation over large areas. Therefore, unless treatments are accompanied by the elimination of or sharp reduction in these activities and their impacts in forests where the fire regime has been altered, MFT alone will not restore fire regimes. (Internal citations omitted.)

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

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

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

Depending on intensity, thinning from below and possibly free thinning can most effectively alter fire behavior by reducing crown bulk density, increasing crown base

height, and changing species composition to lighter crowned and fire-adapted species. Such intermediate treatments can reduce the severity and intensity of wildfires for a given set of physical and weather variables. But crown and selection thinnings would not reduce crown fire potential. (Emphasis added.)

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

For example, the 20-foot wind speed4 must exceed 50 miles per hour for midflame wind speeds to reach 5 miles per hour within a dense Stand (0.1 adjustment factor). In contrast, in an open stand (0.3 adjustment factor), the same midflame wind speeds would occur at only a 16-mile-per-hour wind at 20 feet.

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

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

Constructing firelines by handcrews or heavy equipment results in a number of direct environmental impacts: it kills and removes vegetation; displaces, compacts, and erodes soil; and degrades water quality. When dozerlines are cut into roadless areas they also create long-term visual scars that can ruin the wilderness experience of roadless area recreationists. Site-specific impacts of firelines may be highly significant, especially for interior-dwelling wildlife species sensitive to fragmentation and edge effects.

...Another component of fire suppression involves tree cutting and vegetation removal. Both small-diameter understory and large-diameter overstory trees are felled to construct firelines, helispots, and safety zones.

...A host of different toxic chemical fire retardants are used during fire suppression operations. Concentrated doses of retardant in aquatic habitats can immediately kill fish, or lead to algae blooms that kill fish over time. Some retardants degrade into cyanide at levels deadly to amphibians. When dumped on the ground, the fertilizer in retardant can stimulate the growth of invasive weeds that can enter remote sites from seeds transported inadvertently by suppression crews and their equipment.

...One of the many paradoxes of fire suppression is that it involves a considerable amount of human-caused fire reintroduction under the philosophy of "fighting fire with fire." The most routine form of suppression firing, "burnout," occurs along nearly every linear foot of perimeter fireline. Another form of suppression firing, "backfiring," occurs when firefighters ignite a high-intensity fire near a wildfire's flaming edge, with or without a secured containment line. In the "kill zone" between a burnout/backfire and the wildfire edge, radiant heat intensity can reach peak levels, causing extreme severity effects and high

4 Velocity of the wind 20 feet above the vegetation, in this case tree tops.

mortality of wildlife by entrapping them between two high-intensity flame fronts.

...Firelines, especially dozerlines, can become new "ghost" roads that enable unauthorized or illegal OHV users to drive into roadless areas. These OHVs create further soil and noise disturbance, can spread garbage and invasive weeds, and increase the risk of accidental human-caused fires.

...Roads that have been blockaded, decommissioned, or obliterated in order to protect wildlife or other natural resource values are often reopened for firefighter vehicle access or use as firelines.

...Both vegetation removal and soil disturbance by wildfire and suppression activities can create ideal conditions for the spread of invasive weeds, which can significantly alter the native species composition of ecosystems, and in some cases can change the natural fire regime to a more fire-prone condition. Firefighters and their vehicles can be vectors for transporting invasive weed seeds deep into previously uninfested wildlands.

...Natural meadows are attractive sites for locating firelines, helispots, safety zones, and fire camps, but these suppression activities can cause significant, long-term damage to meadow habitats.

The FS does not disclose scientifically-acknowledged limitations of the use of Fire Regime Condition Classes. Fire Regime Condition Class is a metric that estimates the departure of the forest from historic fire processes and vegetation conditions. Fire regime condition class is derived by comparing current conditions to an estimate of the historical conditions that existed before significant Euro-American settlement. The method likely has very limited accuracy and tends to overestimate the risk of higher-severity fire posed by fuel loads, as documented by studies of recent fires (Odion and Hanson, 2006). Those researchers state:

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

Another critique is found in Rhodes (2007) who states:

Several of the biases [hellip]are embodied in the Fire Regime Condition Class (FRCC) approach (Hann and Bunell, 2001), which is widely used to provide an index of the potential for uncharacteristically severe fire and fire regime alteration. The FRCC relies on of estimates of mean fire intervals, but does not require that they be estimated on the basis of site- specific historical data. It emphasizes fire scar data, but does not require its collection and analysis on a site-specific basis. The FRCC[rsquo]s analysis of departure from natural fire regimes also relies on estimates of how many estimated mean fire intervals may have been skipped. The method does not require identification and consideration of fire-free intervals in site-specific historic record. Notably, a recent study that examined the correlation of

FRCC estimates of likely fire behavior with actual fire behavior in several large fires recently burning the Sierra Nevada in California concluded: [ldquo][Fire Regime] Condition Class was not able to predict patterns of high-severity fire................................................................................ Condition Class identified

nearly all forests as being at high risk of burning with a dramatic increase in fire severity compared to past fires. Instead, we found that the forests under investigation were at low risk for burning at high-severity, especially when both spatial and temporal patterns of fire are considered.[rdquo] (Odion and Hanson, 2006.) These results corroborate that FRCC is biased toward overestimating the alteration of fire regimes and the likelihood of areas burning at uncharacteristically high severity if affected by fire. Therefore, in aggregate there is medium degree of certainty that the FRCC is biased toward overestimating departures from natural fire regimes and the propensity of forests to burn at higher severity when affected by fire.

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

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

The FS is willfully participating in the destruction of the Earth[rsquo]s atmosphere. All of the scientific conclusions we cite are common knowledge by now, so it takes callous, active denial to ignore it.

In commenting on climate issues in relation to the Dead Laundry timber sale proposal, we fully incorporate the document, [ldquo]Flat Country DEIS cmt Forest Carbon Appendix, 3-16-2020[rdquo] 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 [hellip]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.

[hellip]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 [ldquo]offset[rdquo] 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 [ldquo]rethink the forest economy[rdquo] and to [ldquo]invest in forest stewardship,[rdquo] but tabulating the multiple benefits of doing so will demonstrate that often a forest is worth much more standing than logged. Instead of subsidizing the logging of forests for lumber, paper and fuel, society should pay for the multiple benefits of standing forests. It is time to value U.S. forests differently in the twenty-first century. We have a long way to go, but there is not a lot of time to get there.

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

The Dead Laundry EA is utterly insufficient. It doesn[rsquo]t recognize or analyze highly relevant information or apply the science that renders its underlying assumptions scientifically controversial. It doesn[rsquo]t disclose high-quality information to the public, and it doesn[rsquo]t take a hard look at this proposed action in the manner needed above. 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.

Final Guidance for Federal Departments and Agencies on Consideration of GreenhouseGas Emissions and the Effects of Climate Change in National Environmental Policy ActReviews.
Issued on August 1, 2016 and subsequently blocked by the Trump administration, this directive from Executive Office of the President, Council on Environmental Quality has been re- implemented as national direction. [See 86 Fed Reg. 10252 (Feb. 19, 2021).]

The 2016 CEQ guidance acknowledges, [ldquo]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.[rdquo] It directs federal agencies to consider the extent to which a proposed action such as the Dead Laundry timber sale would contribute to climate change5. 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

5 The EA states [ldquo]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).[rdquo]

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 GHG emissions. The agency can only use a qualitative method if tools, methodologies, or data inputs are not reasonably available, and if that is the case, there needs 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 or supporting documents to indicate the FS is acting in consistency with this guidance.

Ongoing climate catastrophe

In the recent revised Forest Plan Draft EIS for the Custer-Gallatin National Forest, the FS[rsquo]s words are, [ldquo]Climate change is expected to continue and have profound effects on the Earth[rsquo]s ecosystems in the coming decades (IPCC 2007).[rdquo] Yet judging by its actions, the FS is a huge climate denier. The EA includes no analysis of climate change whatsoever.

And as alarming as the words in the FS[rsquo]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.

There is extremely urgent scientific concern expressed over the imminent effects of climate change on the earth[rsquo]s ecosystems, and therefore on civilization itself. The IPCC[rsquo]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 [ldquo]no documented historic precedent.[rdquo]

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[mdash]a period well within the lifetime of much of the global population. The report [ldquo]is quite a shock, and quite concerning,[rdquo] said Bill Hare, an author of previous IPCC reports and a physicist with Climate Analytics, a nonprofit organization. [ldquo]We

were not aware of this just a few years ago.[rdquo] The report was the first to be commissioned by world leaders under the Paris agreement, the 2015 pact by nations to fight global warming.

The authors 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.

Logging harms potential of forest ecosystems to sequester carbon and mitigate effects ofclimate change
The 2012 Planning Rule recognizes, in its definition of Ecosystem services, the [ldquo]Benefits people obtain from ecosystems, including: (2) Regulating services, such as long term storage of carbon; climate regulation[hellip][rdquo] The Committee of Scientists, 1999 recognize the importance of forests for their contribution to global climate regulation. Logging, especially large trees as proposed for the Dead Laundry timber sale, would exacerbate climate change. Mildrexler, et al., 2020 state:

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

[middot] 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 [ge] 1[rdquo] 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.

[middot] 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) [ldquo]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.[rdquo] DeLuca, 2009 points to research that [ldquo]showed that if the objective of management is carbon storage, old-growth forests are better left standing. [hellip]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.[rdquo]

Forests are carbon sinks[mdash]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 [ldquo]represents the majority of [carbon] losses from US forest [rdquo] 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. [ldquo]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.[rdquo] Law et al. 2018. This EA is missing an honest carbon accounting of the carbon outputs of this timber sale.

Buotte et al. 2019 published an article prioritizing forest lands for preservation based on [ldquo]carbon priority ranking with measures of biodiversity.[rdquo] This is new and important information that the FS must consider. The researchers mapped [ldquo]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.[rdquo] Here is the map from that article:

As you can see, the Nez Perce-Clearwater National Forests have a medium ranking with pockets of high rankings. This forest is worth preserving[mdash]it has an incredible ability to sequester carbon. Profita (Jan. 1, 2020).

Logging does not serve to increase carbon sequestration in the future. McKinley et al. 2011 states, [ldquo]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.[rdquo] 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, [ldquo]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.[rdquo] The strategy of harvesting and replanting might work for southeastern forests, but not the Nez Perce-Clearwater National Forests. Avoiding deforestation, afforestation, and reducing harvest are the first three strategies that McKinley et al. 2011 list. Because 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, this article states something contradictory than the agency[rsquo]s representation of it and this article provides contrary support for a different strategy than the logging that the agency proclaims will help.

The position that this Forest generally takes when we raise these issues is that its project impacts on climate change is that the project would have a miniscule impact on global carbon emissions. The obvious problem with that viewpoint is, once can say the same thing about every source of carbon dioxide and other greenhouse gas emission on earth, and likewise justify inaction as does this EA. In their comments on the KNF[rsquo]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.

Conversely, 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.)

Law and Harmon, 2011 conducted a literature review and concluded [hellip]

Thinning forests to reduce potential carbon losses due to wildfire is in direct conflict with carbon sequestration goals, and, if implemented, would result in a net emission of CO2 to the atmosphere because the amount of carbon removed to change fire behavior is often far

larger than that saved by changing fire behavior, and more area has to be harvested than will ultimately burn over the period of effectiveness of the thinning treatment.

Best available science supports the proposition that forest policies must shift away from logging if carbon sequestration is prioritized.6 Forests must be preserved indefinitely for their carbon storage value. Forests that have been logged should allowed to convert to eventual old-growth condition. This type of management has the potential to double the current level of carbon storage in some regions. (See Harmon and Marks, 2002; Harmon, 2001; Harmon et al., 1990; Homann et al., 2005; Law, 2014; Solomon et al., 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 [ldquo]logging, whether for biofuels or lumber, is eating away at the carbon stored beneath the forest floor.[rdquo]

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

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

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

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

6 [ldquo]More logging and reforestation occur annually in the U.S., including on our public lands, than in any other nation in the world.[rdquo] 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.

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 [ldquo]best science[rdquo] by agencies, extractive industries and the politicians they[rsquo]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 [ldquo]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.[rdquo] The author [ldquo]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.[rdquo] His testimony begins, [ldquo]I am here to [hellip]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.[rdquo]

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.

Old growth also helps to mitigate the effects of climate change on wildlife habitat. Frey et al., 2016 find: [ldquo]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[deg]C between plantation sites and old-growth sites, a temperature range equivalent to predicted global temperature increases over the next 50 years.[rdquo] They hypothesize older, more complex forests may help to [ldquo]buffer organisms from the impacts of regional warming and/or slow the rate at which organisms must adapt to a changing climate[hellip][rdquo] 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[mdash] 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 to the atmosphere and continuing carbon sequestration to protect the climate system, it would be best to protect large trees for their carbon stores, and also for their co-benefits of habitat for biodiversity, resilience to drought and fire, and microclimate buffering under future climate extremes.

We incorporate the Law and Moomaw (2021) article, entitled: [ldquo]Keeping trees in the ground where they are already growing is an effective low-tech way to slow climate change.[rdquo]

Achat et al. 2015 state, [ldquo]Compared with other terrestrial ecosystems, forests store some of the largest quantities of carbon per surface area of land.[rdquo] Much of the carbon stored is within the soils, with a smaller part in the vegetation. 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[rsquo] potential to continue to sequester carbon. Id.

Logging and associated activities emit vast amounts of greenhouse gases
Law and Harmon, 2011 conducted a literature review and concluded:

Thinning forests to reduce potential carbon losses due to wildfire is in direct conflict with carbon sequestration goals, and, if implemented, would result in a net emission of $CO_2$ to the atmosphere because the amount of carbon removed to change fire behavior is often far larger than that saved by changing fire behavior, and more area has to be harvested than will ultimately burn over the period of effectiveness of the thinning treatment.

Van der Werf, et al. 2009 discuss the effects of land-management practices and state: (T)he maximum reduction in $CO_2$ emissions from avoiding deforestation and forest

degradation is probably about 12% of current total anthropogenic emissions (or 15% if peat degradation is included) - and that is assuming, unrealistically, that emissions from deforestation, forest degradation and peat degradation can be completely eliminated.

...reducing fossil fuel emissions remains the key element for stabilizing atmospheric $CO_2$ concentrations.

(E)fforts to mitigate emissions from tropical forests and peatlands, and maintain existing terrestrial carbon stocks, remain critical for the negotiation of a post-Kyoto agreement. Even our revised estimates represent substantial emissions ...

No analysis of interaction of management actions and climate change
Vegetation management efforts that attempt to replicate how the FS thinks things looked pre- European influence ignores the larger pattern of climate, ignores climate change, and ignores natural succession. See Millar and Wolfenden 1999 for a discussion on why patterns within the context of climate change are important.

The FS (in USDA Forest Service, 2017b) discusses some effects of climate change on forests, including the following statement [ldquo]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.[rdquo] Yet, the EA indicates that part of the Purpose and Needs is to change the forested vegetation[mdash]lacking 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 [ldquo]treatments[rdquo] will result in sustainable vegetation conditions under increasing temperatures.

Furthermore, the FS doesn[rsquo]t present a scientific basis to support its assumption that proposed [ldquo]treatments[rdquo] 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 [ldquo]historical[rdquo] 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 likelihood that [ldquo][hellip]high seedling and sapling mortality rates due to water stress, competing vegetation, and repeat fires that burn young stands,[rdquo] 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. [hellip]Impending changes in regional climates [hellip]have the capacity for causing great shifts in composition of ecological communities.

Conventional wisdom dictates that forests regenerate and recover from wildfire. If that[rsquo]s true, then it[rsquo]s logical to conclude that forests can regenerate and recover from logging. And these days, [ldquo]resilience[rdquo] is a core tenant of FS planning. Unfortunately, assumptions of the EA relating to historic and desired conditions are incorrect. NEPA requires a [ldquo]hard look[rdquo] 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 Dead Laundry 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. [ldquo]Treatments[rdquo] must be acknowledged for what they are: adverse cumulative environmental effects. Logging can neither mitigate, nor prevent, the effects of wildfire or logging. Both cause disturbance to forests that cannot be restored or retrieved[mdash]the assumed resilience no longer exists. It is way too late in the game to pretend to 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 Dead Laundry project area, including that FS target NRV 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.

SCIENTIFIC INTEGRITY

As part of the incorporated comments on the draft RFP, we included a section entitled [ldquo]NEPA [ndash] Scientific Integrity.[rdquo] Again, these comments incorporate our draft RFP comments in their entirety as comments on the Dead Laundry EA. Although the context of those comments is the programmatic planning level, most of the discussion easily applies to project planning.

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

Huck, 2000 states:

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

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

During litigation of a timber sale on the Kootenai NF (CV-02-200-M-LBE, Federal Defendants Response to Motion for Preliminary Injunction), the FS criticized a report provided by plaintiffs,

stating [ldquo](Its) purported [lsquo]statistical analysis[rsquo] reports no confidence intervals, standard deviations or standard errors in association with its conclusions.[rdquo]

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

The analysis methodology rely heavily upon the assumption that the FS knows the [ldquo]NRV[rdquo] as is stated in the EA. Yet the reliability of the data sources used to construct the EA[rsquo]s NRV is not disclosed. The data sources themselves are not identified or obscure.

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

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

The Nez Perce Forest Plan includes a requirement for the FS to validate the models it uses. In Chapter V, the

Forest Plan monitoring plan notes a [ldquo]NFMA Requirement 36 CFR 219.12(K)(2)[rdquo] and the [ldquo]Action() [hellip][rdquo] is [ldquo]Validation of resource prediction models; wildlife, water quality, fisheries, timber.[rdquo]

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

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

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

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

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

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

Larson et al. 2011 state:

Habitat models are developed to satisfy a variety of objectives.................................................................................................. A basic objective of

most habitat models is to predict some aspect of a wildlife population (e.g., presence, density, survival), so assessing predictive ability is a critical component of model validation. This requires wildlife-use data that are independent of those from which the model was developed............................................. It is informative not only to evaluate model predictions with

new observations from the original study site but also to evaluate predictions in new geographic areas.

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

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

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

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

Beck and Suring, 2011 state:

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

Larson et al. 2011 state:

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

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

The documents, [ldquo]USDA-Objectivity of Regulatory Information[rdquo] and [ldquo]USDA-Objectivity of Scientific Research Information[rdquo] are instructional on this topic.

Ruggiero, 2007 (a scientist from the research branch of the FS) recognizes a fundamental need to demonstrate the proper use of scientific information, in order to overcome issues of

decisionmaking integrity that arise from bureaucratic inertia and political influence. Ruggiero, 2007 and Sullivan et al., 2006 provide a commentary on the scientific integrity and agency use and misuse of science. And the Committee of Scientists (1999) recommend [ldquo]independent scientific review of proposed conservation strategies[hellip][rdquo] The interpretation of scientific information the analyses do cite is problematic as we discuss throughout this objection. A big problem is that scientific information we cited in our comments on the PA was ignored or dismissed without discussion.

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

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

(A)s currently structured there are essentially two independent planning processes in operation for the management of the National Forest System: forest planning as called for in the legislation; and the Congressional budgeting process, which budgets on a project basis. The major problem is that there are essentially two independent planning processes occurring simultaneously: one involving the creation of individual forest plans and a second that involves congressionally authorized appropriations for the Forest Service.

Congressional funding for the Forest Service is on the basis of programs, rather than plans, which bear little or no relation to the forest plans generated by the planning process. There is little evidence that forest plans have been seriously considered in recent years when the budget is being formulated. Also, the total budget appropriated by the Congress is typically less than what is required to finance forest plans. Furthermore, the Forest Service is limited in its ability to reallocate funds within the budget to activities not specifically designated. Thus, the budget process commonly provides fewer resources than anticipated by the forest plan and often also negates the [ldquo]balance[rdquo] across activities that have carefully been crafted into forest plans. Balance is a requisite part of any meaningful plan. Finally, as noted by the GAO Report (1997), fundamental problems abound in the implementation of the planning process as an effective decision making instrument. Plans without corresponding budgets cannot be implemented. Thus forest plans are poorly and weakly implemented at best. Major reforms need to be implemented to coordinate and unify the budget process.

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

...outlines a process called the science consistency review, which can be used to evaluate the use of scientific information in land management decisions. Developed with specific reference to land management decisions in the U.S. Department of Agriculture Forest Service, the process involves assembling a team of reviewers under a review administrator to constructively criticize draft analysis and decision documents. Reviews are then forwarded to the responsible official, whose team of technical experts may revise

the draft documents in response to reviewer concerns. The process is designed to proceed iteratively until reviewers are satisfied that key elements are consistent with available scientific information.

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

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

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

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

The Committee of Scientists (1999) state:

To ensure the development of scientifically credible conservation strategies, the Committee recommends a process that includes (1) scientific involvement in the selection of focal species, in the development of measures of species viability and ecological integrity, and in the definition of key elements of conservation strategies; (2) independent scientific review of proposed conservation strategies before plans are published; (3) scientific involvement in designing monitoring protocols and adaptive management; and

(4) a national scientific committee to advise the Chief of the Forest Service on scientific issues in assessment and planning.

GRIZZLY BEAR

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.

The draft Biological Assessment (BA) states the Dead Laundry timber sale would have [ldquo]No Effect[rdquo] on the grizzly bear, listed as Threatened under the Endangered Species Act (ESA). It contains no further analysis or justification, stating: [ldquo]See [lsquo]Wildlife Specialist Report, Biological Assessment, and Biological Evaluation[rsquo] in Dead Laundry Environmental Assessment project

record for documentation of consistency and determination.[rdquo] That Biological Evaluation (BE) states, [ldquo]This project lies within area considered to be [lsquo]may be present[rsquo] for grizzly bear, including the Deadwood-Moose Creek and Elizabeth-North Fork HUCs (USDI 2020c).[rdquo]

We refer the ID Team to documents FOC received from the FS in response to a FOIA submitted on July 17, 2020, seeking documents relating to all known grizzly bear sightings or grizzly presence on the Nez Perce-Clearwater National Forests (NPCNF) subsequent to October 30, 2013.

Documents provided in response to the FOIA indicate a grizzly bear was confirmed in the White Bird area in 2019 and another in 2020, which means one likely denned in that same vicinity. In 2020 grizzly was confirmed in the End Of The World project area of the Salmon River Ranger District.

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 Dead Laundry BE states, [ldquo]One verified grizzly bear observation was been recorded within the Deadwood-Moose Creek and Elizabeth-North Fork HUCs in 2019.

There were other unconfirmed 2019 occurrences of grizzly bears on the NPCNF, as evidenced from tracks or photos, including near Big Cedar (less than 20 miles east of Stites, Idaho), the [ldquo]Newsome Red River[rdquo] bear from September 2019, and a second grizzly bear in the

Upper Lochsa.

Still, the FS remains in denial that the grizzly bear is native species whose habitat needs must be taken into consideration for project analyses such as Dead Laundry. In dismissing the grizzly bear from being an analysis issue, the BE states, [ldquo]The Bitterroot Ecosystem is currently considered to not be permanently occupied by grizzly bear. The number of transient grizzly bears identified in the Forest and near the project has been so few in number and minimal in length of presence to be insignificant.[rdquo]

Since there is solid documentation of recent and ongoing grizzly bear occupancy on this Forest, grizzly bear presence should be considered permanently established. Formal consultation on the forest plan is out of date. Updated consultation with the U.S. Fish and Wildlife Service (USFWS) for the grizzly bear is needed on this project and the forest plan.

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

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

That 2014 programmatic Biological Assessment includes a grizzly bear screening process, and

below is part of a diagram from therein:

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

Furthermore, we note the FS has failed to regulate black bear baiting in the NPCNF, allowing the state of Idaho to be the sole oversight agency of this practice on the NPCNF. In 2007, a grizzly bear was shot and killed at a black bear baiting station in the Kelly Creek watershed in the CNF, not far from this project area. Given that the grizzly bear[rsquo]s habitat on the Clearwater NF had proved lethal to the only confirmed occurrence for over half a century, FS management is obviously preventing the grizzly population from recovering in the Bitterroot Ecosystem recovery area. All of this triggers a duty for the FS to re-consult and find a way to reduce or eliminate this take of grizzlies under the ESA.

It[rsquo]s well known that young female grizzly bears tend to establish home territories in close proximity to their mother[rsquo]s. Also, grizzly bears have a strong tendency to avoid highly roaded landscapes, which largely separate the Bitterroot Ecosystem from known female grizzly home ranges in other Recovery Areas. In contrast to the Bitterroot Ecosystem and the NPCNF as a whole, habitat for bears in other Recovery Areas is delineated by forest plans into Bear Management Units (BMUs) where total and open road densities are limited in order to reduce human caused bear mortality and increase habitat security. [See USDA Forest Service, 1995c (Flathead National Forest Amendment 19); also see USDA Forest Service, 2009d (Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones).]

So what would it take for the FS to institute BMUs and road density standards? In a document received under the FOIA, the FS explains: [ldquo]Bear Management Units have not been developed for

the BE however the Recovery Plan identifies delineation of BMUs as a future task once home range size and habitat use data are available (USFWS 1996). Such data in currently unavailable for the BE because of the lack of resident grizzly bears.[rdquo] Also, [ldquo]the definition of a population of grizzly bears (i.e. two or more reproductive females or one female reproducing during two separate years) in the Bitterroot Environmental Impact Statement (EIS) (Service 2000, pp. 3-14[ndash] 15).[rdquo]

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

The agency[rsquo]s questioning of whether grizzly bears, recently confirmed in and around the Clearwater and Nez Perce National Forest, are [ldquo]residents[rdquo] is beside the point. Grizzly bear habitat quality is still potentially outstanding, but only if strong steps are taken to remove the human impediments to natural recovery. Recovery of the grizzly requires its population to grow and its range expand, especially in anticipation of the impending risk of climate change. We not believe the grizzly bear must leap high arbitrary agency-established hurdles to receive adequate habitat protections.

Mattson (2021) is a report investigating grizzly bear recovery in the Bitterroot Ecosystem and NPCNF. At pp. 56 - 59 (7.c. Habitat Security on the Nez Perce-Clearwater National Forests) Mattson discusses road densities and core security in proposed BMUs for the NPCNF. Figure 25 shows the high road density situation in the Dead Laundry project area.

As Mattson (2021) explains, grizzly bear habitat quality in the Bitterroot Ecosystem is potentially outstanding, but strong steps are needed immediately to remove the human impediments to natural recovery. Recovery of the overall grizzly bear population in the lower 48 states requires its population to grow and its range expand, especially in anticipation of the impending risk of climate change.

The effects to grizzly bears from the Dead Laundry timber sale include potential long term disturbance or displacement due to human presence, road construction and use, motorized use and other mechanized equipment. The presence of these activities and the presence of roads leads grizzly bears to avoid otherwise suitable habitat.

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

In updating the consultation on forest plan impacts on grizzly bears, the FS should be identifying key habitat components for grizzly bears for prioritizing road density reductions (Proctor, et al., 2020) so populations can recover.

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

The forest plan lacks direction regarding road densities located outside of and between security areas.

The FS is aware of the best programmatic agency direction it has adopted to date, that established in Flathead Forest Plan Amendment 19.7 It established Open Motorized Route Density (OMRD)/Total Motorized Route Density (TMRD)/Security Core indices. These are based upon the scientific information concerning security from roads and road density requirements for grizzly bears as found in Mace and Manley, 1993 and Mace et al., 1996.

The FS also ignores cumulative impacts on surrounding lands.

Reducing roads and therefore their impacts beyond what the FS seems willing would benefit not only grizzly bears, but most other natural aspects of the ecosystem, as the FS[rsquo]s Access Amendment Draft SEIS for the Cabinet-Yaak Recovery Area states:

[middot] Alternative D Modified would convert the most roads and consequently would provide the highest degree of habitat security and a lower mortality risk to the Canada lynx. (P. 70.)

[middot] Alternative D Modified would provide a higher degree of habitat security (for gray wolves) than Alternative E Updated[hellip] (P. 74.)

[middot] Alternative D Modified [hellip] could contribute to a cumulative increase in habitat security for black-backed woodpeckers (and pileated woodpeckers) because timber sales or other ground disturbing or vegetation management activities would be less likely to occur in Core Areas. Newly dead trees that support wood boring beetle populations would be less likely to be removed during vegetation management activities or by woodcutters. Alternative D Modified could provide slightly more secure habitat than Alternative E Updated. (P. 84, 112.)

[middot] Alternative D Modified [hellip] could contribute to a cumulative increase in habitat security because timber sales or other ground disturbing or vegetation management activities would be less likely to occur in Core Areas. Snags would be less likely to be removed during vegetation management activities or by woodcutters. Alternative D Modified could provide slightly more secure habitat(for Townsend[rsquo]s big-eared bats, flammulated owls, fringed myotis bats) than Alternative E Updated. (Pp. 85, 86, 95.)

[middot] Alternative D Modified and Alternative E Updated provide different levels of habitat security (for peregrine falcon, fisher, wolverine) based on the relative amount of wheeled motorized vehicle access. (Pp. 87, 89, 91.)

[middot] Alternative D Modified, which closes the most miles of road in suitable habitat, would be the preferred alternative for the western toad. (P. 101.)

[middot] Alternative D Modified closes the most miles of road in suitable habitat and would provide the greatest benefits for the goshawk. (P. 103.)

[middot] Alternative D Modified, which closes the most miles of road in suitable habitat, would be the best Alternative for elk. (P. 104.)

[middot] Alternative E Updated would provide some security and reduced vulnerability (for

moose), but not as much as Alternative D Modified. (P. 104.)

7 AWR and Guardians have prevailed in litigation against the Flathead NF on this issue.

[middot] Although Alternative D Modified and Alternative E Updated would benefit mountain goats, Alternative

D Modified would improve security and reduce the risk of displacement more than Alternative E Updated. (P. 109.)

[middot] Alternative D Modified would improve security (for pine marten) more than Alternative E Updated. (P. 110.)

Please see the documents, [ldquo]Brebner Flat reply brief filed 10.13.20[rdquo], [ldquo]ECOS Conservation Online System-grizzly bear[rdquo] and [ldquo]Species Profile for Grizzly bear (Ursus arctos horribilis)[rdquo] which explain why the FS[rsquo]s [ldquo]no effect[rdquo] determination is wrong, and contrary to law. The fact that the grizzly bear occurs in the CNF and project area is not adequately considered in the EA and project analyses. The EA and DN violate NEPA and the ESA.

In summary, the FS still essentially ignores the grizzly bear, fails to take a hard look at the project[rsquo]s effects to 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[mdash]from reducing road construction and logging, to requiring personnel to take bear country training and carry bear spray, to monitoring and reporting bear sightings.

OLD-GROWTH ECOSYSTEMS AND SPECIES ASSOCIATED WITH OLD GROWTH

-USDA Forest Service, 1987d

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

The birth of [ldquo]old growth[rdquo] 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 EA[rsquo]s perspective about old growth that recognizes these societal values.

In 1989, Forest Service Chief Dale Robertson issued a [ldquo]Position Statement on National Forest Old Growth Values[rdquo] (Chief[rsquo]s Position Statement [ndash] see Green et al., 1992). The Chief[rsquo]s Position Statement began, [ldquo]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. [hellip]Where goals for providing old growth values are not compatible with timber harvesting, lands will be classified as unsuitable for timber production.[rdquo]

The 1989 Chief[rsquo]s Position Statement included steps national forest managers were to take to reflect this range of old growth values. The direction included:

[middot] 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.

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

Green et al., 1992 states [ldquo][hellip]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.[rdquo] And Hamilton, 1993 states, [ldquo]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.[rdquo]

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

National Forest because this type of habitat [ldquo]is vital to the perpetuation of old-growth dependent species of wildlife.[rdquo] (Forest Plan Appendix H.)

Both the Clearwater Forest Plan and scientists recognize old growth is not simply large, healthy trees. As discussed in the Franklin et al. 1987 article about tree death, forest health and resiliency does not mean an absence of fire, insects and disease. Fire, insect, and disease over a long period of time are exactly the processes that develop old growth. Old growth exists not merely as a place large, old, healthy trees grow[mdash]it also exists for the wildlife that need the decaying living trees in which to nest or den, the snags, and the logs on the ground which some of that wildlife den or forage for food. As evidenced by the EA[rsquo]s statements about desired conditions and resilience, the proposed logging is designed to prevent or reduce heart rot, stand decadence, canopy closure, shrub-sapling layer, overall canopy closure, and coarse woody debris.

Scientific information and previous agency analysis on the old-growth associated wildlife indicate that logging would eliminate or reduce the habitat characteristics needed by associated wildlife, such as future snag recruitment, live trees that show signs of decadence, and the opening of canopies.

The Chief[rsquo]s Position Statement adopted a 2/15/89 [ldquo]Draft Action Plan[rdquo] for a Forest Service Old Growth Task Group. The number one item for the Task Group was to [ldquo]Develop a generic definition of ecological old growth. It will identify characteristics for which measurable criteria would be established in more specific definitions for forest types, habitat types, or plant associations; and would help guide the design of new inventories that will include the measurement of old growth attributes.[rdquo] (Emphases added.) Green et al., 1992 ([ldquo]Old-Growth Forest Types of the Northern Region[rdquo]) was one direct result of these regional efforts.

Green et al., 1992 admits: [ldquo]Although old growth ecosystems may be distinguished functionally as well as structurally, this definition is restricted primarily to stand-level structural features which are readily measured in forest inventory.[rdquo] Also, [ldquo]These old growth minimum criteria, associated characteristics, and descriptions were developed to apply to individual stands.[rdquo] (Id.)

FS management policies focus mainly on identifying, designating, inventorying and managing at the level of the old-growth [ldquo]stand[rdquo]8 or patches consisting of multiple contiguous stands.

Kaufmann et al. 2007 note limitations of this approach: [ldquo]The term [lsquo]stand[rsquo] may be more useful for management purposes than for describing the ecology of forests.[rdquo] This report advocates the a more holistic idea of old growth[mdash]what Kaufmann et al. 2007 call [ldquo]old-growth forests or landscapes[rdquo] which:

[hellip]contain sufficient numbers of patches and stands of old growth to be reasonably representative of the forest type in historical times. However, portions of the landscape may be in various stages of development (even temporary openings or patches of very young trees) to provide future old-growth patches in the landscape. Landscapes vary in size, but

8 USDA Forest Service (1990) explains, [ldquo]Timber stands are delineated on the basis of predominant overstory species, tree sized, and tree density. Contiguous old-growth habitat may be composed of more than one stand.[rdquo]

are generally considered to be at least as large as major natural disturbances, such as fire. (Id.)

Franklin and Spies, 1991 also recommend this wider ecosystem perspective:

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[hellip] 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.

Green et al., 1992 (Old-growth forest types of the Northern Region), while largely focusing on within-stand old-growth criteria, also acknowledges the need for considerations beyond mere stand-level attributes:

(A) stand[rsquo]s landscape position may be as important, or more important than any stand old growth attribute. [hellip]Stands are elements in dynamic landscape. We need to have representatives of the full range of natural variation, and manage the landscape mosaic as a whole in order to maintain a healthy and diverse systems. (Emphases added.)

Similarly, Foster et al., 1996 state:

The maintenance of many natural ecosystems requires the protection not only of current old-growth areas, but also of naturally disturbed forests that represent future old-growth. To ensure the continued presence of old growth, these areas must be maintained within a landscape that is adequate in size to allow for the continuing mosaic of disturbance and for the dispersal of organisms and processes among patches.

In a 1983 document that was later adopted into the 1987 Forest Plan for the Idaho Panhandle National Forests (USDA Forest Service 1987d), biologist Danielle Jerry recognized the spatial and temporal [ldquo]shifting mosaic[rdquo] created by natural disturbance processes:

Episotic high and low mortality caused by fire, disease and insects are balanced by primary production. Borman and Likens (1979) describe this condition as a [ldquo]shifting-mosaic steady state.[rdquo] Over a large area the average condition (steady state) of the vegetation is a forest dominated by old-growth trees. Within the gross boundaries of the old-growth forest are found patches representing every successional stage. The location of these patches of seral vegetation shift over time, for as one stand passes from pole to mature to old-growth trees, another stand may be eliminated by an insect attack. Thus, within the gross boundaries of an old-growth ecosystem a mosaic of varying age class stands constantly shift internal boundaries. Traditional ideas about climax vegetation are not really appropriate, for seral

species and a heterogeneous age class are important elements in this [ldquo]shifting mosaic steady state.[rdquo]

The FS fails to embrace wider old-growth values or ecological perspectives for recognizing old- growth landscapes or old-growth ecosystems. The Northern Region[rsquo]s (Green et al., 1992) old- growth definitions did not upgrade existing CNF forest plan direction in such a manner. Instead, they mostly fine-tuned the process whereby the agency identifies old growth by focusing on characteristics within stands. To the degree that the FS believes that Green et al., 1992 improves upon, replaces, or otherwise modifies CNF Forest Plan direction in regards to old growth, it is obligated to amend its forest plan in accordance with NEPA by conducting an EIS.

Along with the adverse indirect impacts the thousands of acres of proposed logging would cause to old-growth ecosystems including associated wildlife, the EA proposes to directly damage existing old-growth stands. The action alternative would feature [ldquo]196 acres of old-growth enhancement[rdquo]:

Only intermediate harvests in Old Growth Enhancements units will be conducted. No western redcedar [ge] 25[rdquo] will be marked for removal. No western larch, western white pine, or ponderosa pine [ge] 21[rdquo] will be marked for removal. No other remaining trees species present on site [ge] 21[rdquo] will be marked for removal unless it is within 50[rsquo] 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).[rdquo]

There is no biological rationale for the claim that old growth will be meaningfully [ldquo]enhanced[rdquo]. And there is likewise no biological rationale for the EA[rsquo]s minimal tree retention diameter limits and other conditions. The EA leaves the door wide open for logging many of the large and old trees of even the FS[rsquo]s [ldquo]desired[rdquo] tree species from old growth. There are no other explicitly described limitations on the changes this logging would cause to old-growth stands, nor explicit minimum structural conditions within the post-logging old-growth stands.

Conflicting with the natural, expected processes within old growth that result in tree mortality, and which create the very habitat conditions associated wildlife depend upon, the mad scientists at the FS prefer to supersize the remaining trees and minimize dead and dying trees, and minimize abundance of snags and large down logs: [ldquo]These treatments in Dead Laundry should see an increase in diameter growth in existing western redcedar, western white pine, ponderosa pine and western larch, while capturing expected mortality in grand fir, Douglas-fir, lodgepole pine, and subalpine fir in treated areas.[rdquo]

The old growth will also be [ldquo]enhanced[rdquo] with compacted soil, noxious weeds, equipment-scraped retention trees, stumps, and burn piles. So whereas in the late 1980s the FS Chief stated [ldquo]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[rdquo] by 2021 the only thing the FS values about old growth is the logs they can drag out.

The Vegetation Resource Report says that old-growth [ldquo]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.[rdquo] Since the Forest Plan states, [ldquo]A [lsquo]weed[rsquo] is no more than a plant outside its desired location or a certain plant where it is not wanted[hellip][rdquo] then clearly the FS is characterizing centuries-old trees to be logged from old growth as weeds.

And then there are the units to be [ldquo]enhanced[rdquo]:

[middot] Unit 19A (5 acres) adjacent to regeneration Unit 19 (a 44 acre [ldquo]opening[rdquo])

[middot] Unit 40A (8 acres) and adjacent Unit 40B (38 acres)[mdash]adjacent to Unit (92 on the unit map, but

since there is no Unit 92 in the EA it must instead be 92A), a 65-acre regeneration [ldquo]opening[rdquo]

[middot] Unit 41 (22 acres)

[middot] Unit 64 (4 acres) adjacent to Unit 56 (an 89-acre regeneration [ldquo]opening[rdquo])

[middot] Unit 67A (4 acres) and adjacent Unit 67B (12 acres)[mdash]adjacent to Unit 68, which is part of a larger set of regeneration units making up a 231-acre [ldquo]opening[rdquo]

[middot] Unit 88 (10 acres)

[middot] Unit 89 (19 acres)

[middot] Unit 90 (26 acres)

[middot] Unit 90B (4 acres) not shown on any map, but likely part of a conglomeration consisting of regeneration Unit 90 (see above) and a 5-acre regeneration Unit 90A (also not shown on any map)

[middot] Unit 123A (40 acres), not shown on any map

[middot] Unit 130A (2 acres), not shown on any map

So old growth in some cases will be [ldquo]enhanced[rdquo] with a view of large clearcuts, always a winner if you like your old growth logged, fragmented, and/or subject to blowdown because of the removal of most of the trees adjacent to it.

The Forest Plan says the preferred minimum stand size for old growth is 80 acres, and that a 300- acre stand should be managed as old growth for pileated woodpeckers in each old-growth analysis unit. Regarding the [ldquo]enhancement[rdquo] units none are even 80 acres. Maybe the FS should experiment with following the Forest Plan.

The Vegetation Resource Report states, [ldquo]Most stands should result in a treatment that provides a balance between increasing ungulate forage and maintaining thermal cover.[rdquo] There is nothing in Forest Plan direction regarding old growth that prioritizes big game species[rsquo] habitat needs. The FS should be paying attention instead to the needs of Forest Plan old-growth management indicator species (MIS) and other wildlife associated with old-growth habitats. The EA and Vegetation Resource Report ignore much of the direction[mdash]including standards and monitoring requirements[mdash]found in the Forest Plan, thus failing to demonstrate compliance with the forest plan as NFMA requires.

The EA states, [ldquo]To maintain snag habitat, timber harvest prescriptions will follow Regional guidance (Bollenbacher et al. 2009) at the project scale for snag and live tree retention.[rdquo] Also, the Vegetation

Resource Report states, [ldquo]For the purpose of maintaining snag habitat, timber harvest prescriptions would follow Regional guidance (Bollenbacher et al. 2009) on project level snag and live tree retention estimates in early seral conditions. This ignores the requirements of Forest Plan Appendix H. Recall that Forest Plan Standard 5.c. is [ldquo]Provide habitat for snag- dependent indicator species (pileated woodpecker and goshawk) in accordance with guidelines provided in Appendix H.[rdquo] Specifically, Forest Plan Appendix H provides:

If the FS believes that Bollenbacher et al. 2009 is consistent with and even superior to Forest Plan Appendix H direction on snag habitat, the agency is obligated to make that determination using an Environmental Impact Statement to amend its forest plan.

The old growth [ldquo]enhancement[rdquo] feature of the Dead Laundry timber sale would be implementing the draft revised forest plan (RFP). In rejecting the analysis of an action alternative that wouldn[rsquo]t experiment with old growth, the EA states:

No logging in old growth. The Dead Laundry project proposes use Old Growth Enhancement (OGE) to maximize the retention of old growth and large trees, as appropriate for the forest type, to the extent that the trees promote stands that are resilient to insects and disease. The OGE treatment aligns with the project[rsquo]s purpose to improve forest health and resiliency in concurrence with desired conditions and objectives identified in the Forest Plan.

Again, in discussing its desired conditions and objectives, the 1987 Forest Plan says nothing about attempting to enhance existing old growth[mdash]that idea is purely a figment of the forest plan revision mindset. The Vegetation Resource Report calls it like it is: [ldquo]an experimental form of free thinning[hellip][rdquo] (emphasis added). Yet nowhere does the FS acknowledge the inherent risk, the damage caused if the [ldquo]experiment[rdquo] doesn[rsquo]t confirm the FS[rsquo]s badly expressed hypothesis (there is nothing in the EA that allows anyone to objectively measure the FS[rsquo]s version of successful enhancement other than the fact that logging would occur). Furthermore the FS ignores the scientific controversy of its experimentation. For example, Pfister et al., 2000 state:

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

Hunter, 1989 cites the Society of American Foresters (1984, p. 17):

With present knowledge, it is not possible to create old-growth stands or markedly hasten the process by which nature creates them. Certain attributes, such as species composition and structural elements, could perhaps be developed or enhanced through silviculture, but we are not aware of any successful attempts. Old growth is a complex ecosystem, and lack of information makes the risk of failure high. In view of the time required, errors could be very costly. At least until substantial research can be completed, the best way to manage for old growth is to conserve an adequate supply of present stands and leave them alone.

Speaking to the hubris exhibited by the FS, Franklin and Spies, 1991 ask, [ldquo]How can we presume to maintain or re-create what we do not understand?[rdquo]

Tomao et al. (2020) state:

If no management practices are performed for a long time, stands may gradually evolve into so-called [ldquo]old-growth forests[rdquo]. In the absence of anthropogenic disturbances, forests may slowly recover the natural disturbance dynamics (forest fires and windstorms, parasite outbreaks, fungal decay, gap creation due to insects) and develop those stand structural features (large living trees, large amount of deadwood, canopy gaps of various size, coexistence of senescent, mature and initial stages) typical of primary forests...

[mdash]

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

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

The FS has conducted no research or monitoring comparing pre- and post-logging old growth occupancy by or abundance of the wildlife species with strong biological association with habitat components found in old growth, to see if logged old growth is still functioning as effective or suitable habitat.

The draft RFP included this guideline:

MA2 and MA3-GDL-FOR-02. Vegetation management activities may be authorized in ponderosa pine, western larch, western white pine, Pacific yew, western redcedar, western hemlock, and whitebark pine old growth stands only if the activities are designed to increase the resistance and resiliency of the stand to disturbances or stressors and if the activities are not likely to immediately modify stand characteristics to the extent that the stand would no longer meet the definition of old growth over the long-term. See the glossary for the definitions of resistance and resilience.

The language in the above draft RFP guideline is some the Dead Laundry EA and Vegetation Resource Report state, either using the same words or slightly paraphrased.

Further, draft RFP guideline MA2 and MA3-GDL-FOR-04 express hope that a [ldquo]non-desired old growth type [hellip]be converted to a desired old growth type to meet desired conditions in MA3- DCFOR-10.[rdquo] The draft RFP[rsquo]s MA2 and MA3-DC-FOR-10 ([ldquo]desired conditions[rdquo]) are that [ldquo]Amounts of ponderosa pine, western larch, western white pine, and whitebark pine old growth are maintained or increased from existing amounts.[rdquo] There is apparently no whitebark pine in the Dead Laundry project area, but the ponderosa pine, western larch, and western white pine are clearly favored for retention in areas the EA proposes to log.

The FS is attempting to justify or otherwise implement activities that are expressly forbidden in the 1993 Clearwater Forest Plan Stipulation for Dismissal agreement (Settlement Agreement).

The draft EIS for the draft RFP states:

The methodology for developing plan components for old growth and for anticipating effects to old growth is discussed in detail in the [ldquo]Old Growth Rationale[rdquo] paper that is in the project file. The thinking was that plan components for old growth should reflect that the Nez Perce-Clearwater is considerably outside of the 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 address underrepresented dominance types while allowing harvest within overrepresented dominance types.

There is much discussion about [ldquo]dominance types[rdquo] in the Dead Laundry Vegetation Resource Report, but none at all in the 1987 Forest Plan.

The Vegetation Resource Report says, [ldquo]Historically, old growth forests on the North Fork ranged from dry-site, open stands maintained by frequent low-severity fire, to denser, wet sites maintained by mixed-severity fires (Spies et al. 2006).[rdquo] We note that Spies et al. 2006 is written by Forest Service scientists at the Pacific Northwest Research Station, concerning implementation of the Northwest Forest Plan[mdash]not about the North Fork of the Clearwater River watershed of North Idaho.

More damage from the FS[rsquo]s industrialization of the old-growth ecosystem would be caused by the new roads to be punched through existing old-growth stands:

There will also be some impact as a result of temporary road access to harvest units going through old growth. When possible, these roads will skirt the boundaries of the old growth stand, or will be placed on existing old road templates, but there are some stands that may be bisected. In these limited situations, the terrain restricts these roads[rsquo] location to ridge tops and there is no way to avoid going through old growth. This project proposes less than 1 mile of new temp road construction through mapped stepdown and old growth, or approximately 2.3 acres.

USDA Forest Service (1990) states, [ldquo]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.[rdquo]

The EA fails to properly analyze the topic of old growth in the context of Forest Plan requirements. The FS basically says, we[rsquo]re slicing roads through old growth but don[rsquo]t worry[mdash] the degradation thus brought is not significant. Again, this says nothing about the existing conditions. The amount and distribution of old growth in the analysis area is not disclosed in the EA. The EA does not disclose population numbers, trends and distribution of old-growth associated species, including Management Indicator Species (MIS). The EA[rsquo]s analysis doesn[rsquo]t satisfy requirements of NEPA or NFMA.

Forest Plan Wildlife and Fish Standard 5.d(1) requires the FS to [ldquo]Provide for old-growth dependent wildlife species by [hellip]Maintaining at least 10 percent of the Forest (including Selway- Bitterroot Wilderness) in old-growth habitat.[rdquo] The EA fails to demonstrate the FS is managing consistent with this forestwide 10% standard.

Forest Plan Wildlife and Fish Standard 5.d(2) requires the FS to [ldquo]Provide for old-growth dependent wildlife species by [hellip](s)electing 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.[rdquo] The EA does not disclose if project area Old Growth Analysis Units (OGAUs) meet or fall below this standard. The EA also fails to disclose how well existing old growth is distributed among the CNF OGAUs. The EA fails to mention that of the six project area Old Growth Analysis Units (OGAUs), three contain less than 5%.

The EA states that the majority of the project area is identified in the Forest Plan as Management Area E-1. Forest Plan Timber Standard 4(c) for Management Area E-1 requires the FS to: [ldquo]Identify and maintain suitable old-growth stands and replacement habitats for snag and old- growth dependent wildlife species[hellip][rdquo] The EA fails to demonstrate consistency with this standard.

Destroying old growth violates earlier Forest Service directives, such as the Reilly, 2006 memo, as well as the Settlement Agreement. In a letter dated 10/8/93, Clearwater Forest Supervisor James Caswell indicated that the Forest Plan appeal Settlement Agreement [ldquo]commits the Forest Service to prepare EISs for new roads and timber sale projects which directly affect [lsquo]verified[rsquo] old-growth stands 100 acres or larger.[rdquo]

The Vegetation Resource Report states, [ldquo]with the addition of step down and recruitment, all OGAU[rsquo]s are exceeding the five percent requirement.[rdquo] For the designation or protection of [ldquo]step down[rdquo] or [ldquo]recruitment[rdquo] old growth to have any meaning, it must be designated in a manner that takes into consideration how close to meeting the old-growth criteria the designated stands are. The juxtaposition of such stands with other stands of old growth (or of [ldquo]step down[rdquo] or [ldquo]recruitment[rdquo] old growth) would also be a key consideration, given the elevated biological value of larger, unbroken blocks of such habitat. The EA provides no such explanation or analysis.

Moreover, the FS apparently has no accounting device for [ldquo]recruitment[rdquo] or [ldquo]step down[rdquo] old growth. This could mean explicit administrative commitments, spreadsheets, or GIS/spatial inventories. The FS apparently believes it is free to identify whatever it wants to fit these categories, with ever-changing designations at any time. Since a designation as replacement old growth carries no administrative weight and encompasses stands with potentially few old-growth characteristics, there is no reason to presume that such designation will actually lead to these stands evolving into old growth. It is clear that the replacement designation is merely a bookkeeping device, and has no relevance to the Forest Plan requirements except to indicate that these stands may be good candidates for old growth at some undefined point in the future. It is entirely conceivable that the FS could come out with another timber sale in this same area with an entirely different set of replacement old growth designations and log away what the Dead Laundry designates as [ldquo]recruitment[rdquo] or [ldquo]step-down.[rdquo] Such a situation clearly does not provide for the habitat needs of old-growth associated species as required by the Forest Plan.

Furthermore, the FS lacks any established way of maintaining a publicly accessible inventory of old growth, let alone [ldquo]step down[rdquo] and [ldquo]recruitment[rdquo] old growth. The latter two categories need only meet very lax criteria, and as far as we[rsquo]re aware, in the 34 years of Forest Plan implementation there[rsquo]s no documentation of the FS ever designating [ldquo]step down[rdquo] or [ldquo]recruitment[rdquo] old growth which has eventually/later fully met existing old growth criteria. These lesser FS categories are an empty promise to the public, to associated wildlife, and other old- growth values.

The Vegetation Resource Report includes Table 8. Existing Old Growth, Step Down and Recruitment by OGAU in the Dead Laundry Project Area that purports to show how the FS is managing consistent with Forest Plan Standards. Yet it fails. Under the table it states, [ldquo]Derived from Old Growth GIS data managed by the Regional Office.[rdquo] The report does not state the nature of the data[mdash]is it spatial or some black box FIA sample? How large are the stand sizes, in response to the identified preferred minimum of 80 acres? Are there any blocks of old growth that meet the recommendation for contiguous 300-acre minimum (or alternately, [ldquo]not more than three 100 acre areas as long as the areas are within 2 square miles[rdquo])?

It is also concerning that the FS provides no map or maps of the existing, [ldquo]recruitment[rdquo], [ldquo]step-down[rdquo] old growth the FS claims exists in the project area or old growth analysis units (OGAUs). There is absolutely no identifying information anywhere we can find, except for the old-growth [ldquo]enhancement[rdquo] treatment units.

And the question is begged: What real value is this [ldquo]step down[rdquo] and [ldquo]recruitment[rdquo] old growth to wildlife species finding optimum conditions in old growth?

It also cannot be discerned if the stands are meeting the [ldquo]preferred minimum[rdquo] 80-acre stand size requirement for old growth. And the FIA data the FS often relies upon to estimate old growth, in its dry statistical nature, utterly fails to provide any information on such stand size requirements, or any spatial information whatsoever. These, and other problems deny the public high quality information and don[rsquo]t show that the FS has taken a hard look at impacts or cumulative impacts. This also violates NFMA because the FS cannot demonstrate compliance with the forest plan, especially since the agency has not been meeting old-growth standards on this forest and has increased logging in recent years. See Reilly (2006) and R1 Timber sold annual reports as displayed in our Draft Revised Forest Plan comments.

USDA Forest Service 1987a acknowledges smaller patches of old growth are of lesser value for old-growth associated wildlife:

A unit of 1000 acres would probably meet the needs of all old growth related species (Munther, et al., 1978) but does not represent a realistic size unit in conjunction with most other forest management activities. On the other hand, units of 50-100 acres are the smallest acceptable size in view of the nesting needs of pileated woodpeckers, a primary cavity excavator and an old growth related species (McClelland, 1979). However, managing for a minimum size of 50 acres will preclude the existence of species which have larger territory requirements. In fact, Munther, et al. (1978), report that units of 80 acres will meet the needs of only about 79 percent of the old growth dependent species (see Figure 1). Therefore, while units of a minimum of 50 acres may be acceptable in some circumstances, 50 acres should be the exception rather than the rule. Efforts should be made to provide old growth habitat in blocks of 100 acres or larger. [hellip]Isolated blocks of old growth which are less than 50 acres and surrounded by young stands contribute very little to the long-term maintenance of most old growth dependent species. (Emphases added.)

It appears that the FS[rsquo]s old-growth allocations in any given area vary over time, but there[rsquo]s no clear explanation of what[rsquo]s going on. The FS actions appear arbitrary and capricious. It would be consistent with the FS[rsquo]s treatment of the subject of old growth (vague, confusing, disingenuous, and misleading) for the very best stands just short of meeting old growth criteria to be clearcut under the Dead Laundry timber sale. Large, old trees not within designated categories of old growth are not protected at all with the silvicultural prescriptions. Outside of the old growth proposed for experimental damage, there isn[rsquo]t even a simple diameter limit on trees to be logged.

The Wildlife Report describes another FS [ldquo]Desired Condition[rdquo]:

Presence of a balance of successional stages to provide habitat for wildlife species; early- successional (30-50%), young-mid-successional (20-40%), mature-mid-successional (30- 45%), and late-old forest (15- 40%). Appropriate old growth stands identified and protected to meet established goals and provide habitat for old-growth dependent species (Forest Plan DFC, page II-18).

This appears to be yet another example of Dead Laundry phantom forest plan desired conditions, because page II-18 of the Forest Plan has no such language. Perhaps this is more draft Forest Plan direction being misleadingly attributed to the current forest plan.

In failing to analyze and disclose actual old growth conditions, the FS not only fails the species we discuss in detail, it also fails old-growth associated species such as moose, flammulated owls, white-headed woodpeckers, boreal toads, long-eared myotis, long-legged myotis, fringed

myotis , and Townsend[rsquo]s big-eared bats.

One might assume the CNF Forest Plan minimum old-growth standards are based upon historic amounts prior to

EuroAmerican exploitation, so that maintaining such minimum would safeguard wildlife populations so they wouldn[rsquo]t vanish from any national forest or need listing under the ESA. But estimates of the amount of old growth on the CNF 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 FS statements responding to requests for data on presettlement amounts of old growth. For example, USDA Forest Service, 2019c states:

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[rsquo]s Bollenbacher and Hahn, 2008g state, [ldquo]actual estimates for the amount of OG are constrained by the limited field inventory data collected before the 1930s, and inconsistent[mdash]or absent[mdash]OG definitions.[rdquo]

Following his research, Lesica (1996) suggested reliance on 10% as minimum old-growth standard could result in extirpation of some species. He estimated that 20-50% of low and many mid-elevation forests were in old-growth condition prior to European settlement.

Gautreaux, 1999 states:

[hellip]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.

[hellip]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[hellip]

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.

[hellip] 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, [ldquo]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.[rdquo] (Emphasis added.) Lesica, 1996 (also cited in Gautreaux, 1999) stated forest plan standards of maintaining approximately 10% of forests as old growth in the Northern Region may extirpate some species. This is based on his estimate that 20-50% of low and many mid- elevation forests were in old-growth condition prior to European settlement. This should be considered some of the best science on historic range of old growth necessary for insuring viability of old-growth associated species.

Regarding the FS reliance upon Forest Inventory and Analysis (FIA) data to determine forestwide amounts of old growth[mdash]and therefore Forest Plan consistency and viability assurance, here are significant methodological flaws, only one of those being that the FIA data do not determine the size of any particular old-growth stand.

The FS Region 1 report Bollenbacher, et al., 2009 states concerning the FIA inventory: [ldquo]All northern Idaho plots utilized a primary sample unit (PSU) composed of four fixed radius plots with trees 5 [ndash] 20.9 inches tallied on a 1/24th acre plot and trees 21.0 inches DBH and larger tallied on a [frac14] acre plot.[rdquo] Also, Czaplewski, 2004 states, [ldquo]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.[rdquo] In addition, Bollenbacher and Hahn, 2008 under [ldquo]Defining Old Growth[rdquo] state: [ldquo]There are no specific criteria for minimum patch size for OG in the Northern Region definitions[rdquo] but recognize [ldquo]There are, however, some Forest Land Management Plans that may include guidance for a minimum map unit for OG stands.[rdquo] Bollenbacher and Hahn, 2008 try to make a case for smaller minimum stand sizes, saying [ldquo]The regional vegetation minimum map unit of 5 acres for a stand polygon would be a reasonable lower limit for all vegetation classes of forest vegetation including OG stands.[rdquo] Clearly, whether the FS is using a [frac14]-acre, one-acre, or five-acre minimum map unit, none conform to the Forest Plan old-growth minimum stand size criteria. Furthermore, it would be ludicrous to propose that any old-growth associated MIS, Sensitive, or ESA-listed species could survive on even a five-acre old-growth stand[mdash]there is no scientific evidence to support such a premise. In sum, FIA data do not reliably measure ecologically functioning old growth.

Regardless, old growth is well below NRV for the Forest and project area, yet how viability for old-growth associated species can be assured while further depletion of habitat would occur goes without explanation.

The EA exaggerates the ecological value of trees that better resist insects and disease. From its timber-centric perspective, growing such trees is a major purpose claimed in the EA. Yet the EA does not reconcile such a position with the following best available science concerning forests:

[ldquo](A)ttributes such as decadence, dead trees [hellip]are important[hellip][rdquo] (Green et al., 1992). [ldquo]Accumulations of large-size dead standing and fallen trees that are high relative to earlier stages.[rdquo] (Id.)

[ldquo]Decadence in the form of broken or deformed tops or bole and root decay.[rdquo] (Id.) Green et al., 1992 describe Defining characteristics of old growth, which include:

Old growth forests encompass the late stages of stand development and are distinguished by old trees and related structural attributes. These attributes, such as tree size, canopy layers, snags, and down trees generally define forests that are in and old growth condition.

Definition

Old growth forests are ecosystems distinguished by old trees and related structural attributes. Old growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics which may include tree size, accumulations of large dead woody material, number of canopy layers, species composition, and ecosystem function.

(O)ld growth is typically distinguished from younger growth by several of the following attributes:

1. Large trees for species and site.
2. Wide variation in tree sizes and spacing.
3. Accumulations of large-size dead standing and fallen trees that are high relative to earlier stages.
4. Decadence in the form of broken or deformed tops or bole and root decay.
5. Multiple canopy layers
6. Canopy gaps and understory patchiness.

The 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 [ldquo]species [hellip](which) find optimum habitat in the [ldquo]old[rdquo] successional stage[hellip][rdquo] And Kootenai National Forest (1991) states, [ldquo]we[rsquo]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.[rdquo] (Also see USDA Forest Service, 1990a.) We also incorporate the Idaho Panhandle NF[rsquo]s forestwide old-growth planning document (USDA Forest Service, 1987d) and the IPNF Forest Plan[rsquo]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 [ldquo]old[rdquo] 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 I9). 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.

The EA also does not properly analyze and disclose the natural historic range vs. current conditions regarding patch size, edge effect, and amount of interior forest old growth in the CNF. 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. [hellip](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. [hellip]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 [ldquo]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.[rdquo] 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

9 USDA Forest Service 1987b.

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. [hellip](A) way to moderate both the demands for and the stresses placed upon the old-growth ecosystem, and to enhance each island[rsquo]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 [ldquo]key components in metapopulation functioning[rdquo] 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 [hellip] [ldquo]Landscape dynamics[mdash]Connectivity[rdquo]; and [hellip] [ldquo]Landscape dynamics[mdash]Seral/structural stage patch size and shapes.[rdquo]

The FS utilizes its Green et al. 1992 document inappropriately, in that it was never intended to set old-growth criteria. The numbers were intended to be minimum screening criteria for possible old growth stands from the timber stand database. According to the Green et al. 1992 the final determination of old growth status was to be made by a qualified ecologist or wildlife biologist. Further explanation is in USDA Forest Service, 1990a. Strict reliance on data base queries from the timber stand database has been shown to give unreliable results (Iron Honey Timber Sale,

Idaho Panhandle National Forests [ndash] 9th Circuit Court of Appeals, 2004) and is no substitute for field investigation by qualified professionals.

Green et al. 1992 arrived after the Forest Plan was adopted. In preparing and adopting these old growth guidelines, the FS did not use an independent scientific peer review process, as discussed by Yanishevsky, 1994:

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

A former member of the Region 1 Old-Growth Committee described a [ldquo]definition process[rdquo] that relied heavily upon the Committee members[rsquo] pre-conceived notions of the quantifiable characteristics of old-growth forests (Schultz 1992b).

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

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

Yanishevsky (1994) also pointed out the inadequacy of maintaining merely [ldquo]minimum[rdquo] amounts of habitat such as snags and old growth.

The FS has also not complied with forest plan requirements for monitoring population trends of it old-growth Management Indicator Species (MIS). MIS population trend monitoring is an important mechanism upon which the FS[rsquo]s forest plan management assumptions rely upon to insure old-growth associated wildlife viability. Without such trend data, the FS is unable to apply [ldquo]adaptive management[rdquo] to change its management of the forest plan habitat standards turn out to be insufficient for maintaining viability. It also is unable to provide an adequate cumulative effects analysis.

The Committee of Scientists (1999) state, [ldquo]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.[rdquo] (Emphasis added.)

Furthermore, the FS cannot even cite any scientific information that shows 10% old growth forestwide is within reference conditions, otherwise known as within the [ldquo]historic range of variability[rdquo] (HRV) or Natural Range of Variation (NRV). This fact makes it all the more important to monitor population trends.

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.)

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

[middot] 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.

[middot] 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).

[middot] 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).

[middot] 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.

[middot] 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 [ldquo]reservoirs[rdquo] for species that find early successional stages of second-growth conifer stands marginal habitat.

[middot] 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.

[middot] 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[rsquo] presence.

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

[middot] 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 [hellip]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.

[middot] 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[mdash]

one for everyday use in gathering stand data[mdash]emphasizes structural and compositional rather than the conceptually important functional features that are difficult to measure.

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

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

[middot] 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.

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

Bollenbacher and Hahn, 2008 discuss [ldquo]Maintaining Resilient Old Growth Forests: Impacts of Forest Management on Wildlife[rdquo]:

When OG stands are treated to increase their resilience, how do these treatments affect wildlife? Few studies have rigorously tested this question, despite the persistent need for information. Inferring causation from treatment effects requires an experiment.

Experimental standards[mdash]randomization, replication, and controls[mdash]are not routinely incorporated into project planning, nor are the funding and time needed to examine population responses.

Bollenbacher and Hahn, 2008 make further points:

[middot] 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).

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

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

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

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

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

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

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

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

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

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

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

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

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

[middot] Hollow trees larger than 20 inches (51 cm) in diameter at breast height (dbh) are the most valuable for denning, shelter, roosting, and hunting by a wide range of animals. Hollow chambers are used as dens by black bears, as night roosts by woodpeckers, and as dens,

shelter, roosts, and hunting sites by a variety of animals, including flying squirrels, wood rats, bats, American marten, northern flickers and Vaux[rsquo]s swift.

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

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

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

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

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

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

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

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

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

[middot]	The role of down wood in salmon habitat has received much attention over the past two decades. Large wood is a key component of salmonid habitat both as a structural element and as cover and refugia from high flows. Large wood serves key functions in channel morphology, as well as sediment and water routing. The importance of wood to salmon habitat varies from headwater to stream mouth. As stream order increases and gradient decreases in third- to fifth-order streams, down wood is a dominant channel-forming feature. Larger wood deflects water and increases hydraulic diversity, producing a range of pool conditions that serve as habitats

for juvenile salmonids in summer. Diverse channel margins are a primary aspect of rearing habitat. Flow obstructions created by large wood provide foraging areas for young salmonid fry that are not yet able to swim in fast currents, and provide refugia to juvenile salmonids at high flow. In higher order streams, flow deflections created by large wood trap sediments and nutrients, and enhance the quality of gravels for spawning. Down wood is less of a channel-forming feature along large rivers, but defines meander cutoffs and provides cover and increased invertebrate productivity for juvenile salmonids.

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

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

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

[middot] The slow rate of nutrient release from decomposing wood may serve to synchronize nutrient release with nutritional demands in forests, and also to minimize nutrient losses via leaching to the ground water. In addition to nitrogen bound chemically within wood, down wood reduces nutrient losses from ecosystems by intercepting nutrients in litterfall

and throughfall. Favorable temperature and moisture conditions also makes large decaying wood sites of significant nitrogen inputs via N-fixation.

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

[middot] Moisture Retention. Water stored in large decomposing wood accelerates microbial decay rates by stabilizing temperature and preventing desiccation during the summer.11, 160, 376 Moist conditions within the wood favor decay by attracting burrowing and tunneling mammals and invertebrates that improve aeration of wood, and by providing colonization substrate and moisture for mycorrhizae and other fungi. Moist .nurse logs. also provide excellent sites for seedling establishment and production of sporocarps. These processes increase retention and cycling of nutrients within ecosystems and contribute to higher biodiversity and biomass production.

[middot] Mycorrhizae. Mycorrhiza, meaning fungus-root, is a symbiotic association of fungi with plant roots. The fungus improves nutrient and water availability to the host in exchange for energy derived from plant sugars. Mycorrhizae are necessary for the survival of numerous tree families, including pine, hemlock, spruce, true fir, Douglas-fir, larch, oak, and alder. Mycorrhizal associations are a source of nutrients to promote wood decay. By the time a log reaches more advanced stages of decomposition (Class 3) fungal colonization leads to the accumulation of nutrients in hyphae, rhizomorphs and sporocarps, especially for ectomycorrhizal fungi, where

>90% of the fungal activity is associated with organic material. Ectomycorrhizal fungi decrease the ratio of carbon to nitrogen in decomposing wood, and mediate nutrient availability to plants while improving nutrient retention by forest ecosystems.

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

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

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

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

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

[middot] Insects and pathogens play a key role in maintaining diverse and productive forests by creating habitat and stimulating nutrient cycling

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

[middot] These silvicultural practices clearly altered the abundance and recruitment of large down wood and snags in managed forests of the Pacific Northwest, including:

1. Lower abundance of large diameter snags and down wood legacies in managed forests (and streams); e.g. lack of the U-shaped pattern; higher accumulation of smaller-diameter fuels in eastside forests.

2. Reduced recruitment and retention of large trees to provide future legacies.

3. Shorter mean residence time for down wood (i.e. faster decomposition as a function of reduced log diameter).

4. Altered species composition of forests (westside: more Douglas-fir, less western red cedar; eastside: less pine, more true fir species).

[middot] Several major lessons have been learned in the period 1979-1999 that have tested critical assumptions of these earlier management advisory models:

[middot] Calculations of numbers of snags required by woodpeckers based on assessing their biological potential. (that is, summing numbers of snags used per pair, accounting for unused snags, and extrapolating snag numbers based on population density) is a flawed technique. Empirical studies are suggesting that snag numbers in areas used and selected by some wildlife species are far higher than those calculated by this technique.

[middot] Setting a goal of 40% of habitat capability for primary excavators, mainly woodpeckers, is likely to be insufficient for maintaining viable populations.

[middot] Numbers and sizes (dbh) of snags used and selected by secondary cavity-nesters often exceed those of primary cavity excavators.

[middot] Clumping of snags and down wood may be a natural pattern, and clumps may be selected by some species, so that providing only even distributions may be insufficient to meet all species needs.

[middot] Other forms of decaying wood, including hollow trees, natural tree cavities, peeling bark, and dead parts of live trees, as well as fungi and mistletoe associated with wood decay, all provide resources for wildlife, and should be considered along with snags and down wood in management guidelines.

[middot] The ecological roles played by wildlife associated with decaying wood extend well beyond those structures per se, and can be significant factors influencing community diversity and ecosystem processes.

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

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

[middot] Effective management of decaying wood must do more than simply provide for inputs of dead trees. Rather, management should strive to provide for diversity of tree species and size classes, in various stages of

decay and in different locations and orientations within the stand and landscape.

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

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

[middot] Management for certain species must consider habitat requirements at different spatial and temporal scales. It may then be possible to modify silvicultural practices at the stand scale to meet multiple objectives at landscape and larger scales. The landscape perspective also is pertinent to managing riparian systems, where the role of wood decay

in riparian environments varies according to the type and geography of the associated water body.

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

ACCESS AND TRAVEL MANAGEMENT

Within these comments we incorporate FOC[rsquo]S written contributions during the NEPA and appeal processes concerning the Clearwater National Forest Travel Plan. We also incorporate FOC[rsquo]s August 27, 2014 letter to the Forest Supervisor concerning the Nez Perce-Clearwater National Forests[rsquo] travel analysis (36 CFR [sect] 212 Subpart A). And we incorporate our comments on the Draft Revised Forest Plan, concerning roads, found on pp. 301-323.

FOC staff visited the Dead Laundry project area on September 17 & 18, 2020 mainly to survey the condition of roads the FS had identified as needing to be reconstructed for use during the timber sale. The Project Proposal (PP) and associated maps were used, along with the Motor Vehicle Use Map (MVUM), the Clearwater National Forest map, and also 7.5 minute quad topographic maps.

What was discovered on the survey was that roads specified in the PP for reconstruction as part of the timber sale were in widely varying conditions. This ranged from roads easily walked and showing signs of recent motorized vehicle use, to roads seemingly no longer existing. Appendix A to these comments is more detailed information. Some of the proposed [ldquo]reconstructed[rdquo] roads to be used during the timber sale are indistinguishable from undisturbed forest. Others have been previously decommissioned to a large extent that they would need major construction work to be utilized. For both these categories it is obvious that a lot of taxpayer dollars would be spent getting them to haul route condition. The EA lacks any genuine analysis of the economic costs and benefits of such actions, which also prevents the public from understanding the environmental tradeoffs. The EA presents no discussion as to why the previously decommissioned (or in some cases perhaps administratively [ldquo]stored[rdquo]) roads were put in that condition as the last active management dealing with them. In other words, it does not explain what values, previously committed to, would be compromised by reconstruction.

Our survey of [ldquo]reconstruction[rdquo] roads, as documented in Appendix A to these comments, was far from comprehensive but it still reveals that the EA and Transportation Report likely grossly understate the degree of stream/RHCA crossings to be newly constructed, because where roads were previously [ldquo]stored[rdquo] or decommissioned, the [ldquo]reconstruction[rdquo] actually involves installing culverts and fill in the previously reclaimed areas.

In a report prepared for the Environmental Protection Agency, Endicott, 2008 notes the [ldquo]physical impacts of forest roads on streams, rivers, downstream water bodies and watershed integrity can

be dramatic and have been well documented.[rdquo] According to Endicott, 2008, [ldquo]forestry-related sediment is a leading source of water quality impairment to rivers and streams nationwide.[rdquo] Remarkably, EPA indicates that [ldquo]up to 90% of the total sediment production from forestry operations[rdquo] comes from logging roads and steam crossings.10 A significant portion of this sediment is collected and discharged directly into rivers and streams through ditches, channels, and culverts. (Endicott, 2008.)

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

Endicott, 2008 states:

There is no question that stormwater pollution from industrial logging roads and forest roads is harming and has the potential to harm beneficial uses, including spawning and rearing habitat for salmon and steelhead and drinking water supplies. Important ecological, economic, and social consequences stem from the sediment discharged from ditches, channels, and culverts along forest roads. Ecologically, fine and coarse-grained sediment loading degrades water quality and detrimentally affects fish and other aquatic species[rsquo] habitat. (Endicott, 2008.) Sedimentation affects streams by reducing pool depth, altering substrate composition, reducing interstitial space, and causing braiding of channels (Rieman and McIntyre 1993), which reduce carrying capacity. The effects of road construction and associated maintenance account for a majority of sediment loads to streams in forested areas;

Sedimentation negatively affects bull trout embryo survival and juvenile bull trout rearing densities. (Shepard et al. 1984 at 6; Pratt 1992 at 6.) An assessment of the interior Columbia Basin ecosystem revealed that increasing road densities were associated with declines in four nonanadromous salmonid species (bull trout, Yellowstone cutthroat trout (Oncorhyncus clarkii bouvieri), westslope cutthroat trout (O. c. lewisi), and redband trout (O. mykiss spp.)) within the Columbia River basin, likely through a variety of factors associated with roads. Bull trout were less likely to use highly roaded basins for spawning and rearing and, if present in such areas, were likely to be at lower population levels. (Quigley and Arbelbide 1997 at 1183.) These activities can directly and immediately threaten the integrity of the essential physical or biological features necessary for bull trout survival.

Endicott, 2008 concluded:

The physical impacts of roads have detrimental effects on fish and fish habitat. Mechanisms through which roads exert these deleterious impacts include fine sediment effects, changes in streamflow, changes in water temperature caused by loss of riparian cover or conversion of groundwater to surface water, and migration barriers. The physical

10Guidance Specifying Management Measures For Sources of Nonpoint Pollution in Coastal Waters,

EPA Guidance Paper 840-B-93-001c, at 27 (1993); see also Endicott 2008 at p. 9.

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

impacts of roads discussed above have widespread and profound effect on fish habitat and fish communities in populations across a wide range of environments and conditions (Lee at al., 1997).

The Dead Laundry EA does not demonstrate the FS is managing the project area and forest consistent with the Travel Management Regulations (36 CFR 212) Subpart A which requires the FS to involve the public while conducting a science-based analysis to identify the minimum road system needed to manage the Forest ecologically sustainably and within expected budgets.

Table 6 of EA outlines the proposal for roads:

The EA also states, [ldquo]25 miles of the total temporary road construction would be on existing road templates from legacy transportation routes.[rdquo] The EA does not disclose other [ldquo]existing road templates[rdquo] or other [ldquo]legacy transportation routes[rdquo] existing in the project area that will NOT be used as timber haul routes, and will therefore be left in, vaguely, [ldquo]template[rdquo] conditions which to us means a potential chronic source of sediment and/or mass wasting. The Transportation Systems Report says its intent [ldquo]is to present the methodology and the unit of analysis used to establish roads to accommodate proposed treatment activities and its environmental effects and consequences.[rdquo] It admits, [ldquo]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.[rdquo] The EA and Report do not analyze and disclose ongoing ecological impacts or economic implications of the legacy templates that will remain in their existing condition. In fact in a 9/8/2020 email to FOC, the ID Team leader stated, [ldquo]there is no map of non-system roads in the project area. It is also accurate that our roads map and forthcoming draft EA will only identify roads that we are proposing to conduct work on or use for the project.[rdquo]

How does the FS even apply its models to estimate impacts of these non-system roads[mdash]if the FS does not even acknowledge they exist? The answer is[mdash]they don[rsquo]t. If the FS were to glance at the 1994 Osier Ridge and Moose Mountain quadrangle 7.5 minute topographic maps they would begin to understand some cumulative impacts implications of the many[mdash]perhaps hundreds of miles[mdash]of old roads that may still cause persistent impacts on the landscape in the Dead Laundry project area, which project modeling ignores.

The best the FS can do for analyzing the cumulative effects is this from the Transportation Systems Report: [ldquo]The cumulative effect of no action would result in a transportation system that would remain static. The backlog of deferred road maintenance would not be performed as the current funding on the forest is not sufficient to address needs.[rdquo] In other words, no cumulative effects analysis at all.

The Transportation Systems Report discloses that 82.29 miles of road in the analysis area get no treatment in conjunction with this timber sale. Nothing anywhere analyzes the ongoing and foreseeable impacts of the continuing erosion and degradation. Their present condition is not discussed, analyzed, or disclosed anywhere.

The Transportation Systems Report states, [ldquo]Road [hellip]reconstruction activities may include culvert replacements, spot rock replacements, brushing, and reshaping drainage dips.[rdquo] As our Appendix A indicates, this vastly understates the amount of work needed for many roads proposed for [ldquo]reconstruction.[rdquo] Performing major culvert installation including moving tons of fill is required in places. We are left wondering if the Transportation Systems Report author has actually visited many of these [ldquo]reconstruction[rdquo] roads.

That report also states, [ldquo](T)hose roads that are causing unacceptable environmental problems or have deferred maintenance needs will be carefully reviewed to assess when and how they can be brought up to the standard required for safe operation of the intended vehicles.[rdquo] If that is true, the results of this [ldquo]careful review[rdquo] don[rsquo]t appear anywhere we see. If this is to inform future decisions[mdash]what and when might they be?

The Transportation Systems 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.

Yet it is clear the FS is not up to the challenge. After all the timber sale activities are finished, and the [ldquo]treated[rdquo] roads resume their degradation, nothing really will have changed. Budgets still will be vastly insufficient to deal with all the problems. As the Report states, [ldquo]Deferred maintenance is continually accruing, especially due to the reduced capacity to perform annual maintenance on Level 2 & 3 roads. Long intervals between project associated maintenance, has exacerbated the maintenance backlog.[rdquo] And the FS clearly doesn[rsquo]t care.

Lacking a proper travel analysis, there is no way for the public to expect the post-project road and trail network would be affordable and maintenance needs could be addressed by expected budgets[mdash]or if the erosive forces of nature will be the main manager of the transportation network instead.

The FS has performed no economic analysis that identifies sources of funds needed to maintain the road system.

When the project mitigation stops in a year or two, the trajectory for fish habitat conditions will be downward. Beschta et al., 2004 state:

(R)oad and landing construction is expensive and can siphon limited funds away from effective restoration measures, such as obliteration and maintenance. The backlog in maintenance of U.S Forest Service roads has been estimated to be several billion dollars (U.S. Department of Agriculture Forest Service 2000), and road construction inevitably adds to this seemingly insurmountable backlog. For these reasons, the construction and reconstruction of roads and landings is not consistent with postfire ecosystem restoration. (Emphasis added.)

Johnson (1995) states, [ldquo]For the roads we no longer actively use, our dwindling road maintenance budget will make it difficult to maintain the culvert crossings. When these fail during storm and runoff events, tremendous amounts of sediment can be delivered directly to the channel and from there down to lower streams with significant beneficial uses such as sensitive fish habitat.[rdquo] The FS fails to analyze the significance of this foreseeable lack of maintenance in the project area[mdash] the direct, indirect and cumulative effects poorly maintained roads have on water quality.

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

We have continually raised the issue with temporary roads in that they aren[rsquo]t temporary. Beschta et al., 2004 explain that, whatever [ldquo]temporary[rdquo] means in this project[rsquo]s context, the newly disturbed sites have most of the hydrological and soil impacts of new road construction over the short- and long-term:

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

Reid & Dunne, 1984 state:

Runoff rates and sediment concentrations from 10 road segments subject to a variety of traffic levels were monitored to produce sediment rating curves and unit hydrographs for different use levels and types of surfaces. These relationships are combined with a continuous rainfall record to calculate mean annual sediment yields from road segments of each use level. A heavily used road segment in the field area contributes 130 times as much

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

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

The EA does not incorporate the science-based transportation analysis required under 36 CFR [sect] 212 Subpart A, and so there was no assessment that identified the unneeded roads. The EA also fails to discuss how the CNF[rsquo]s Travel Plan is being implemented here.

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

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

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

The EA does not incorporate the required science-based transportation analysis, and so there was no assessment that identifies all of the unneeded roads. Table 5 (Travel Analysis Process Summary Table) of the Transportation Systems Report does list several roads as [ldquo]Likely not needed.[rdquo] And it goes unexplained why the FS is not proposing to minimize later costs and environmental degradation by actually decommissioning those roads.

Our comments on the Draft Revised Forest Plan state:

[hellip]the Nez-Clear National Forest has yet to identify, let alone achieve, a MRS that complies with Subpart A requirements. It is unclear if the Forest Service recognizes this fact, as it asserts, [ldquo][i]n 2015, a forest-level roads analysis was completed for the Nez Perce-

Clearwater. This analysis established a minimum road system for arterial, collector, and important local class National Forest roads on the Nez Perce-Clearwater.[rdquo]12 Only NEPA- level decisions can identify the minimum road system, as the analysis may have acknowledged when it explained agency officials utilize the report as it works to identify the MRS.13[hellip]Further, we question the utility of the 2015 Travel Analysis Report as it recommended only 14 miles of road as [ldquo]unneeded.[rdquo]14 The Nez-Clear National Forest contains 7,682 miles of NFS road, and 14 miles represents just 0.18 percent of the total road system. It is beyond likely such a reduction could ever represent long-term funding expectations as required by Subpart A, or that such a small reduction would result in a road system that provides for the protection of NFS lands. A fact the Forest Service seems to recognize since it has decommissioned over 200 miles of road between 2015-2018.15As such, the Forest Service cannot rely on its 2015 TAR to adequately inform recommendations that will satisfy Subpart A requirements.

The NPCNF[rsquo]s identification of a paltry 14 miles of road as [ldquo]unneeded[rdquo] stands in stark contrast to the red/green map FOC obtained under FOIA concerning just the Nez Perce portion of the NPCNF, from the year 2000.

Forestwide, roads are not being maintained as needed. In the CNF[rsquo]s January 7, 2003 Roads Analysis Report it states:

Key Findings: Road maintenance funding is not adequate to maintain and sign roads to standard.
This road analysis clearly shows that annual appropriated maintenance funding is inadequate to maintain the current road system on the Forest. Many roads will continue to build up additional deferred maintenance costs and degrade unless increases in road management funding become available.

Also, [ldquo]Road maintenance funding is not adequate to maintain and sign roads to standard.

[hellip]Congressionally appropriated road maintenance funding is approximately 22% of what is needed for the current classified road system.[rdquo] (Id.)

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

12 Draft Revised Forest Plan DEIS, p. 3.4.4-7.

13 Id., (stating, [ldquo]The travel analysis report is used by the Nez Perce-Clearwater to prioritize maintenance needs and identify opportunities to decommission roads or put them into intermittent stored service as the Nez Perce-Clearwater works to identify the minimum number of routes needed for an efficient transportation system, as directed in 36 CFR [sect] 212 subpart A.[rdquo]).

14Id.

15 Id., p. 3.4.4-10, Table 1. (That DEIS states incorrectly that Table 2 provides decommissioning numbers

for the Nez Perce National Forest, but the table[rsquo]s title states [ldquo]Miles of roads constructed from 1999 to 2018 on the Nez Perce National Forest.[rdquo]).

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

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

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

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

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

Also please see Friends of the Clearwater's August 27, 2014 Travel Analysis letter to the Forest Supervisor.

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

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

[bull]  A TAP must analyze all roads (maintenance levels 1 through 5);

[bull]  The Travel Analysis Report must include a map displaying roads that will inform the Minimum Road System pursuant to 36 C.F.R. [sect] 212.5(b), and an explanation of the underlying analysis;

[bull]  The TAP and Watershed Condition Framework process should inform one another so that they can be integrated and updated with new information or where conditions change.

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

[bull]  Produce a Travel Analysis Report summarizing the travel analysis;

[bull]  Produce a list of roads likely not needed for future use; and

[bull]  Synthesize the results in a map displaying roads that are likely needed and likely not needed in the future that conforms to the provided template.

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

The Travel Management Regulations at 36 CFR [sect] 212.5 state:

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

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

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

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

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

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

Roads have well-documented, significant and widespread ecological impacts across multiple scales, often far beyond the area of the road [ldquo]footprint[rdquo]. Such impacts often create large and extensive departures from the natural conditions to which organisms are adapted, which increase with the extent and/or density of the road network. Road density is a useful metric or indicator of human impact at all scales broader than a single local site because it integrates impacts of human disturbance from activities that are associated with roads and their use (e.g., timber harvest, mining, human wildfire ignitions, invasive species introduction and spread, etc.) with direct road impacts. Multiple, convergent lines of empirical evidence summarized herein support two robust conclusions: 1) no truly [ldquo]safe[rdquo] threshold road density exists, but rather negative impacts begin to accrue and be expressed with incursion of the very first road segment; and 2) highly significant impacts (e.g., threat of extirpation of sensitive species) are already apparent at road densities on the order of 0.6 km per square km (1 mile per square mile) or less. Therefore, restoration strategies prioritized to reduce road densities in areas of high aquatic resource value from low-to-moderately-low levels to zero-to-low densities (e.g., <1 mile per square mile, lower if attainable) are likely to be most efficient and effective in terms of both economic cost and ecological benefit. By strong inference from these empirical studies of systems and species sensitive to humans[rsquo] environmental impact, with limited exceptions, investments that only reduce high road density to moderate road density are unlikely to produce any but small incremental improvements in abundance, and will not result in robust populations of sensitive species.

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

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

relation to management of livestock, timber, recreation, hunting, trapping, mineral development, and other human activities. (Emphases added.)

Frissell, 2014 states:

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

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

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

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

Continual monitoring and maintenance on open roads reduces risks of sediment delivery to important water resources.

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

The FS relies heavily upon BMPs to address the issues associated with logging roads, but only implemented within the context of a project such as this one. Comprehensive monitoring of the effectiveness of logging road BMPs in achieving water quality standards does not demonstrate

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

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

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

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

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

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

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

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

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

When considering how effective BMPs are at controlling non-point pollution on roads, both the rate of implementation of the practice, and the effectiveness of the practice should both be considered. The FS tracks the rate of implementation and the relative effectiveness of BMPs from in-house audits. This information is summarized in the National BMP Monitoring Summary Report with the most recent data being the fiscal years 2013-2014 (Carlson et al.

2015). The rating categories for implementation are [ldquo]fully implemented,[rdquo] [ldquo]mostly implemented,[rdquo] [ldquo]marginally implemented,[rdquo] [ldquo]not implemented,[rdquo] and [ldquo]no BMPs.[rdquo] [ldquo]No BMPs[rdquo] represents a failure to consider BMPs in the planning process. More than a hundred evaluation on roads were conducted in FY2014. Of these evaluations, only about one third of the road BMPs were found to be [ldquo]fully implemented[rdquo] (Id., p. 12).

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

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

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

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

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

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

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

When designating off-road vehicle trails and areas, federal agencies are required to minimize damage to forest resources, disruption of wildlife, and user conflicts. Exec. Order No. 11,644 [sect] 3(a), 37 Fed. Reg. 2877 (Feb. 8, 1972), as amended by Exec. Order No. 11,989, 42 Fed. Reg. 26,959 (May 24, 1977). The FS must locate designated trails and areas in order to minimize the following criteria: (1) damage to soil, watershed, vegetation, and other public lands resources;

(2) harassment of wildlife or significant disruption of wildlife habitat; and (3) conflicts between off-road vehicle use and other existing or proposed recreational uses. 36 C.F.R. [sect] 212.55(b)(1)- (3).

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

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

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

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

US Fish and Wildlife Service, 1998 indicates that bull trout are absent when road densities exceed 1.71 mi./mi2., depressed when the road density = 1.36 mi/mi2 and strong when road density equals or is less than .45 mi/mi2. (P. 67.)

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

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

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

2. What is broke or at risk?

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

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

More than 50 percent of the Nez Perce National Forest roads were built between 1960 and 1979. Road standards used during construction of these roads employed current BMPs.

The life span of BMPs range anywhere from 10 to 50 years with repeated maintenance, so it is likely that many BMPs installed during original construction are at the end of their life span. BMPs productivity and life spans are reduced if maintenance has not occurred.

Roads with BMPs near or at the end of their life span have a higher risk of failure.

4. How do you fix it?

Analyze all the system and non-system roads in the area and determine a minimum road system required based on needs and risks. Maintain roads needed for public and administrative use. Prioritize the repair of the needed roads based on risk and needs.

Update all needed roads to ensure existing standards are met. Updates may include reconstruction, relocation or maintenance of roadways so they are in a stable condition. During the updates, use BMPs for minimal impact on the watershed.

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

9. What are the social / resource implications of no actions?

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

10. What are some of the foundational elements used in shaping your responses? Nez Perce National Forest Plan

Selway Middle Fork Subbasin Assessment
CFR 36, Part 212, Travel Management Rule - Subpart A
Interior Columbia Basin Assessment

(Emphasis added.) From 111017WildlifeClearCreekNFMAComments.docx:

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

From 110606NFMAQuestionsKaren.docx: What[rsquo]s broke / at risk

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

The EA fails to demonstrate compliance with all relevant forest plan standards, in violation of the Forest Plan and NFMA. The EA violates the Travel Management Regulations at 36 CFR [sect]

212. It also violates NEPA by failing to use the best available science, and by failing to disclose project inconsistency with the Travel

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

EA FAILS TO DISCLOSE EXISTING CONDITIONS

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

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

It is impossible to judge any potential cumulative impacts of this project if there isn[rsquo]t an understanding of the present conditions, and to omit present conditions to the public frustrates the public[rsquo]s right to high-quality information under NEPA and any meaningful review.

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

ROCKY MOUNTAIN ELK

We incorporate our discussion on elk from our comments on the draft RFP and its DEIS (pp. 219-227).

The Wildlife Report states, [ldquo]Suitable habitat present in project area. Potential for individual and habitat disturbance with project activities. [hellip][rdquo]

The Report states, [ldquo]Elk summer habitat was analyzed using the Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho (Leege 1984) as updated by Servheen et al. 1997.[rdquo]

The Wildlife Report basically cops out from conducting analysis of impacts during the years of the timber sale: [ldquo]Conducting EHE analysis during project activities is not required within the guidelines from Servheen et al. (1997) since it would be impossible to accurately determine EHE during implementation due to the complexities associated with the timing of potentially multiple sale contracts and different operators, and potential contract extensions. Temporary roads were not included in the calculations.[rdquo] What this basically means, considering other management actions, the EHE is essentially meaningless.

The Wildlife Report states:

Forest Plan 40-acre size limit is planned to be exceeded on up to 23 proposed harvest units. Some units are adjacent to each other, creating larger opens with limited cover vegetation between. [hellip]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.[rdquo]

This is a highly subjective, arbitrary conclusion.

The Wildlife Report says elk foraging habitat is limited because the habitat is heavily forested. It fails to include a sufficient cumulative effects analysis of its fire suppression policies however.

The FS does not analyze or disclose cumulative effects on elk habitat from nearby management activities.

FISHER

We incorporate our discussion on the fisher from our comments on the draft RFP and its DEIS (pp. 227-236).

The FS is not taking a hard look at impacts to fisher, nor disclosing the current status of this species. As a result, there is potential for significant impacts, so the FS must conduct an environmental impact statement, regardless of the Region 1 memo (USDA Forest Service, 2019b).

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

The CNF[rsquo]s Lolo Insects and Disease FEIS discloses that [ldquo]Fishers have a [hellip]state rank of S1 (critically imperiled) (Nature Serve 2017).[rdquo] Fisher populations in the Clearwater are genetically unique (see Schwartz 2007). As such, they take on even more importance from a conservation perspective.

Research heavily associates fishers with older forests throughout the year. (Aubry et al. 2013, Olsen et al. 2014, Raley et al. 2012, Sauder 2014, Sauder and Rachlow 2014, Wier and Corbould 2010). Fine spatial scales of habitat that fisher need is well-studied. Fishers need dense overhead cover, abundant coarse woody debris, and large trees. (Aubry et al. 2013, Sauder and Rachlow 2014). The FS recognizes that [ldquo][f]ishers are associated with areas of high cover and structural complexity in large tracts of mature and old-growth forests.[rdquo] Revised Forest Plan DEIS Ch. 1 p. 15; see also DEIS 3.2.3.2-83. Female fishers use cavities in large-diameter live trees and snags because tree cavities regulate temperatures and protect kits from predators; [ldquo][H]eartwood decay and cavity development is more important to fishers for denning than is the tree species.[rdquo] Raley et al. 2012. Research has found that females more often use dens in live trees with decay. Live trees have more regulated thermal properties and stable microclimates, so the temperature fluctuates less and kits are protected from weather extremes. Fishers rest primarily in deformed or deteriorating live trees. Raley et al. 2012.

Forest patterns are divided into forest composition and forest configuration, and fishers need both. Forest composition is a patch area or proportion of landscape specific to a habitat type. Habitat loss is mostly a change in forest composition. Forest configuration, on the other hand, is spatial and accounts for how patches are arranged across the landscape, like average patch shape,

distances between patches of the same type, and the cluster of patches across the landscape. Sauder and Rachlow 2014.

Forest configuration figures just as much into the type of habitat that fisher need, specifically the proximity of mature forest patches. Sauder and Rachlow 2014 found that fishers in the Clearwater used landscapes with large patches of mature forest arranged in connected patterns. The proximity among mature forest patches was a stronger predictor of fisher use than the mere abundance of mature forest. Sauder and Rachlow 2014.

Most studies have found that fishers are reluctant to stray from forest cover and that they prefer more mesic forests (Olson et al. 2014, Sauder 2014, Sauder and Rachlow 2014, Weir and Corbould 2010). Both Sauder and Rachlow (2014) and Weir and Corbould (2010) predicted the influence of openings on fisher habitat occupancy based on their data. For example, Weir and Corbould predicted that a 5% increase in forest openings would decrease the likelihood of fisher occupancy by 50%. Sauder and Rachlow (2014) suggested that an [ldquo]increase of open area from 5% to 10% reduces the probability of occupation by fishers by 39%. Sauder and Rachlow (2014) reported that the median amount of open area within fisher home ranges was 5.4%. This was consistent with [ldquo]results from California where fisher home ranges, on average, contained <5.0% open areas[rdquo] (Raley et al. 2012). [ldquo][R]relatively small changes in the amount of open area in a landscape can have large effects on the probability of occupation by fishers.[rdquo] Sauder and Rachlow 2014. Indeed, Weir and Corbould (2010) states that the abundance of open areas within a landscape was the most important variable in predicting landscape occupancy by fishers. See also Sauder and Rachlow 2014.

The NPCNF[rsquo]s Lolo Insects and Disease FEIS states, [ldquo]Availability of large diameter logs (greater than 21 inches dbh) appeared to be particularly important in winter habitat selection.[rdquo] (Emphasis added.) How that particularly important habitat feature was modeled or used in any estimate(s) of fisher habitat availability in the Dead Laundry project area is impossible to determine.

Jones and Garton, 1994 noted [ldquo]Fishers seemed to prefer large-diameter Engelmann spruce trees and hollow grand fir logs as resting sites in north-central Idaho (Jones 1991).[rdquo] (Emphasis added.) Yet the Dead Laundry EA indicates the FS believes grand fir is an undesirable species in the project area.

The whole point of tree farming is to minimize the loss of commercial value. Unfortunately that[rsquo]s the premise of the EA purpose and need[mdash]to prevent dead trees and down logs from happening. Yet there[rsquo]s no cumulative effects analysis that discloses what such actions across the Forest will mean for fisher.

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

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

Also Jones, (undated) recognizes the following:

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

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

Heinemeyer and Jones, 1994 stated,

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

The FS provides little nothing the way of analysis of fisher cumulative habitat impacts. In Washington, Hayes and Lewis, 2006 noted, [ldquo]Trapping reduced populations quickly. Despite decades of protection from harvest, fisher populations never recovered in Washington. [hellip]The fisher was listed as endangered in Washington in 1998 by the Washington Fish and Wildlife Commission and is now considered likely extirpated from the state.[rdquo]

Sauder (2014) suggests that five National Forests (Clearwater, Nez Perce, Coeur d[rsquo]Alene, Kaniksu, and Kootenai) hold the key to recovery of the species in the Northern Region. As with most of the Sensitive wildlife, fishers receive little habitat protection emphasis in current forest plans. Both the Clearwater and the Nez Perce Forest Plans list fisher as an old-growth-dependent species. The old-growth standards for both of these forests are five percent old-growth per drainage and ten percent old-growth forestwide. As discussed in the old-growth section, there is likely significant uncertainty on the real abundance of old growth and whether these areas are connected.

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

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

common where the density of humans is low and human disturbance is reduced. Although perhaps not as associated with "wilderness" as the wolverine (V. Banci, Chapter 5), the fisher is usually characterized as a species that avoids humans (Douglas and Strickland 1987; Powell 1993).

When compared to the above description of the habitat in which fishers thrive, one can see the FS[rsquo]s description of how to increase the health of tree stands for logging is not compatible with science that recognizes tree death as a natural process and the process that leads to the kind of habitat relied upon by species that need older, unlogged forests.

We are concerned that the FS does not have a pulse on the existing condition of the fisher in this area or anywhere on the forest, making any finding that there would be no significant impact unsupported. The EA fails to address fisher entirely, and according to a forest-plan-revision map, regeneration logging overlaps with fisher habitat that appears to be a habitat corridor. See USDA, Forest Service 2019a. Isolating habitat by fragmenting it negatively impacts species. See Laurance 2008. Pulsford et al. 2015 describes the importance of habitat connectivity.

The Wildlife Report discusses some long-term direct adverse impacts to this sensitive species for the habitat impacted. Yet, the EA doesn[rsquo]t acknowledge this potential impact or provide convincing reasons as to why this timber sale, by degrading habitat connectivity, wouldn[rsquo]t have significant impacts on the fisher. For these reasons the EA is insufficient and doesn[rsquo]t take a hard look at the impacts of logging and the cumulative effects from other nearby projects.

The fisher is a sensitive species in Region 1 and the threats to this species have increased, if anything. The best available information[mdash]the existing information[mdash]we have for this species suggests it may very well be in trouble. The most recent information that we could find the FS producing are the relatively low numbers in a Nez Perce 2002 monitoring report[mdash]the Forest Service chose not to monitor fisher on the Clearwater even though this forest has fisher habitat.

There have been cumulative impacts from trapping over the past twenty years, and this doesn[rsquo]t seem to have figured into the Forest Service[rsquo]s assessment of impacts on fisher. Trapping is allowed on the Nez Perce-Clearwater National Forest. IDFG has reported that, since 2012, traps set for wolves have caught 56 fisher, 20 of whom died in the traps. See IDFG Non-target wolf trapping LICYEAR2013-2019 spreadsheet in [ldquo]IDFG pub rec to WWP.[rdquo] The past eight years of wolf trapping has resulted in some concerning impacts to fisher. For example, in the 2013-2014 season, IDFG reported that 22 fisher were trapped that season, 10 of whom died in traps. While the trappers reporting these numbers indicated the balance were released, we don[rsquo]t know if trapping contributed to mortality shortly thereafter. Also, these are just the numbers reported, so we don[rsquo]t know if there were more unreported, either because trappers chose not to or did not check their traps. While we don[rsquo]t know where this trapping occurred, the FS has recognized that the Nez Perce-Clearwater contains a lot of fisher habitat, so it follows that at least some of these numbers were likely from this forest. Also, it is very reasonably foreseeable that trapping is going to increase for several reasons. The first reason is that IDFG extended its wolf trapping season, so active traps will exist longer on the landscape, and these season modifications impact parts of both the Nez Perce and Clearwater National Forests. See IDFG 2020a, compare with IDFG 2020b (hunting units map). The second reason is that trapping depends on access. This

project proposes fifteen miles of temporary roads and additional permanent roads, which will create more access for trappers. Finally, as stated above, Heinemeyer and Jones 1994 stated that even light pressure can cause local extinction, which is a significant impact.

Habitat loss has cumulatively impacted the fisher as well. The FS has increased logging on the Nez Perce and Clearwater National Forests, some of the highest amounts of timber sold over the last 20 years occurring in the last four of five. Below we used the cut and sold reports from Region 1 for the Nez Perce and Clearwater National Forests to track the logging trend in million board feet:

We couldn[rsquo]t find any information about how the modeled suitable habitat accounts for what the FS has logged. What has the FS done to validate this habitat model?

There is no cumulative effects analysis that considers the impacts of other management actions with the impacts from the Dead Laundry timber sale as it pertains to fisher, both in terms of number of acres of habitat altered or how the spatial aspect of altered habitat exacerbates habitat fragmentation. E.g., the East Saddle timber sale, which would clearcut 377 acres not far south of the Dead Laundry project area (Decision Memo signed May 7, 2020).

[ldquo][S]pecies at the brink have been pushed to a critical conservation status because of human activities[hellip][rdquo] Ceballos et al. 2020. Habitat fragmentation is among these reasons, including simplifying the complex structure of old growth. Trapping is another reason. The FS must account the actual population of fisher or validate some confident modeling, and there seems to be none of that.

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

CANADA LYNX

The EA states, [ldquo]Lies within (3) Lynx Analysis Units and contains some modeled suitable habitat present. No reported observations in project, but 7 within 10 miles with last verified in 1994. No IDFG survey findings of (sic). No Linkage Area.[rdquo]

The Wildlife Report says [ldquo]Seven observation of lynx have occurred within ten miles of the project since 1965, including a 1983 report of a shot lynx and a 1991 report of 3 kittens on the road. The last verified lynx observation was in 1994. IDFG 2013-2015 hair-snare and photo surveys did not record any lynx.[rdquo]

The Wildlife Report analysis for impacts on lynx consists almost entirely upon describing consistency with some of the NRLMD direction. There is no indication as to how well the NRLMD is performing in maintaining viability. The EA also fails to analyze and disclose habitat connectivity and linkages, and to quantify cumulative impacts from other activities on lynx habitat.

The Wildlife Report states, [ldquo]The Forest is regarded as secondary occupied habitat and includes no lynx Designated Critical Habitat.[rdquo] [ldquo]Secondary[rdquo] habitat was automatically omitted from Critical Habitat under the Endangered Species Act (ESA), which in turn means the FS avoids analysis of impacts to critical habitat [ldquo]primary constituent elements[rdquo] which, according to the FS[rsquo]s Betty Baptiste Environmental Assessment, Flathead National Forest (2018) are:

By definition [hellip]the physical and biological features essential to conservation of the lynx,

[hellip]in an appropriate quantity and spatial arrangement (USDI 2008). Based on the current knowledge of the life history, biology, and ecology of the lynx, the PCE and its four components for lynx Critical Habitat are:

1. Boreal forest landscapes supporting a mosaic of differing successional forest stages and containing:

a) Presence of snowshoe hares and their preferred habitat conditions, which include dense understories of young trees, shrubs or overhanging boughs that protrude above the snow, and mature multistoried stands with conifer boughs touching the snow surface (PCE 1a);

b) Winter snow conditions that are generally deep and fluffy for extended periods of time (PCE 1b);

c) Sites for denning that have abundant coarse woody debris, such as downed trees and root wads (PCE 1c); and

d) Matrix habitat (e.g., hardwood forest, dry forest, non-forest, or other habitat types that do not support snowshoe hares) that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range (PCE 1d).

The FS downplays resident lynx on the CNF as [ldquo]transient[rdquo] rather than considering any possibility for lynx to be breeding here. As stated in the CNF[rsquo]s Lolo Insect & Disease EIS: [ldquo]The CNF considers lynx may be present as transients moving through the forest during dispersal events: which does not suggest that lynx are breeding, denning, or rearing young currently on the CNF.[rdquo] In other words, to the FS lynx on the CNF are homeless rogues not entitled to full Forest

Plan protection. This places the onus of protection on the species itself, which apparently must show up in a FS office with a litter of kittens, a news release, and a banner to get recognized as legitimate residents.

The FS does not satisfy NEPA[rsquo]s requirements to [ldquo]take a hard look[rdquo] at cumulative effects. It fails to acknowledge impacts of other ongoing management actions, such as authorization of motorized activity and expansion of the road network in the project area. The analysis area for cumulative impacts on lynx is properly much larger than the project area, but the FS fails to identify the proper cumulative effects analysis area for and thus avoids take a [ldquo]hard look.[rdquo] Below we cite some scientific information the FS apparently wants to ignore.

The FS fails to disclose how many acres of forest would be made uninhabitable for and avoided by lynx especially in winter due to the large openings created. Openings, whether small in uneven-aged management, or large with clearcutting, remove lynx winter travel habitat on those affected acres, since lynx avoid openings in the winter (Squires et al. 2010). Existing openings such as clearcuts not yet recovered are likely to be avoided by lynx in the winter (Squires et al. 2010, Squires et al. 2006a). The average width of openings crossed by lynx in the winter was 383 feet, while the maximum width of crossed openings was 1240 feet (Squires et al. 2010). Winter is the most constraining season for lynx in terms of resource use; starvation mortality has been found to be the most common during winter and early spring. (Id.) The FS fails to analyze habitat fragmentation or connectivity within any LAU or between adjoining LAUs.

The FS fails to analyze cumulative impacts of past fire suppression on lynx habitat, a factor which is a justification of the project. The FS fails to conduct an analysis comparing the historic, pre-management conditions of lynx habitat components with current conditions.

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

Lynx are highly mobile and generally move long distances [greater than 60 mi. (100 km.)]; they disperse primarily when snowshoe hare populations decline; subadult lynx disperse even when prey is abundant, presumably to establish new home ranges; and lynx also make exploratory movements outside their home ranges. 74 Peg. Reg. at 8617.

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

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

The Lynx Conservation Assessment and Strategy (LCAS 2000) noted that lynx prefer to move through continuous forest (1-4); lynx have been observed to avoid large openings, either natural or created (1-4); opening and open forest areas wider than 650 feet may restrict lynx movement

(2-3); large patches with low stem densities may be functionally similar to openings, and therefore lynx movement may be disrupted (2-4). Squires et al. 2006a reported that lynx tend to avoid sparse, open forests and forest stands dominated by small-diameter trees during the winter.

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

Other recent science also undermines the adequacy of the Forest Plan/NRLMD. Holbrook, et al., 2018 [ldquo]used univariate analyses and hurdle regression models to evaluate the spatio-temporal factors influencing lynx use of treatments.[rdquo] Their analyses [ldquo]indicated [hellip]there was a consistent cost in that lynx use was low up to 710 years after all silvicultural actions.[rdquo] (Emphasis added.) From their conclusions:

First, we demonstrated that lynx clearly use silviculture treatments, but there is a 10 year cost of implementing any treatment (thinning, selection cut, or regeneration cut) in terms of resource use by Canada lynx. This temporal cost is associated with lynx preferring advanced regenerating and mature structural stages (Squires et al., 2010; Holbrook et al., 2017a) and is consistent with previous work demonstrating a negative effect of precommercial thinning on snowshoe hare densities for 710 years (Homyack et al., 2007). Second, if a treatment is implemented, Canada lynx used thinnings at a faster rate post- treatment (e.g.,720 years posttreatment to reach 50% lynx use) than either selection or regeneration cuts (e.g., 734[ndash]40 years post-treatment to reach 50% lynx use). Lynx appear to use regeneration and selection cuts similarly over time suggesting the difference in vegetation impact between these treatments made little difference concerning the potential impacts to lynx (Fig. 4c). Third, Canada lynx tend to avoid silvicultural treatments when a preferred structural stage (e.g., mature, multi-storied forest or advanced regeneration) is abundant in the surrounding landscape, which highlights the importance of considering landscape-level composition as well as recovery time. For instance, in an area with low amounts of mature forest in the neighborhood, lynx use of recovering silvicultural treatments would be higher versus treatments surrounded by an abundance of mature forest (e.g., Fig. 3b). This scenario captures the importance of post-treatment recovery for Canada lynx when the landscape context is generally composed of lower quality habitat. Overall, these three items emphasize that both the spatial arrangement and composition as well as recovery time are central to balancing silvicultural actions and Canada lynx conservation.

So Holbrook et al., 2018 fully contradict FS assumptions that clearcuts/regeneration can be considered useful lynx habitat within 25 years post-logging.

Vanbianchi et al., 2017, who found, [ldquo]Lynx used burned areas as early as 1 year postfire, which is much earlier than the 2[ndash]4 decades postfire previously thought for this predator.[rdquo]

Kosterman, 2014, Vanbianchi et al., 2017 and Holbrook, et al., 2018 each demonstrate that Forest Plan/NRLMD direction is not adequate for lynx viability and recovery, as the FS assumes.

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

The FS fails to analyze and disclose how much lynx habitat is affected by snowmobiles and other recreational activities. See Ruediger, et al., 2000.

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

We incorporate our discussion on the Canada lynx from our comments on the Draft Forest Plan and EIS (pp. 209-219).

WOLVERINE

The Wildlife Report states, [ldquo]Wolverine year-round habitat is at high elevations near conifer forests below tree line, rocky alpine habitat above tree line, cirque basins, and avalanche chutes (USDI 2013).[rdquo] Also, [ldquo]All of the project is considered to be potential male dispersal habitat. The project area includes 35,917 acres of female dispersal habitat, 12,811 acres of primary habitat, and 9,152 acres of maternal habitat.[rdquo]

The Wildlife Report indicates that for the logging and road building, much of this habitat will be disrupted, prey species habitat will be destroyed, access for trappers will increase, connectivity habitat will be fragmented.

The FS does not satisfy NEPA[rsquo]s requirements to [ldquo]take a hard look[rdquo] at cumulative effects. It fails to acknowledge impacts of other ongoing management actions, such as authorization of motorized activity and expansion of the road network in the project area. And although the report suggests that the analysis area for cumulative impacts on wolverines is properly much larger than the project area, it fails to identify the proper cumulative effects analysis area for the wolverine and thus avoids take a hard look at cumulative impacts therein. The NPCNF Draft Revised Forest Plan and Draft EIS indicate the FS doesn[rsquo]t believe the NPCNF is geographically large enough to have the minimum number of reproductive wolverines to meet viability criteria.

Below we cite some scientific information the FS apparently wants to ignore.

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

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

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

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

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

Ruggiero et al. (1994b) recognized that [ldquo]Over most of its distribution, the primary mortality factor for the wolverines is trapping.[rdquo] Those authors also state, [ldquo]Transient wolverines likely play a key role in the maintenance of spatial organization and the colonization of vacant habitat.

Factors that affect movements by transients may be important to population and distributional dynamics.[rdquo]

Roads and human density are important factors influencing current wolverine distribution (Carroll et al. 2001b); and wolverine habitat selection is negatively correlated with human activity [ndash] including roads (Krebs et al. 2007). Wolverine occurrence has shown a negative relationship with road densities greater than 2.8 mi/mi2 (1.7 km/km2) (Carroll et al. 2001b).

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

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

Wisdom et al. (2000) state:

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

access (Bailey and others 1986, Hodgman and others 1994, Terra-Berns and others 1997, Witmer and others 1998).

[hellip]Snow-tracking and radio telemetry in Montana indicated that wolverines avoided recent clearcuts and burns (Hornocker and Hash 1981).

Copeland (1996) found that human disturbance near natal denning habitat resulted in immediate den abandonment but not kit abandonment. Disturbances that could affect wolverine are heli-skiing, snowmobiles, backcountry skiing, logging, hunting, and summer recreation (Copeland 1996, Hornocker and Hash 1981, ICBEMP1996f).

Carroll et al. (2001b) state:

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

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

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

[middot]	Provide large areas with low road density and minimal human disturbance for wolverine and lynx, especially where populations are known to occur. Manage human activities and road access to minimize human disturbance in areas of known populations.

[middot]	Manage wolverine and lynx in a metapopulation context, and provide adequate links among existing populations.

[middot]	Reduce human disturbances, particularly in areas with known or high potential for wolverine natal den sites (subalpine talus cirques).

Copeland et al. 2010 state, [ldquo]Available evidence [hellip]indicates that connectivity among wolverine populations is essential for maintaining viability in fragmented portions of their range (Flagstad et al. 2004; Cegelski et al. 2003, 2006; Schwartz et al. 2007).[rdquo]

Logging and road activities may affect wolverines; published, peer-reviewed research finds: [ldquo]Roaded and recently logged areas were negatively associated with female wolverines in summer.[rdquo] Fisher et al., 2013. The [ldquo]analysis suggests wolverines were negatively responding to human disturbance within occupied habitat. The population consequences of these functional habitat relationships will require additional focused research.[rdquo] Id.

Results from Scrafford et al., 2018 [ldquo]show that roads, regardless of traffic volume, reduce the quality of wolverine habitats and that higher-traffic roads might be most deleterious. We suggest that wildlife behavior near roads should be viewed as a continuum and that accurate modeling of behavior when near roads requires quantification of both movement and habitat selection.

Mitigating the effects of roads on wolverines would require clustering roads, road closures, or access management.[rdquo]

Nowhere in the Forest Plan or project analysis can be found a description of the quantity and quality of habitat that is necessary to sustain the viability of the wolverine.

The FS fails to analyze and disclose cumulative impacts of recreational activities on wolverine. Our challenge to the CNF Travel Plan explains how the FS is failing to minimize impacts on Wolverine as required by the Travel Management Rule and Executive Orders.

The Analysis of the Management Situation Technical Report for Revision of the Kootenai and Idaho Panhandle

Forest Plans states:

Direct mortality (related to access) from trapping, legal hunting, and illegal shooting has impacted all wide-ranging carnivores (e.g. lynx, wolverine, grizzly and black bears, wolves)[hellip]

[hellip]Wolverine populations may have declined from historic levels, as a result of over- trapping, hunting, habitat changes, and intolerance to human developments. As the amount of winter backcountry recreation increases, wolverine den sites may become more susceptible to human disturbance.

The FS[rsquo]s illogical wolverine determination may be based upon a 2013 memo from the Regional Office (USDA Forest Service 2013c). It appears that FS district level specialists are not allowed to arrive at effects conclusions based upon their own expertise and judgment.

We incorporate our discussion on the wolverine from our comments on the Draft Forest Plan and EIS (pp. 189-193).

The FS fails to consider and use the best available science and fails to insure population viability of the wolverine in violation of NFMA and additionally, violating NEPA's requirements that the FS demonstrate scientific integrity. See 36 C.F.R. 219.3; 40 C.F.R. 1502.24.

BLACK-BACKED WOODPECKER

We incorporate our discussion on the black-backed woodpecker from our comments on the Draft Forest Plan and EIS (pp. 243-249).

The EA states, [ldquo]No modeled habitat. Some insect and disease present, but not large patches to support resident population. No burned areas within project area. No reported observations in/near project area. Project may create habitat.[rdquo] The Wildlife Report states, [ldquo]Black-backed woodpecker primarily occurs in recently burned montane and pine forests but will also forage in diseased tree areas or small patches of dead trees resulting from disturbances[hellip][rdquo]

Yet the EA justifies the Dead Laundry timber sale in large part because of the specter of insect- takeover. The actions proposed are intended to reduce the risk and extent of insect and diseases within the project area. Furthermore, the propose actions are meant to suppress this species[rsquo] habitat, by [ldquo]improve forest stand resilience to insect and disease.[rdquo]

The Wildlife Report ignores important indirect effects, including rendering much black-backed woodpecker habitat quite unsuitable in the event of fire. All the areas to be logged are potential habitat of high quality. All it takes is a fire, which could happen naturally or as a result of project activities. Those areas logged before a fire would have far less habitat value to this species. This is a cumulative effect ignored in the Dead Laundry analyses.

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

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

The Boise National Forest (USDA Forest Service, 2010d) adopted the black-backed woodpecker as an indicator species in its revised forest plan in 2010:

The black-backed woodpecker depends on fire landscapes and other large- scale forest disturbances (Caton 1996; Goggans et al. 1988; Hoffman 1997; Hutto 1995; Marshall 1992; Saab and Dudley 1998). It is an irruptive species, opportunistically foraging on outbreaks of wood-boring beetles following drastic changes in forest structure and composition resulting from fires or uncharacteristically high density forests (Baldwin 1968; Blackford 1955; Dixon and Saab 2000; Goggans et al.1988; Lester 1980). Dense, unburned, old forest with high levels of snags and logs are also important habitat for this species, particularly for managing habitat over time in a well-distributed manner. These areas provide places for low levels of breeding birds but also provide opportunity for future disturbances, such as wildfire or insect and disease outbreaks (Dixon and Saab 2000; Hoyt and Hannon 2002; Hutto and Hanson 2009; Tremblay et al. 2009). Habitat that supports this species[rsquo] persistence benefits other species dependent on forest systems that develop with fire and insect and disease disturbance processes. The black-backed woodpecker is a secondary consumer of terrestrial invertebrates and a primary cavity nester. Population levels of black-backed woodpeckers are often synchronous with insect outbreaks, and targeted feeding by this species can control or depress such outbreaks (O[rsquo]Neil et al. 2001). The species physically fragments standing and logs by its foraging and nesting behavior (Marcot 1997; O[rsquo]Neil et al. 2001). These KEFs influence habitat elements used by other species in the ecosystem. Important habitat elements (KECs) of this species are an association with medium size snags and live trees with heart rot. Fire can also benefit this

species by stimulating outbreaks of bark beetle, an important food source. Black-backed woodpecker populations typically peak in the first 3[ndash]5 years after a fire. This species[rsquo] restricted diet renders it vulnerable to the effects of fire suppression and to post-fire salvage logging in its habitat (Dixon and Saab 2000).

[hellip] Black-backed woodpeckers are proposed as an MIS because of their association with high numbers of snags in disturbed forests, use of late-seral old forest conditions, and relationship with beetle outbreaks in the years immediately following fire or insect or disease outbreaks. Management activities, such as salvage logging, timber harvest, and firewood collection, can affect KEFs this species performs or KECs associated with this species, and therefore its role as an MIS would allow the Forest to monitor and evaluate the effects of management activities on identified forest communities and wildlife species. (Emphasis added.)

The EA and Wildlife Report don[rsquo]t disclose the FS[rsquo]s strategy and best available science for insuring viable populations of the black-backed woodpecker.

Current forest management policies pose serious implications for the black-backed woodpecker. Forestwide suppression of habitat conditions would eliminate population viability. The Wildlife Specialist Report for the NPCNF[rsquo]s End of the World timber sale states, [ldquo]By reducing the potential for stand-replacing wildfire and beetle outbreaks in the project area, project implementation would reduce the potential for black-backed woodpecker occupancy in the future in the project area.[rdquo] The Dead Laundry EA indicates the FS doesn[rsquo]t want high quality black- backed woodpecker habitat to develop.

The FS[rsquo]s analyses fail to quantify such impacts[mdash]directly, indirectly, and cumulatively. Such failures to quantify and meaningfully analyze and disclose cumulative effects is pervasive throughout the analyses for all ESA-listed, MIS, and Sensitive species.

Hutto, 2006 addresses this subject; from the Abstract:

The bird species in western North America that are most restricted to, and therefore most dependent on, severely burned conifer forests during the first years following a fire event depend heavily on the abundant standing snags for perch sites, nest sites, and food resources. Thus, it is critical to develop and apply appropriate snag-management guidelines to implement postfire timber harvest operations in the same locations. Unfortunately, existing guidelines designed for green-tree forests cannot be applied to postfire salvage sales because the snag needs of snag-dependent species in burned forests are not at all similar to the snag needs of snag-dependent species in green-tree forests. Birds in burned forests have very different snag-retention needs from those cavity-nesting bird species that have served as the focus for the development of existing snag-management guidelines.

Specifically, many postfire specialists use standing dead trees not only for nesting purposes but for feeding purposes as well. Woodpeckers, in particular, specialize on wood-boring beetle larvae that are superabundant in fire-killed trees for several years following severe fire. Species such as the Black-backed Woodpecker (Picoides arcticus) are nearly restricted in their habitat distribution to severely burned forests. Moreover, existing postfire salvage-

logging studies reveal that most postfire specialist species are completely absent from burned forests that have been (even partially) salvage logged. I call for the long-overdue development and use of more meaningful snag-retention guidelines for postfire specialists, and I note that the biology of the most fire-dependent bird species suggests that even a cursory attempt to meet their snag needs would preclude postfire salvage logging in those severely burned conifer forests wherein the maintenance of biological diversity is deemed important.

Hutto, 2008 cautions against the common practice of landscape scale thinning to [ldquo]restore[rdquo] forests to a condition thought to be more congruent with historical conditions:

Black-backed Woodpeckers [hellip]require burned forests that are densely stocked and have an abundance of large, thick-barked trees favored by wood-boring beetles (Hutto 1995, Saab and Dudley 1998, Saab et al. 2002, Russell et al. 2007, Vierling et al. 2008). Indeed, data collected from within a wide variety of burned forest types show that the probability of Black-backed Woodpecker occurrence decreases dramatically and incrementally as the intensity of traditional (pre-fire) harvest methods increases. (Emphases added.)

The Hutto, 2008 Abstract states:

I use data on the pattern of distribution of one bird species (Black-backed Woodpecker, Picoides arcticus) as derived from 16,465 sample locations to show that, in western Montana, this bird species is extremely specialized on severely burned forests. Such specialization has profound implications because it suggests that the severe fires we see burning in many forests in the Intermountain West are not entirely [ldquo]unnatural[rdquo] or [ldquo]unhealthy.[rdquo] Instead, severely burned forest conditions have probably occurred naturally across a broad range of forest types for millennia. These findings highlight the fact that severe fire provides an important ecological backdrop for fire specialists like the Black- backed Woodpecker, and that the presence and importance of severe fire may be much broader than commonly appreciated.

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

The viability of the black-backed woodpecker is threatened by fire suppression and other [ldquo]forest health[rdquo] policies that specifically attempt to prevent its habitat from developing. [ldquo]Insect infestations and recent wildfire provide key nesting and foraging habitats[rdquo] for the black-backed woodpecker and [ldquo]populations are eruptive in response to these occurrences[rdquo] (Wisdom et al.

2000). A basic purpose of the FS[rsquo]s management strategies is to negate the natural processes that the black-backed woodpecker biologically relies on; the emphasis in reducing the risk of stand loss due to stand density coupled with the increased risk of stand replacement fire events.

Viability of a species cannot be assured, if habitat suppression is a forestwide policy.

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

Contrary to what one might expect to find immediately after a major disturbance event, I detected a large number of species in forests that had undergone stand-replacement fires. Huff et al. (1985) also noted that the density and diversity of bird species in one- to two- year-old burned forests in the Olympic Mountains, Washington, were as great as adjacent old-growth forests[hellip]

[hellip]Several bird species seem to be relatively restricted in distribution to early post-fire conditions[hellip] I believe it would be difficult to find a forest-bird species more restricted to a single vegetation cover type in the northern Rockies than the Black-backed Woodpecker is to early [first 6 years] post-fire conditions. (Emphasis added).

USDA Forest Service 2011c states:

Hutto (2008), in a study of bird use of habitats burned in the 2003 fires in northwest Montana, found that within burned forests, there was one variable that exerts an influence that outstrips the influence of any other variable on the distribution of birds, and that is fire severity. Some species, including the black-backed woodpecker, were relatively abundant only in the high-severity patches. . Hutto[rsquo]s preliminary results also suggested burned forests that were harvested fairly intensively (seed tree cuts, shelterwood cuts) within a decade or two prior to the fires of 2003 were much less suitable as post-fire forests to the black-backed woodpecker and other fire dependent bird species. Even forests that were harvested more selectively within a decade or two prior to fire were less likely to be occupied by black-backed woodpeckers. (Emphasis added.)

Also see the agency[rsquo]s Fire Science Brief, 2009, which states, [ldquo]Hutto found that Black-backed Woodpeckers fared best on sites unharvested before fire and poorest in the heavily harvested sites.[rdquo]

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

Cherry (1997) states:

The black-backed woodpecker appears to fill a niche that describes everything that foresters and fire fighters have attempted to eradicate. For about the last 50 years, disease and fire have been considered enemies of the [lsquo]healthy[rsquo] forest and have been combated relatively successfully. We have recently (within the last 0 to 15 years) realized that disease and fire have their place on the landscape, but the landscape is badly out of balance with

the fire suppression and insect and disease reduction activities (i.e. salvage logging) of the last 50 years. Therefore, the black-backed woodpecker is likely not to be abundant as it once was, and continued fire suppression and insect eradication is likely to cause further decline. (Emphasis added.)

FS management emphasis continues to suppress this species[rsquo] habitat, as evident from the EA[rsquo]s Purpose and Need.

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

Woodpeckers play critical roles in the forest ecosystem. Woodpeckers are primary cavity nesters that excavate at least one cavity per year, thus making these sites available to secondary cavity nesters (which include many species of both birds and mammals). Black- backed and three-toed woodpeckers can play a large role in potential insect control. The functional roles of these two woodpecker species could easily place them in the [lsquo]keystone[rsquo] species category[mdash]a species on which other species depend for their existence.

Wickman (1965) calculated that woodpeckers may eat up to 50 larvae per day that were each about 50 mm in length. The predation on these larvae is significant. It has been estimated that individual three-toed woodpeckers may consume thousands of beetle larvae per day, and insect outbreaks may attract a many-fold increase in woodpecker densities (Steeger et al. 1996). The ability of woodpeckers in to help control insect outbreaks may have previously been underestimated.

Cherry (1997) also notes:

Black-backed woodpeckers preferred foraging in trees of 34 cm (16.5 in) diameters breast height and (63 ft) 19 m height (Bull et al. 1986). Goggans et al. (1987) found the mean dbh of trees used for foraging was 37.5 cm (15 in) and the mean dbh of trees in the lodgepole pine stands used for foraging was 35 cm (14 in). Steeger et al. (1996) found that both (black-backed and three-toed) woodpecker species fed in trees from 20-50 cm (8-20 in) dbh.

Black-backed woodpeckers excavate their own cavities in trees for nesting. Therefore, they are referred to as primary cavity nesters, and they play a critical role in excavating cavities that are later used by many other species of birds and mammals that do not excavate their own cavity (secondary cavity nesters). Black-backed woodpeckers peel bark away from the entrance hole and excavate a new cavity every year. Other woodpeckers sometimes take over their cavities (Goggans et al. 1987).

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

Hutto and Gallo, 2006 state:

Every timber-drilling and timber-gleaning species was less abundant in the salvage-logged plots, including two of the most fire-dependent species in the northern Rocky Mountains[mdash] American Three-toed (Picoides dorsalis) and Black-backed (P. arcticus) Woodpeckers.

Lower abundances in salvage-logged plots occurred despite the fact that there were still more potential nest snags per hectare than the recommended minimum number needed to support maximum densities of primary cavity-nesters, which suggests that reduced woodpecker densities are more related to a reduction in food (wood-boring beetle larvae) than to nest-site availability.

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

In California, the Black-backed Woodpecker[rsquo]s strong association with recently burned forest, a habitat that is ephemeral, spatially restricted, and often greatly modified by post- fire logging, as well as the species[rsquo] relative rarity, may make the woodpecker vulnerable to declines in the state. Additionally, Black-backed Woodpeckers in California are affected by the management of unburned forests [ndash] both because pre-fire stand conditions affect the suitability of post-fire habitat for the species, and because a substantial proportion of California[rsquo]s Black-backed Woodpeckers nest and forage at a low population density in unburned forests. Conserving the Black-backed Woodpecker in California likely requires appropriate management and stewardship of the habitat where this species reaches its highest density [ndash] recently burned forest [ndash] as well as appropriate management of [lsquo]green[rsquo] forests that have not burned recently.

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

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

The viability of the black-backed woodpecker is threatened by fire suppression, [ldquo]restoration[rdquo] logging and [ldquo]forest resilience[rdquo] policies which specifically attempt to prevent its habitat from developing. [ldquo]Insect infestations and recent wildfire provide key nesting and foraging habitats[rdquo] for the black-backed woodpecker and [ldquo]populations are eruptive in response to these occurrences[rdquo] (Wisdom et al. 2000). A basic purpose of the agency[rsquo]s management strategies are to negate the natural processes that the black-backed woodpecker biologically relies on; the emphasis in reducing the risk of stand loss due to stand density coupled with the increased risk of stand replacement fire events. Viability of a species cannot be assured, if habitat suppression is a forestwide policy.

PILEATED WOODPECKER

We incorporate our discussion on the pileated woodpecker from our comments on the Draft Forest Plan and EIS (pp. 239-243).

The pileated woodpecker is a Clearwater National Forest management indicator species (MIS) for old-growth forest and large snag habitat.

The Dead Laundry EA does not mention pileated woodpeckers. In fact, it fails to discuss the concept of MIS in any way, including how population trend monitoring was a mechanism with which the FS was to assure viability of native wildlife species. The Forest Plan declares MIS are [ldquo]used to monitor the effects of planned management activities on viable populations of wildlife and fish[hellip][rdquo]. And after all, Forest Plan Goal 5.a. (Wildlife) is [ldquo]Provide habitat for viable populations of all indigenous wildlife species.[rdquo] And Forest Plan assumption is, [ldquo]The benchmark analysis indicated that old-growth stands exist in quantities sufficient to maintain viable populations of old-growth dependent wildlife species in each decade of the planning horizon.[rdquo] The EA ignores the fact that the FS has not monitored the population trends of its MIS as required by the Clearwater Forest Plan, thus neglecting to follow basic adaptive management principles as well as Forest Plan requirements. The Forest Plan requires the FS to monitor [ldquo]Population Trends of Indicator Species[rdquo], reporting at least every five years.

The NPCNF[rsquo]s Lolo Insect & Disease FEIS describes pileated woodpecker habitat:

Pileated woodpeckers are large, cavity-nesting birds associated with late successional stage forests, but also may use younger forests that have scattered, large, dead trees (Bull and Jackson, 1995). The woodpecker appears to seek out microhabitats with a higher diversity of tree species and higher densities of decadent trees and snags than are available across a landscape (Savignac et al, 2000; Aubry and Raley, 2002). Through their selection of large dead and damaged trees, the bird may serve as a good indicator of ecological function rather than just the age of a stand or forest (Bonar, 2001).

The above habitat characteristics are the kind of habitat features the purpose and need of the Dead Laundry timber sale would suppress and prevent from developing.

There is no analysis in the EA that discloses the geographic and temporal cumulative effects of the FS[rsquo]s overall management strategy (basically tree farming) which attempts to suppress the natural processes creating decadent trees, snags which the pileated woodpecker relies upon.

There is no reliable, up-to-date forestwide analysis of habitat, and forestwide population trends have not been monitored.

The Wildlife Report notes, [ldquo]Forest Plan criteria for pileated woodpeckers is [lsquo]In each 10,000 acres of suitable habitat, a 300 acre stand should be managed as old growth for pileated woodpeckers[hellip]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[hellip] The 100+ acre stands should be wider than 200 yards at any one point.[rsquo][rsquo][rdquo] Nothing in the EA or Wildlife Report demonstrated the project area is being managed consistently with this forest plan requirement.

The Ninth Circuit has stated the FS [ldquo]must both describe the quantity and quality of habitat that is necessary to sustain the viability of the species in question and explain its methodology for measuring this habitat.[rdquo] (Lands Council v. McNair).

The logging and road building will destroy foraging and nesting habitat. Since neither the EA nor Wildlife Report include a cumulative effects analysis as required by NEPA, it is impossible to tell how much pileated woodpecker habitat has already been destroyed or degraded by logging, road building, and other management.

No estimates of snags for the project area are found in the EA or other analyses. There[rsquo]s no analysis whatsoever[mdash]qualitative or quantitative, direct, indirect, or cumulative. So the FS has no idea if conditions in the project area are adequate for supporting reproducing populations of pileated woodpeckers or other snag- and down log-dependent wildlife.

The EA doesn[rsquo]t disclose a scientifically sound strategy to insure viable populations of the pileated woodpecker. Bull et al. 2007 represents over 30 years of investigation into the effects of logging on the pileated woodpecker and is recent research information on such effects, and contrast the effects of natural disturbance with large-scale logging on pileated woodpeckers.

Also see Bull et al., 1992, Bull and Holthausen, 1993, and Bull et al., 1997 for biology of pileated woodpeckers and the habitats they share with cavity nesting wildlife.

The Idaho Panhandle NF[rsquo]s original Forest Plan old-growth standards (USDA Forest Service, 1987c) were largely built around the habitat needs of its indicator species, the pileated woodpecker. Very similar direction is found in the Clearwater Forest Plan, as cited above. Bull and Holthausen 1993, provide field tested management guidelines. They recommend that approximately 25% of the home range be old growth and 50% be mature forest.

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

[middot] Canopy cover in nesting stands

[middot] Canopy cover in feeding stands

[middot] Number of potential nesting trees >20[rdquo] dbh per acre

[middot] Number of potential nesting trees >30[rdquo] dbh per acre

[middot] Average DBH of potential nest trees larger than 20[rdquo] dbh

[middot] Number of potential feeding sites per acre

[middot] Average diameter of potential feeding sites

USDA Forest Service, 1990 states, [ldquo]To provide suitable pileated woodpecker habitat, strips should be at least 300 feet in width[hellip][rdquo]

This preferred diameter of nesting trees for the pileated woodpecker is notable. McClelland and McClelland (1999) found similar results in their study in northwest Montana, with the average nest tree being 73 cm. (almost 29[rdquo]) dbh. The pileated woodpecker[rsquo]s strong preference for trees of very large diameter is not adequately considered in the Forest Plan. The EA provides no firm

numerical commitment for leaving specific numbers and sizes of largest trees favored by so many wildlife species.

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

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

McClelland (1977), states:

(The Pileated Woodpecker) is the most sensitive hole nester since it requires old growth larch, ponderosa pine, or black cottonwood for successful nesting. The Pileated can be considered as key to the welfare of most hole-nesting species. If suitable habitat for its perpetuation is provided, most other hole-nesting species will be accommodated.

Pileated Woodpeckers use nest trees with the largest dbh: mean 32.5 inches; Pileated Woodpeckers use the tallest nest trees: mean 94.6 feet;

The nest tree search image of the Pileated Woodpecker is a western larch, ponderosa pine, or black cottonwood snag with a broken top (status 2), greater than 24 inches dbh, taller than 60 feet (usually much taller), with bark missing on at least the upper half of the snag, heartwood substantially affected by Fomes laracis or Fomes pini decay, and within an old-growth stand with a basal area of at least 100 sq feet/acre, composed of large dbh classes.

A cluster analysis based on a nine-dimensional ordination of nest tree traits and habitat traits revealed close association between Yellow-bellied Sapsuckers, Mountain Chickadees, and Red-breasted Nuthatches. These three species plus the Pileated Woodpecker and Hairy Woodpecker are relatively grouped by coincident occurrence in old growth. Tree Swallows, Black-capped Chickadees, and Common Flickers are separated from the above five species by their preference for more open areas and their frequent use of small dbh nest trees.

(Most) species found optimum nesting habitat in stands with a major component of old growth, particularly larch. Mean basal area for pileated woodpecker nest sites was 150 square feet per acre. (McClelland. B.R. and others, 1979)

Many large snags are being cut for firewood. Forest managers should limit firewood cutting to snags less than 15 inches in d.b.h. and discourage use of larch, ponderosa pine, and black cottonwood. Closure of logging roads may be necessary to save high-value snags. Logging slash can be made available for wood gatherers.

Recent scientific research reveals the inadequacy of the CNF[rsquo]s snag retention guidelines. For one example, Lorenz et al., 2015 state:

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

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

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

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

2002).[rdquo]

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

Many species of birds are dependent on snags for nest sites, including 85 species of cavity- nesting birds in North America (Scott et al. 1977). Therefore, information of how many and what types of snags are required by cavity-nesting bird species is critical for wildlife biologists, silviculturists, and forest managers.

Researchers across many forest types have found that cavity-nesting birds utilize snags with large DBH and tall height for nest trees (Scott, 1978; Cunningham et al., 1980;

Mannan et al., 1980; Raphael and White, 1984; Reynolds et al., 1985; Zarnowitz and Manuwal, 1985; Schreiber and deCalesta, 1992).

Spiering and Knight (2005) found the following.

Larger DBH and greater snag height were positively associated with the presence of a cavity, and advanced stages of decay and the presence of a broken top were negatively associated with the presence of a cavity. Snags in larger DBH size classes had more evidence of foraging than expected based on abundance.

Percent bark cover had little influence on the presence of a cavity. Therefore, larger and taller snags that are not heavily decayed are the most likely locations for cavity-nesting birds to excavate cavities.

The association of larger DBH and greater height of snags with cavities is consistent with other studies (Scott, 1978; Cunningham et al., 1980; Mannan et al., 1980; Raphael and White, 1984; Reynolds et al., 1985; Zarnowitz and Manuwal, 1985; Schreiber and deCalesta, 1992).

Spiering and Knight (2005) state that the [ldquo]lack of large snags for use as nest sites may be the main reason for the low densities of cavity-nesting birds found in managed stands on the Black Hills National Forest  The increased proportion of snags with evidence of foraging as DBH

size class increased and the significant goodness-of-fit test indicate that large snags are the most important for foraging.[rdquo]

Dudley & Vallauri, 2004 state:

Up to a third of European forest species depend on veteran trees and deadwood for their survival. Deadwood is providing habitat, shelter and food source for birds, bats and other mammals and is particularly important for the less visible majority of forest dwelling species: insects, especially beetles, fungi and lichens. Deadwood and its biodiversity also play a key role for sustaining forest productivity and environmental services such as stabilising forests and storing carbon.

Despite its enormous importance, deadwood is now at a critically low level in many European countries, mainly due to inappropriate management practices in commercial forests and even in protected areas. Average forests in Europe have less than 5 per cent of the deadwood expected in natural conditions. The removal of decaying timber from the forest is one of the main threats to the survival of nearly a third of forest dwelling species and is directly connected to the long red list of endangered species. Increasing the amounts of deadwood in managed forests and allowing natural dynamics in forest protected areas would be major contributions in sustaining Europe's biodiversity.

For generations, people have looked on deadwood as something to be removed from forests, either to use as fuel, or simply as a necessary part of "correct" forest management. Dead trees are supposed to harbour disease and even veteran trees are often regarded as a

sign that a forest is being poorly managed. Breaking up these myths will be essential to preserve healthy forest ecosystems and the environmental services they provide.

In international and European political processes, deadwood is increasingly being accepted as a key indicator of naturalness in forest ecosystems. Governments which have recognised the need to preserve the range of forest values and are committed to these processes can help reverse the current decline in forest biodiversity. This can be done by including deadwood in national biodiversity and forest strategies, monitoring deadwood, removing perverse subsidies that pay for its undifferentiated removal, introducing supportive legislation and raising awareness.

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

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

The EA also fails to quantify expected snag loss due to safety concerns, which vary with different methods of log removal.

Without any analysis, the FS merely assumes that management will result in snags and down logs in abundance to continuously support viable populations. No monitoring is cited to support claims of benefits to snag and down log-dependent species[rsquo] population numbers or distribution.

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

The EA fails to apply the best available science to describe the quantity and quality of habitat that is necessary to sustain the viability of the pileated woodpecker.

NORTHERN GOSHAWK

We incorporate our discussion on the northern goshawk from our comments on the Draft Forest Plan and EIS (pp. 250-253).

The northern goshawk is a Clearwater National Forest MIS for old-growth forest habitat.

The Dead Laundry EA does not contain analysis for the northern goshawk. In fact, it fails to discuss the concept of MIS in any way, including how population trend monitoring was a mechanism with which the FS was to assure viability of native wildlife species. The Forest Plan declares MIS are [ldquo]used to monitor the effects of planned management activities on viable populations of wildlife and fish[hellip][rdquo]. And after all, Forest Plan Goal 5.a.

(Wildlife) is [ldquo]Provide

habitat for viable populations of all indigenous wildlife species.[rdquo] And Forest Plan assumption is, [ldquo]The benchmark analysis indicated that old-growth stands exist in quantities sufficient to maintain viable populations of old-growth dependent wildlife species in each decade of the planning horizon.[rdquo] The EA ignores the fact that the FS has not monitored the population trends of its MIS as required by the Clearwater Forest Plan, thus neglecting to follow basic adaptive management principles as well as Forest Plan requirements. The Forest Plan requires the FS to monitor [ldquo]Population Trends of Indicator Species[rdquo], reporting at least every five years.

The Wildlife Report states, [ldquo]No known nests in project area.[rdquo] However there is no indication the FS has thoroughly searched for goshawk nest stands in the project area. The FS must utilize goshawk survey methodology consistent with the best available science. For example the recent and comprehensive protocol, [ldquo]Northern Goshawk Inventory and Monitoring Technical Guide[rdquo] by Woodbridge and Hargis 2006. Also, USDA Forest Service 2000b state:

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

The logging and road building will destroy nesting and foraging habitat g. Since neither the EA nor Wildlife Report include a cumulative effects analysis as required by NEPA, it is impossible to tell how much goshawk habitat has already been destroyed or degraded by logging, road building, and other management.

Moser (2007) found that goshawk breeding home ranges in northern Idaho are much larger than other regions (mean of about 12,720 acres for males; 9,540 acres for females).

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

In addition, Reynolds et al. 1992 recommend logged openings of no more than 2 acres in size or less in the

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

Crocker-Bedford (1990) noted:

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

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

The FS fails to apply the best available science to describe the quantity and quality of habitat necessary to sustain the viability of the northern goshawk.

PINE MARTEN

We incorporate our discussion on the pine marten from our comments on the Draft Forest Plan/Draft EIS (pp. 237-239).

The American marten is a Clearwater National Forest MIS for mid- to high-elevation, mature forest. The EA does not contain analysis of the pine marten. In fact, it fails to discuss the concept of MIS in any way, including how population trend monitoring was a mechanism with which the FS was to assure viability of native wildlife species. The Forest Plan declares MIS are [ldquo]used to monitor the effects of planned management activities on viable populations of wildlife and fish[hellip][rdquo]. And after all, Forest Plan Goal 5.a. (Wildlife) is [ldquo]Provide habitat for viable populations of all indigenous wildlife species.[rdquo] And Forest Plan assumption is, [ldquo]The benchmark analysis indicated that old-growth stands exist in quantities sufficient to maintain viable populations of old-growth dependent wildlife species in each decade of the planning horizon.[rdquo] The EA ignores the fact that the FS has not monitored the population trends of its MIS as required by the Clearwater Forest Plan, thus neglecting to follow basic adaptive management principles as well as Forest Plan requirements. The Forest Plan requires the FS to monitor [ldquo]Population Trends of Indicator Species[rdquo], reporting at least every five years.

The logging and road building will destroy or degrade suitable marten habitat in the project area. Since neither the EA nor Wildlife Report include an adequate cumulative effects analysis as required by NEPA, it is impossible to tell how much pine marten habitat has already been destroyed or degraded by logging, road building, and other management.

The FS relies upon Region-wide database analyses by Samson to conclude that marten and other species viability is assured, although the Wildlife Report does not address the age and reliability of the data. The FS also doesn[rsquo]t consider Samson[rsquo]s conclusions for the longer term, for any wildlife species, which is far less certain.

The pine marten is a species whose habitat is significantly altered by thinning and other active forest management. (See Moriarty et al., 2016; Bull and Blumton, 1999; Hargis et al., 1999 and Wasserman et al., 2012).

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

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

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

The FS fails to apply the best available science to describe the quantity and quality of habitat that is necessary to sustain the viability of the pine marten.

VIABILITY

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

The Clearwater Forest Plan also requires population trend monitoring of MIS. By including MIS population trend monitoring requirements in forest plans, the agency acknowledged, wisely, that it needed to verify its assumption that allowing old-growth habitat to be reduced to 10% forestwide (a level well below the NRV)[mdash]assures viability of such species. The FS has failed to meet its MIS monitoring commitments. The FS failed to verify its minimum habitat old-growth MIS assumption.

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 [ldquo]consists of the number of individuals, adequately distributed throughout their range, sufficient to perpetuate their long-term existence in natural self-sustaining populations.[rdquo] 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[rsquo]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. [hellip]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 says a viable population is one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area.

The FS must address issues consistent with best available scientific information, such as the [ldquo]estimated numbers[rdquo], 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.

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

Schultz, 2010 criticizes 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[rsquo]s use of the term [ldquo]viable[rdquo] while only referring to habitat characteristics while ignoring population dynamics. Population dynamics refers to persistence of a population over time[mdash]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[rsquo]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 Wildlife Report relies upon Northern Region wildlife habitat relationship models (Samson 2006a, Samson 2006b) or other models. It fails to address the fact that Sampson[rsquo]s analyses are about as old as a Forest Plan was designed to last, and who knows how old the data are that he used in his 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 that [ldquo]In regard to long-term viability, this conservation assessment has found that long-term habitat conditions in terms of Representativeness, Redundancy, and Resiliency are [ldquo]low[rdquo] for all species.[rdquo] The EA and Wildlife Report do not disclose Sampson[rsquo]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 (ne- 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 [ldquo]critical habitat threshold[rdquo] 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: [ldquo]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[hellip][rdquo]

Samson also admits that [ldquo]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[rdquo] and that [ldquo]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[rdquo] and finally that [ldquo]FIA does not adequately sample rare habitats[rdquo]. This especially concerning given the reliance on the FIA queries to identify suitable habitat and the fact that the data used in the analysis is now likely at least 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: [ldquo]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.[rdquo]

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

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

The rivers and streams in the Dead Laundry project area support [ldquo]Special status aquatic species

[hellip]Bull Trout (listed as a threatened species under the Endangered Species Act) and Region 1 Sensitive species Westslope Cutthroat Trout, and Redband Trout.[rdquo] (Fisheries Specialist Report). However, the EA and Fisheries Specialist Report fail to describe the abundance, demographics, or health of populations in any of the streams in the project area. The existing condition of populations is not described, violating NEPA.

The Fisheries Specialist Report states, [ldquo]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.[rdquo] Yet it completely fails to consider, analyze, and disclose any changes or trends in RMOs, a Forest Plan requirement under the INFISH amendment.

The Fisheries Specialist Report states, [ldquo]Water temperature will not be analyzed because there are no thermal barriers in the project area and temperatures fall within normal limits.[rdquo] However the Water Report states, [ldquo]Seven streams within the analysis area are on the IDEQ 303(d) list and have a Total Maximum Daily Load (TMDL) in place for sediment or temperature (IDEQ, 2003; IDEQ, 2018).[rdquo] Does this mean the Fisheries Specialist believe it[rsquo]s [ldquo]normal[rdquo] for streams to be listed by the state of Idaho for temperature concerns?

Furthermore, the FS fails to explain how Dead Laundry timber sale impacts would be consistent the TMDLs.

[ldquo]Various field reviews and monitoring activities support the conclusion that stream habitat conditions have improved since the Forest Plan was written in 1987.[rdquo] (Fisheries Specialist Report). The Report fails to substantiate that conclusion.

The Fisheries Specialist Report states:

The proposed action would result in a total of 0.7 miles of new temporary road and 2.5 miles of existing temporary roads within RHCAs, for a total of 3.2 miles of temporary road within RHCAs which would be decommissioned upon project completion. New construction would result in 0.7 miles of roads in RHCAs and would cross one tributary of moose creek. There will be a total of 25 miles of reconditioning within RHCA. There will also be a total of 21 miles of reconstruction in the RHCAs in the project area. This results in a total of 46.7 miles of roads within the RHCAs in the project area upon completion of project activities.

The sum total of the analysis of all this road work impacts on fisheries is expressed by the word [ldquo]minimized[rdquo] (Id.). There is no quantitative analysis. Much of this conclusion is based upon the assumption of 100% effectiveness of BMPs, which we point out as arbitrary and unreasonable elsewhere in these comments.

The Fisheries Specialist Report claims [ldquo]New construction would result in 0.7 miles of roads in RHCAs and would cross one tributary of moose creek.[rdquo] There is no map in the EA or on the project website which allows anyone to verify this claim of only one new creek crossing, or to visualize new road work in RHCAs. Furthermore, this ignores the fact that construction of several new crossings would be required in conducting [ldquo]reconstruction[rdquo] of previously decommissioned or abandoned roads.

[ldquo]All Dead Laundry project activities should maintain or improve water quality; therefore, the Dead Laundry project is designed to produce no measurable increase in sediment from road segments in RHCAs.[rdquo] (Fisheries Specialist Report). Yet elsewhere, this Report contradicts itself by admitting that measurable sediment would result from project activities.

The Fisheries Specialist Report states:

The new road construction proposed that would have 0.7 miles within RHCAs, crosses one small, headwater stream that is a tributary to moose creek. The crossing is ~2,176 feet up stream from its confluence with Moose creek. This is an important distance to note because when sediment leaves a road, the greatest impact to water quality is immediately below where it enters a stream. Effects decrease quickly within several hundred feet and return to near-background levels within [frac12] mile, even without mitigation (Foltz, Yanosek & Brown, 2009).

However, the Fisheries Specialist misapplies the Foltz et al. 2009 conclusions, because that study is about culvert removal. Performed properly, culvert removal returns the affected site to more natural conditions. In this case, the new culverts remain, since the road becomes a permanent system road. Furthermore Foltz et al. 2009 state:

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. (Emphasis added.)

This begs the question: why does the FS disregard water quality impacts when they are at a level where regulatory limits are potentially not being met?

The Fisheries Specialist Report also states, [ldquo]The actions of the project would improve 46.7 miles of RCHA road miles through reconstruction and reconditions. The actions will gravel stream crossings, stabilize existing roads, replace culverts, spot-rock replacement, and reshape drainage ditches.[rdquo] Yet this Report fails to consider conditions later in time, when inevitably the maintenance budget inadequacies result in degraded road conditions and inevitably, dirty water. We discuss this issue elsewhere in these comments.

The Fisheries Specialist Report also states:

Log-haul is not expected to contribute to measurable increases in instream sediment as a result of gravel surfacing and dust abatement. Arismendi et al (2017) found no significant increase in median suspended sediment or turbidity downstream compared to upstream of road crossings where road reconstruction and log-haul occurred.

This contradicts the NPCNF[rsquo]s own information (USDA Forest Service, 2016b[mdash]the Johnson Bar Draft EIS), which states, [ldquo]Increased heavy-truck traffic related to log hauling can increase rutting and displacement of road-bed material, creating conditions conducive to higher sediment delivery rates (Reid and Dunne, 1984).[rdquo]

The Fisheries Report fails to consider cumulative impacts from all past management actions, totally failing NEPA[rsquo]s purpose to take a [ldquo]hard look.[rdquo]

The Fisheries Report completely fails to demonstrate[mdash]or even mention[mdash]the Forest Plan Standards found in Appendix K. From Appendix K, we snip and paste project area Forest Plan Watersheds:

Are these Objectives[mdash]really a Forest Plan Standard according to the Forest Plan[mdash]being met? The Fisheries Specialist apparently has no idea.

The Report completely obfuscates the sediment issue in claiming that project-induced sediment won[rsquo]t be [ldquo]measurable[rdquo] without explaining what that means[mdash]who measures, how they measure, when they measure, what they measure, what[rsquo]s the threshold for significance[hellip] It[rsquo]s just [ldquo]immeasurable.[rdquo] In reality, the FS has no intention of measuring project-induced sediment.

Nothing in the proposed monitoring section proposes to measure sediment. USDA Forest Service, 2006c states:

Increasing sediment production is generally associated with ground based harvest systems and particularly road construction. Sediment decreases habitat diversity, degrades spawning and rearing habitat and consequently fish reproduction and survival. It also reduces aquatic insect production. The density of salmonids in rearing habitat has been shown to be inversely proportional to the level of fine sediment (Bjornn and Reiser 1991). Fine sediment can greatly reduce the capability of winter and summer rearing habitats and when levels reach 30% or more, survival to emergence is significantly reduced (Shepard et al.

1984). Fine sediment may have the greatest impact on winter rearing habitat for juvenile salmonids. Fine sediments can cap or fill interstitial spaces of streambed cobbles. When interstitial rearing space is unavailable, juvenile salmonids migrate until suitable wintering habitat can be found (Muhlfeld 2001). Fine sediment has also been shown to cause alterations in macroinvertebrate abundance and diversity.

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

The FS doesn[rsquo]t disclose the existing conditions of site-specific stream reaches and project effects on water quality, fish and other aquatic resources. The EA doesn[rsquo]t disclose information regarding the existence and effects of bedload and accumulated sediment. The EA doesn[rsquo]t analyze and disclose channel stability for specific stream reaches. The EA doesn[rsquo]t disclose the amount of existing accumulated fine and bedload sediment that remains from the previous logging and road construction.

The FS doesn[rsquo]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[rsquo]t disclose populations of fish species in the project area, and compare those numbers to minimum viable populations.

The document, [ldquo]Water Resource Effects Analysis[rdquo] (Water Report) states: [ldquo]Unless otherwise stated, I analyze direct, indirect, and cumulative effects at the subwatershed scale (6th level hydrologic unit code; HUC 12). This ensures that the effects of the proposed activities are analyzed at the scale of an entire stream system and encompass not only the steep, headwater streams at the project site but also the lower-gradient stream reaches where effects are most likely to occur.[rdquo] However this ignores and potentially dilutes important, potentially significant impacts occurring at the smaller headwater scale[mdash]which move downstream and create impacts in larger streams. The FS is using an improper scale for watershed analysis, both for ECA and sediment yield. HUC12 analysis areas water down potential significant impacts. The Clearwater Forest Plan Appendix K has divided streams down to smaller areas than a HUC 12 area, so for streams that are impaired and stand to be more so because of this project. Using the larger HUC 12 analysis will mask potentially significant effects at the smaller subwatershed scale. The analysis should be done at the stream level identified in the Clearwater Forest Plan.

King, 1994 explains that small headwaters areas are particularly sensitive to the increased water yields due to removal of tree canopy:

Timber removal on 25-37% of the area of small headwater watersheds increased annual water yield by an average of 14.1 inches, prorated to the area in harvest units and roads. Increases in streamflow occurred during the spring snowmelt period, especially during the rising portion of the snowmelt hydrograph. These forest practices also resulted in large increases in short duration peakflows, greatly increasing the sediment transport capacity of these small streams. The cumulative effects of these activities on streamflow in the Main Fork, with only 6.3% of its area in roads and harvest units, were not detectable.

Ziemer, 1998 observed the same phenomenon in his study on flooding and stormflows. Also, King, 1989 observed that [ldquo]Current procedures for estimating the hydrologic responses to timber removal of third to fifth order streams often ignore what may be hydrologically important modifications in the low-order streams.[rdquo] This is recognized in Gerhardt, 2000 (cited by the Water Report): [ldquo]Research results have suggested that additional emphasis should be placed on scheduling and location of harvest in 1st and 2nd order tributaries to minimize impacts in these headwater areas (King, 1989).[rdquo]

The Water Report even alludes to this, albeit indirectly: [ldquo]Sediment inputs to stream channels occur as a complex series of pulses that are delivered and stored within low-order, high-gradient stream channels (Benda & Dunne, 1997). Sediment accumulates for centuries within these channels before being transported or [ldquo]flushed[rdquo] downstream by episodic events with large increases in water yield (Kirchner et al., 2001).[rdquo]

The Water Report states, [ldquo]Predicted changes in water yield within the Dead Laundry project area

HUC12 subwatersheds16 are assessed using the indicator of ECA, which represents the amount of forest canopy openings in a watershed, and is often used as surrogate for water yield.[rdquo] In other words, the FS is only examining ECA within larger watersheds[mdash]ignoring the scientific information indicating significant impacts might occur in smaller watersheds experiencing high ECAs from logging.

Before trying to discern such impacts on smaller, headwater streams not analyzed by the EA or Water Report, it[rsquo]s worth examining the logic of the HUC12 subwatershed delineation adopted by the Water Report. As displayed in the Water Report Figure 1, the Elizabeth Creek-North Fork Clearwater River HUC12 watershed is not really a single watershed[mdash]it is made up of small streams feeding separately into the North Fork Clearwater River. Only at the confluence of farthest downstream small stream in this HUC12 and the North Fork could the combined effects be experienced hydrologically. And of course, then the effects would be diluted by impacts upstream from this HUC12 in other upstream portion of the North Fork not in this HUC12[mdash]and even directly across the North Fork from this HUC12[mdash]rendering the analysis essentially meaningless.

Similarly, in bunching Laundry Creek and Osier Creek in the same HUC12 (Osier Creek), the combined water yield impacts from those two streams would only be felt for a little over a mile of their combined flow[mdash]before they enter Independence Creek, which is yet a third project area HUC12 (Deadwood-Moose Creek)!

Furthermore, by including Swamp Creek within the Osier Creek HUC12, the Water Report dilutes project impacts by including a watershed falling within an Inventoried Roadless Area.

It seems the way the four HUC12s were delineated avoids all possibility of arriving at any conclusion of significance from the water yield increases of the Dead Laundry timber sale[rsquo]s massive clearcutting and prescribed burning. Since the Water Report uses the same HUC12 watersheds for its sediment analysis, that portion of its analysis is also highly suspect.

So if one looks that the proposed vegetation [ldquo]treatments[rdquo] along Independence Creek, one might be concerned about all the potential water yield increase and sediment increase impacts in that stream. However, the Water Report has no analysis at that watershed scale. Is the FS saying any such concern is misplaced?

Headwater streams and non-fish bearing streams need more, not less, protection (Rhodes et al., 1994; Moyle et al., 1996; Erman et al., 1996; Espinosa et al., 1997). Both Erman et al., 1996 and Rhodes et al., 1994 conclude, based on review of available information, that intermittent and non-fish-bearing streams should receive stream buffers significantly larger than those afforded by PACFISH/ INFISH.

In arbitrarily delineating HUC12 watersheds, and by ignoring the science on potential significant impacts in small, headwaters streams, the Water Report and EA violate NEPA.

16 [ldquo]10,000-40,000 acres[rdquo] in size, according to the Water Report.

The FS also ignores potential of landslides. This is one reason the FS assumption that INFISH buffers will prevent sediment from reaching streams is also not reasonable. (See McClelland, et al., 1997.)

The Water Report states, [ldquo]When sediment leaves a road, the greatest impact to water quality is immediately below where it enters a stream. Effects decrease quickly within several hundred feet and return to near- background levels within [frac12] mile even without mitigation (Foltz, Yanosek & Brown, 2009).[rdquo] This same misapplication of the research was written into the Fisheries Specialist Report (see above).

The Water Report states, [ldquo]Similarly, stored roads are intensively treated to minimize effects to streams and other waterbodies and have effects similar to decommissioned roads.[rdquo] No science or monitoring is cited to support that statement.

The Water Report states:

Existing condition percent sediment yields over natural for project area streams, where available, are produced from the Clearwater National Forest Watershed Condition Report (Jones and Murphy 1997) and presented in Table 6. These sediment yields are based on watershed modeling, and indicate that project area streams, within modeled drainages, were meeting Forest Plan percent sediment yield over natural conditions criteria in 1997.

It[rsquo]s unclear as to why this Report is citing 24-year old data instead of more recent information cited elsewhere. Furthermore, by ignoring Cobble Embeddedness data (Fisheries Specialist Report) the hydrologist is deceiving himself with the above statement.

The Water Report states: [ldquo]Comparison of the estimated pre- (current condition) and post-project (recovered condition) sediment delivery indicates no predicted net change in sediment delivery from roads as a result of the proposed action (Alternative 2).[rdquo] This ignores sediment dumped into project area streams DURINGtimber sale activities.

The Fisheries Specialist Report states, [ldquo]While Westlope (sic) Cutthroat Trout and Resident Rainbow Trout are known to occur in the project area, these species are not relevant to analysis due to their wider range of habitat requirements than bull trout.[rdquo] Please see Forest Plan Appendix K.

The Fisheries Specialist Report states:

Surface fine sediments is measured in percent. Based on the channel type, there are different tolerances of functionality. In the project area, there is only one area that is not in a high functioning category for percent surface fines. Deception Gulch was measured at 28.2%, which a low functioning category based on Deception Gulch being a B channel type. Deception Gulch is a tributary to the North Fork Clearwater River. Given that this is not an area of critical habitat for bull trout, and has no access to anadromous species, percent surface fines will not be analyzed in this report.

The Fisheries Specialist Report fails to state the relevance of [ldquo]surface fines[rdquo] in terms of the Forest Plan; it also ignores the inherent contractions from the Cobble Embeddedness data it discusses:

Cobble embeddedness (CE) is an indicator of habitat health. As the CE percentage increases in a stream, the ability of fish to use the stream for spawning or rearing decreases. The fine sediments will settle to the substrate and will cause a lack of gravel sorting in the stream beds. Another issue with high CE is it limits and reduces macro invertebrate development which can have implication on nutrient cycling and the food web. There are three levels of habitat functionality based on CE. High functioning systems are below 20% CE, moderately functioning systems are between 20-30%, and low functioning systems have a CE of over 30%.

Also (Id.):

[middot] Deception Gulch and Comet creek are low functioning[hellip]

[middot] Lake creek is moderately functioning[hellip]

[middot] Deadwood creek and Ruby creek are low functioning. Independence Creek is showing moderate functionality[hellip]

[middot] Osier, China, Swamp, Pollok, and Sugar creeks are all low functioning streams.

[middot] Moose creek is the only designated critical habitat for Bull Trout in the project area that is functioning at a high level.

So why[mdash]after 33 years of Forest Plan implementation, and 25 years after the Forest Plan was amended by PACFISH and INFISH[mdash]are these streams still not functioning near naturally or properly? The EA and specialists[rsquo] reports don[rsquo]t have the cumulative effects analyses to even allow speculation on this situation.

The Water Report states:

At best, any predicted runoff or erosion value would be within plus or minus 50% of the true value. Erosion rates are highly variable, and most models can predict only a single value. Replicated research has shown that observed values vary widely for identical plots, or the same plot from year to year (Elliot et al. 1995; Tysdal et al. 1999). Additionally, spatial variability and variability of soil properties add to the complexity of erosion prediction (Robichaud 1996). (Emphases added.)

The FS relies upon those unreliable modeling results to arbitrarily and capriciously claim [ldquo]no significant effects.[rdquo]

USDA Forest Service 1994b states [ldquo]It is important to realize that all models greatly simplify complex processes and that the numbers generated by these models should be interpreted in light of field observations and professional judgement.[rdquo] (III-77.) Harr, 1987 states:

Perhaps the most basic of the erroneous beliefs is the idea that simplicity can be willed onthe forest hydrologic system. This belief encourages the implementation of simplistic guidelines, the adoption of arbitrary thresholds of concern, and the search for all-

encompassing methodologies to predict consequences of forest activities on water resources. These actions occur sometimes with the blessings of hydrologists or soil scientists but other times over their objections. The belief in simplicity has been nurtured by the rapid increase in the use of computer simulation models in forest planning and the desire to accept the output from such models. Another reason for pursuit of simplicity is the current emphasis on planning called for by NFMA; such planning is often conducted under strict time and budgetary constraints.

I must point out that, on the average, the simplistic methodologies may have resulted in fairly prudent forest management. But rather than being viewed as merely a first attempt at solving a problem, they often seem to inhibit further investigation and development. Also, they tend to lead forest managers and some specialists to believe that hydrologic systems really do function in the manner described by the simplistic methodologies.

Forest hydrologic systems are more complex than one would believe after reading some of the methodologies and procedures that have been proposed to predict cumulative effects of logging on water resources. For example, many of these procedures state that a threshold of harvest activity or intensity will be determined, without specifying how it will be determined or whether it really exists or can be measured. Similarly, implementing a methodology for estimating cumulative effects of harvest operations on water resources does not mean that such cumulative effects either exist or can be measured.

(I)n our desire to simplify, to create a methodology that will predict consequences of harvest activities everywhere or in the average situation, we usually expend considerable energy creating a methodology that predicts reasonably accurately virtually nowhere. We may implement procedures without providing for testing or monitoring the results to see whether the procedures are, in fact, working. In the process, we may even develop a false sense of security that our methodology can really protect soil and water resources.

Analysis for the Dead Laundry timber sale acknowledges that proposed actions that could affect water resources include vegetation treatments, fuels treatments, temporary road construction, temporary road reconstruction on existing road templates, new system road construction, existing system road maintenance and reconstruction, and culvert replacements.

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

WUI project in 2018 (before the road in this exact same area was blown out from a landslide).

At center-top-third of this picture is a culvert, which you can[rsquo]t see because of the sediment. Below is a detail shot of the above picture where the culvert is.

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

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

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

This is how sedimentation gets into the stream, which can be upstream of any logging buffers next to the stream. Yet, the Forest Service bases its conclusion that there won[rsquo]t be sedimentation because PACFISH/INFISH buffers or BMPs will stop it.

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

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

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

These three photos are not meant to illustrate water quality problems of any specific stream, because the flow was not followed downslope to any water body destination, which it may or may not have reached before soaking into the soil. Instead, the photos show typical problems of roads without proper drainage features and/or lacking frequent enough maintenance, leading to accelerated erosion during storm or spring runoff events and necessitating more imminent maintenance steps needed to keep the road usable by the public. And this is ignored in the Dead Laundry EA and specialists[rsquo] reports.

Forest Plan standards include, [ldquo]Secure favorable condition of flow by maintaining the integrity and equilibrium of all stream systems.[rdquo] The EA fails to demonstrate that integrity and equilibrium of all stream systems is being maintained.

Forest Plan standards also include, [ldquo]Manage water quality and stream conditions to assure management activities do not cause permanent or long-term damage to beneficial uses.[rdquo] Since the EA fails to demonstrate that integrity and equilibrium of all stream systems is being maintained, it fails this standard also.

Forest Plan standards also include:

Design, schedule and implement management activities that would: 1) maintain water quality and stream conditions that are not likely to cause sustained damage to the biological potential of the fish habitat, 2) not reduce fish habitat productivity in the short- term below the assigned standard, 3) maintain water quality in a condition that is not likely to inhibit recovery of the fish habitat[hellip]

The EA and Reports are also ignoring the [ldquo]lag time between hilltop recovery (growth) and channel recovery[rdquo] (USDA Forest Service 1994b):

It is important to recognize that the Equivalent Clearcut Area model uses tree growth (canopy density) to estimate Spring peak flows and that channels do not recover immediately in response to tree growth. There is a lag time between hilltop recovery (growth) and channel recovery. The length of the lag time is difficult to predict and is likely to be influenced by factors other than simply canopy density (e.g. the role of culvert failures, in-stream activities, geology, etc.).

Peak flows can be altered by forest harvest activities after removal of canopy through less interception, which results in more snow accumulation and snowmelt available for runoff (Troendle and King 1985). The EA does not disclose the potential for the project to damage channel morphology and aquatic habitat, with its overly simplistic ECA methodology.

The analysis of the effects of roads fail to take into account the increases of extreme peak flows due to the high density of roads. Forest Service hydrologist Steve Johnson, states, [ldquo]Impacts from roads basically fall into three areas: introduced sediment into streams; snowmelt re-direction and concentration; and surface flow production.[rdquo] (Johnson, 1995.)

Johnson (1995) discusses how [ldquo]snowmelt re-direction and concentration and surface flow production[rdquo] increase peak flow amounts multiplicatively by the presence of roads in a drainage.

USDA Forest Service, 2017c explains that native westslope cutthroat trout have declined due to habitat degradation and competition with nonnative brook trout (the latter being ignored without considering their impacts on native trout species in the project area):

The distribution and abundance of westslope cutthroat trout has declined from historic levels (less than 59 percent of historically occupied stream habitat) across its range, which included western Montana, central and northern Idaho, a small portion of Wyoming, and portions of three Canadian provinces (Liknes and Graham 1988, Shepard et al. 2005). Westslope cutthroat trout persist in only 27 percent of their historic range in Montana. Due to hybridization, genetically pure populations are present in only 2.5 percent of that range (Rieman and Apperson 1989). Introduced species have hybridized or displaced westslope cutthroat trout populations across their range. Hybridization causes loss of genetic purity of the population through introgression. Within the planning area, genetically pure populations of westslope cutthroat trout are known to persist in Ruby Creek (MFISH 1992, 2012). Some of these remaining genetically pure populations of westslope cutthroat trout are found above fish passage barriers that protect them from hybridization, but isolate them from other populations.

Brook trout are believed to have displaced many westslope cutthroat trout populations (Behnke 1992). Where the two species co-exist, westslope cutthroat trout typically predominate in higher gradient reaches and brook trout generally prevail in lower gradient reaches (Griffith 1988). This isolates westslope cutthroat trout populations, further increasing the risk of local extinction from genetic and stochastic factors (McIntyre and Rieman 1995).

Habitat fragmentation and the subsequent isolation of conspecific populations is a concern for westslope cutthroat trout due to the increased risk of local and general extinctions. The probability that one population in any locality will persist depends, in part on, habitat quality and proximity to other connected populations (Rieman and McIntyre 1993). Therefore, the several small, isolated populations left in the project area are at a moderate risk of local extirpation in the event of an intense drainage-wide disturbance.

Habitat degradation also threatens the persistence of westslope cutthroat trout throughout their range. Sediment delivered to stream channels from roads is one of the primary causes of habitat degradation. Sediment can decrease quality and quantity of suitable spawning substrate and reduce overwintering habitat for juveniles which reduces spawning success and increases overwinter mortality. Roads can also alter the drainage network of a watershed and thereby increase peak flows. The end result of increased peak flows is decreased channel stability and accelerated rates of mass erosion. Across their range the strongest populations of westslope cutthroat trout exist most frequently in the wilderness, Glacier National Park, and areas of low road densities or roadless areas (Liknes and Graham 1988, Marnell 1988, Rieman and Apperson 1989, Lee et al. 1997).

Also see the USDA Forest Service, 2017c discussion on bull trout.

The INFISH Forest Plan Amendment was adopted in 1995. It includes direction such as Standards and Guidelines as well as Riparian Management Objectives (RMOs). Yet the Fisheries Specialist Report and EA fail to provide an analysis regarding PACFISH direction. Without an 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 any better now than in 1997. But there[rsquo]s no analysis that discusses current conditions in relation to RMOs. Apparently it[rsquo]s the FS[rsquo]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 [ldquo]open,[rdquo] 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.

Kappesser, 2002 discusses an assessment procedure used on the IPNF:

The RSI [Riffle Stability Index] addresses situations in which increases in gravel bedload from headwaters activities is depositing material on riffles and filling pools, and it reflects qualitative differences between reference and managed watersheds[hellip]it can be used as an indicator of stream reach and watershed condition and also of aquatic habitat quality.

According to Kappesser, 1992:

The stability condition of a watershed may be broadly determined by evaluating the level of harvest activity (ECA), its spatial distribution with regard to headwater harvest and rain on snow risk and the density of roading in the watershed with consideration of road location relative to geology and slope. Each of these four factors may [be] evaluated against [ldquo]threshold[rdquo] levels of activity characteristic of watersheds on the IPNF that are known to be stable, unstable, or on a threshold of stability.

ROS events can be the most channel changing, sediment producing events and can have a significant adverse effect on fish and their habitat (Kappesser, 1991b):

Filling of pools by bedload sediment is seen as a significant factor in the reduction of rearing and overwintering habitat for fish such as West Slope Cutthroat Trout (Rieman and Apperson, 1989). Bedload increases have traditionally been interpreted as the result of channel scour in response to increased peak flows created by timber harvest.

(Also see Kappesser, 1991a.) The Inland Northwest frequently gets at least one mid-winter chinook which is often accompanied by windy and rainy conditions. The warm wind blowing across the snow, especially in relatively open areas on south and southwestern facing slopes between 2,500 to 4,500 feet elevation results in rapid snow melt and high levels of instantaneous water flows.

Similar to its failure to downplay sediment impacts by avoiding genuine analysis, the FS minimizes the fact some of these stream channels already show signs of significant management- induced damage so further increasing peak flow is, by definition, significant.

It also makes no sense for the FS to say that the massive clearcutting will have no effect on water temperature. Even though relatively little vegetation disturbance would be carried out within default riparian buffers, those upland clearcuts correlate with increasing water temperatures in streams. Guenther et al. (2014) found increases in stream temperature in relation to selective logging. They found increases in bed temperatures and in stream daily maximum temperatures in relation to 50% removal of basal area in both upland and riparian areas. Increases in daily maximum temperatures varied within the logged area from 1.6 to 3 degrees Celsius.

US Fish and Wildlife Service (1998) recognizes, upland forest canopy removal raises stream temperatures. The FS must address best available science indicating the openings created by the project clearcuts would result in increases to water in streams. (Id.):

Groundwater entering streams (especially small streams) may be an important determinant of stream temperatures (Spence et al. 1996) or may provide localized thermal refugia in larger stream systems. Where groundwater flows originate above the neutral zone (16-18 meters below the surface in general) groundwater temperatures will vary seasonally, as influenced by air temperature patterns (Spence et al. 1996). Timber harvest from upland areas exposes the soil surface to greater amounts of solar radiation than under forested conditions (Carlson and Groot 1997), elevating daytime temperatures of both air and soil (Fleming et al. 1998, Buckley et al. 1998, Morecroft et al. 1998) and increasing diurnal temperature fluctuations (Carlson and Groot 1997).

Relationships between shallow source groundwater flows and air and soil temperatures indicate that harvest activities in upland areas may increase stream temperatures via increasing temperature of shallow groundwater inflows. Other pathways for harvest actions to influence stream temperature include changing the volume and timing of peak flows, elevating suspended sediment levels, and altering channel characteristics (Chamberlin et al. 1991, Spence et al. 1996, USDA and USDI 1998a).

US Fish and Wildlife Service, 1998 also states:

Bull trout spawning typically occurs in areas influenced by groundwater (Allan 1980; Shepard et al. 1984; Ratliff 1992; Fraley and Shepard 1989). In a recent investigation in the Swan River drainage, bull trout spawning site selection occurred primarily in stream reaches directly influenced by groundwater upwellings or directly downstream of these upwelling reaches (Baxter and Hauer, in prep.). In addition, warmer summer stream temperatures, as well as extreme winter cold temperatures that can result in anchor ice, may be moderated by cold water upwellings.

Surface/groundwater interaction zones, which are typically selected by bull trout for redd construction, are increasingly recognized as having high dissolved oxygen; constant cold water temperatures, and increased macro-invertebrate production (R. Edwards, University of Washington, pers. Comm. 1998).

The EA and Fisheries Specialist Report also don[rsquo]t contain an analysis of fish population trends. The Forest Plan requires such monitoring, but this is part of the failure of the FS to monitor as the plan requires. This goes for MIS, Sensitive, and ESA-listed species. The FS simply does not know population trends of native fish species.

There is insufficient analysis of the health of the populations of native aquatic species in project area streams. There[rsquo]s no discussion on how past management actions have affected fish. There isn[rsquo]t a proper cumulative effects analysis. NEPA and NFMA are violated.
SOIL

We incorporate our comments regarding soil (pp. 76-109) on the Draft Revised Forest Plan and Draft EIS within this Objection.

The EA includes practically no analysis of the current condition of soils in the project area, including cumulative impacts, a violation of NEPA. The EA has absolutely no analysis demonstrating compliance with Forest Plan or Regional direction regarding the soil, so one must have internet access to read the Soil Report.

The EA states, [ldquo]there is very little detrimental soil disturbance in the project area.[rdquo] However, contradicting that statement the EA also states, [ldquo]Under Alternative 1, no road decommissioning, decompacting of existing skid trails, or other potential actions would occur that would improve soil conditions at these sites and facilitate a more rapid recovery. Soils in these detrimentally disturbed areas would continue to remain in a less productive condition for the foreseeable future.[rdquo] And the Soil Report admits, [ldquo]The proposed project area has been extensively managed. Past management activities include timber harvest and roads, and have caused soil disturbance and decreased soil productivity in some areas.[rdquo]

The EA states, [ldquo]There are existing unneeded temporary roads and skid trails from past management that still exist in the Dead Laundry project area.[rdquo] The FS has not quantified such impacts.

The Soil Report makes misleading statements, such as, [ldquo]Changing logging method from tractor to cable system reduces soil disturbance by 8-20%, logging systems that switch from tractor to skyline reduce disturbance by 20% (Archer 2008).[rdquo] The mitigation measures do not really reduce existing soil disturbance. Implementation of some logging techniques may result in less soil disturbance than would have occurred with other techniques, but use of the word [ldquo]reduce[rdquo] in this context is false and misleading. The FS should just speak in accurate and frank terminology, and admit its timber sale will be causing increased damage to the soil, not [ldquo]reducing[rdquo] soil damage.

A. 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)[mdash]failing to accurately disclose existing amount of detrimental soil disturbance (DSD) within each activity area, failing to provide accurate estimates of DSD that would be attributable to project activities, and failing to provide reliable estimates of cumulative, post-project DSD in activity areas.

The Soil Report reports:

During implementation, some units may exceed R1 Soil Management Standards due to proposed harvest activities combined with high levels of existing disturbance from past activities. However, because of design features and recovery time, all units will be placed in a condition that will facilitate recovery, the expected cumulative effects will be within Regional soil quality standards, and overall soil productivity will be maintained.

Relying upon vague [ldquo]recovery time[rdquo] promises effectively renders meaningless the 15% Standard, however. The FS uses an arbitrary interpretation of mandatory Region 1 direction on soils.

The Clearwater Forest Plan includes the Forestwide Goal to [ldquo]Insure that soil productivity is maintained and no irreversible damage occurs to soil and water resources from Forest management activities.[rdquo] The FS has ignored that goal from day 1 of forest plan implementation.

Clearwater Forest Plan Soil Standard #11(a) states, [ldquo]Manage activities on lands with ash caps such that bulk densities on at least 85 percent of the area remain at or below 0.9 gram/cubic centimeter.[rdquo] The FS fails to demonstrate consistency with this standard. Nothing in the Soil Report indicates soil bulk density has been measured. This Forest Plan standard[rsquo]s limitations of increase in bulk density and R1 SQS limitations on DSD are not reconciled.

Geist et al., 1990 describe a methodology using a sampling grid, and they demonstrate that taking bulk soil density samples is quite feasible. This is necessary because deep, not necessarily visible subsurface compaction has been detected long after logging activities (e.g. Page- Dumroese, 1993).

The Soil Report indicates that the field surveys are only [ldquo]visual[rdquo] which don[rsquo]t take into account subsurface conditions:

The FSDMP consists of sampling along random azimuths at fixed-point spacing. At each sampling point, visual assessments are made to determine whether factors related to soil disturbance, including forest floor condition, soil compaction, displacement, rutting, platy structure, and burn intensity, are present. The presence of soil disturbance and disturbance class is determined at each point, and the percent soil disturbance of each treatment unit is calculated. (Emphasis added.)

Here[rsquo]s another statement from science and common sense in the Soil Report which the Dead Laundry project analysis[rsquo]s DSD methodology essentially downplays: [ldquo]Surface layers to a depth of several centimeters generally recover to undisturbed bulk densities faster than the subsurface layers, but the effects of unmitigated compaction can last for decades (Froehlich et al. 1985).[rdquo] (Emphasis added.) There is nothing in the EA or Soil Report that shows the FS will investigate this excruciatingly slow recovery of subsurface compaction. This is in regards to soil conditions deeper than a ripper, and even freeze-thaw processes, typically reach.

Page-Dumroese, et al., 2007 discuss wildly variable results of different soil compaction instruments, which is why the FS must explain the limitations of the compaction survey methodology. Determining compaction without providing a scientific basis for its accuracy or validity, is arbitrary and capricious.

Craigg and Howes (in Page-Dumroese, et al. 2007) state:

Meaningful soil disturbance standards or objectives must be based on measured and documented relationships between the degree of soil disturbance and subsequent tree growth, forage yield, or sediment production. Studies designed to determine these relationships are commonly carried out as part of controlled and replicated research projects. The paucity of such information has caused problems in determining threshold levels for, or defining when, detrimental soil disturbance exists; and in determining how much disturbance can be tolerated on a given area of land before unacceptable changes in soil function (productive potential or hydrologic response) occur. Given natural variability of soil properties across the landscape, a single set of standards for assessing detrimental disturbance seems inappropriate.

[hellip]Each soil has inherent physical, chemical, and biological properties that affect its ability to function as a medium for plant growth, to regulate and partition water flow, or to serve as an effective environmental filter. When any or a combination of these inherent factors is altered to a point where a soil can no longer function at its maximum potential for any of these purposes, then its quality or health is said to be reduced or impaired (Larson and Pierce 1991).

The Soil Report states, [ldquo]The presence of soil disturbance and disturbance class is determined at each point, and the percent soil disturbance of each treatment unit is calculated. Calculations based on monitoring and research (Archer 2008; Reeves et al 2011) were used to estimate direct and indirect soil disturbance from the proposed actions and also the cumulative effects from project design feature implementation.[rdquo] (Emphasis added.) However the concept of [ldquo]disturbance class[rdquo] is not found in Archer 2008 or Reeves et al., 2011. This classification is extremely subjective and not based upon DSD definitions. There is no discussion of the reliability of this system, for example the agreement between any given rater and others.

From Reeves et al 2011, we find the following [ldquo]Detrimental Soil Impacts Definition[rdquo]:

Existence of one, or a combination of any, of the attributes listed below can indicate detrimental soil conditions. After management activities of harvesting and site

prepa-ration, 85% of the activity area (harvest unit) must be in a satisfactory condition (without detrimental impacts). The Northern Region SQS define detrimental impacts as the fol-lowing (FSM 2500-99-1):

Compaction: a 15% increase in the natural bulk density. Cumulative effects of multiple site entries should be considered.

Rutting: wheel ruts at least 2 inches (5 cm) deep in wet soils.

Displacement: removal of >1inch (2.5 cm) of any surface horizon, usually the A horizon, from a continuous area greater than 100 ft2 (9.2 m2).

Severely burned soil: physical and biological changes to the soil resulting from high- intensity burns of long duration as described in the Burned-Area Emergency Rehabilitation Handbook (FSH 2509.13).

Surface erosion: rills, gullies, pedestals, and soil deposition.

Soil mass movement: any soil mass movement caused by management activity.

Again, soil bulk density wasn[rsquo]t measured or estimated.

Clearwater Forest Plan Soil Standard #11(b) states, [ldquo]Design resource management activities to maintain soil productivity and minimize erosion.[rdquo] The FS fails to demonstrate consistency with this standard. The FS fails to correlate this Forest Plan standard[rsquo]s mandate to maintain soil productivity and the R1 SQS proxy[mdash]limitations on DSD.

The FS also fails to demonstrate consistency with Clearwater Forest Plan Soil Standard #11(c), which states, [ldquo]The minimum coordinating requirements for projects on land types with high or very high mass stability or parent material erosion hazard ratings are:

(1) The field verification of the mapped unit and predicted hazard rating.

(2) Review road locations using a team consisting of an engineering geologist, hydrologist, soil scientist, and a silviculturist. Assess concerns and possible mitigation measures to determine if a geotechnical investigation is needed.

After the "P" line has been located, stake mitigating road designs, using the original ID team members and road designer.

The R1 SQS defines DSD:

1. Detrimental Soil Disturbance. These disturbances includes the effects of compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter, and soil mass movement. At least 85 percent of an activity area must have soil that is in satisfactory condition. Detrimental conditions include:

Compaction. Detrimental compaction is a 15 percent increase in natural bulk density. The cumulative effects of multiple site entries on compaction should also be considered since compacted soils often recover slowly.

Rutting. Wheel ruts at least 2 inches deep in wet soils are detrimental.

Displacement. Detrimental displacement is the removal of 1 or more inches (depth) of any surface soil horizon, usually the A horizon, from a continuous area greater than 100 square feet.

Severely-burned Soil. Physical and biological changes to soil resulting from high-intensity burns of long duration are detrimental. This standard is used when evaluating prescribed fire. Guidelines for assessing burn intensity are contained in the Burned-Area Emergency Rehabilitation Handbook (FSH 2509.13).

Surface Erosion. Rills, gullies, pedestals, and soil deposition are all indicators of detrimental surface erosion. Minimum amounts of ground cover necessary to keep soil loss to within tolerable limits (generally less than 1 to 2 tons per acres per year) should be established locally depending on site characteristics.

Soil Mass Movement. Any soil mass movement caused by management activities is detrimental.

From the Soil Report, it is impossible to determine how well or how accurately the amount of DSD was measured from past management activities that disturbed and damaged soil.

The Soil Report states, [ldquo]The soil disturbance estimates of proposed activities used in this project are mostly based on local monitoring and research results (Archer 2008, Reeves et al. 2011).[rdquo]

For each type of ground based logging, the Archer, 2008 average was at least 13% and the reported range was [ldquo]Tractor harvest led to 8 to 22% detrimental disturbance after harvest.[rdquo] An estimate based upon those results is not found in any part of the soil analysis we can find.

While the Soil Report acknowledges inaccuracies and data limitations, it still obscures the reliability of DSD data gathered by the methods the FS relied upon for the soils analysis. No inter-rater reliability determination was made. The FS analysis is not based upon high quality data.

The EA does not provide a statistically sound explanation of how accurate the values are, or what percentage error can be expected of its existing and estimated values for DSD. This renders the estimates and measures of DSD inadequate for demonstrating consistency with forest plan standards and the R1 SQS, in violation of NFMA.

The Soil Report claims that if design features are followed, the detrimental effects of the proposed action will not exceed the R1 SQS or Forest Plan standards. Again, the FS fails to provide adequate basis for that conclusion, and fails to explain the discrepancy between that statement and the results of monitoring it cites (Archer, 2008).

National forests in R-1 have monitored DSD with very mixed results. For example, a recent IPNF forest plan monitoring report (USDA Forest Service 2013a) revealed the relatively high frequency of violating their 15% standard, despite implementation of design features and BMPs. In fact, Reeves et al., 2011 found mixed results on compliance with the R-1 15% standard, with average DSD for activity areas for some Forests over 15%. Our point is, FS pledges to meet standards must be taken with a grain of salt.

NEPA requires that agencies specify the effectiveness of their mitigations. 40 C.F.R. 1502.16. The EA fails to specify the effectiveness of its mitigation of DSD. There is no quantitative monitoring data that demonstrates DSD remediation activities have taken a CNF activity area with DSD amounts violating the quantitative standard to an amount that no longer violates the standard. The project includes design criteria to utilizing existing skid trails and ripping and seeding of skid trail convergence areas, presumably to accelerate restoration of soil functioning and reduce DSD. However, USDA Forest Service 2005d states:

Decompaction can at least partly restore soil porosity and productivity. Soil displacement that mixes or removes the volcanic ash surface layer reduces soil moisture holding capacity, which may be irreversible and irretrievable. (Emphasis added.)

The soil report states, [ldquo]Past monitoring and research indicate that the effectiveness of the project design features would be moderate to high (McNabb and Froehlich 1983; Graham et al. 1994; Graham et al. 1999; Korb et al, 2004; Neary et al. 2009; Curran et al. 2005a, b; Wagenbrenner et al. 2015).[rdquo] This begs the question: which of those studies uses the FS definition of DSD to judge [ldquo]effectiveness[rdquo] of the mitigations?

Then there is the issue of the reliability and validity of the soil survey methods used by the FS. USDA Forest Service, 2012a states:

The U.S. Forest Service Soil Disturbance Field Guide (Page-Dumroese et al., 2009) was used to establish the sampling protocol.

[hellip]Field soil survey methodology based on visual observations, such as the Region 1 Soil Monitoring Guide used here, can produce variable results among observers, and the confidence of results is dependent on the number of observations made in an area (Page- Dumroese et al., 2006). The existing and estimated values for detrimental soil disturbance (DSD) are not absolute and best used to describe the existing soil condition. The calculation of the percent of additional DSD from a given activity is an estimate since DSD is a combination of such factors as existing groundcover, soil texture, timing of operations, equipment used, skill of the equipment operator, the amount of wood to be removed, and sale administration. (Emphasis added.)

Horn et al., 2007 state:

Generally, the data obtained for the measured soil stresses and the natural bearing capacityprove that sustainable wheeling is impossible, irrespective of the vehicletype and the working process.Top and subsoil compaction, an increase in precompression stress values in the various soil horizons, deep rut depth and vertical and horizontal soil displacement associated with shearing effects take place and affect the mechanical strength of forest soils...

For future forest use, deformed [compacted] areas must be classified as long-term irreversibly degraded (if we compare the nearly non-existing plant growth in traffic lanes more than 20 years old, not shown in this publication, but derived from in situ observations). They require, with respect to regaining pore functioning, many decades, if swelling and shrinkage, as well as biological strengthening, processes occur.

Following a study by Cullen et al., 1991 the authors concluded: [ldquo]This result lends support to the general observation that most compaction occurs during the first and second passage of equipment.[rdquo] Page-Dumroese (1993), in a Forest Service research report investigating logging impacts on volcanic ash-influenced soil in the Idaho Panhandle National Forest, states, [ldquo]Moderate compaction was achieved by driving a Grappler log carrier over the plots twice.[rdquo] Page-Dumroese (1993) also cited other studies that indicated: [ldquo]Large increases in bulk density have been reported to a depth of about 5 cm with the first vehicle pass over the soil.[rdquo] Williamson and Neilsen (2000) assessed change in soil bulk density with number of passes and found 62% of the compaction to the surface 10cm to come with the first pass of a logging machine. In fine

textured soils Brais and Camire (1997) demonstrated that the first pass creates 80 percent of the total disturbance to the site. The FS fails to consider and use the best available science, in violation of NFMA and additionally, NEPA's requirements for scientific integrity. See 36 C.F.R. 219.3; 40 C.F.R. 1502.24.

The FS does not properly account for all the long-term DSD in the project area, including locations outside current [ldquo]activity areas.[rdquo] The NPCNF[rsquo]s recent Lolo Insects and Disease FEIS discloses:

The limited soil productivity recovery in the areas impacted by roads and skid trails, even after 50 years of natural recovery, mirrors the results of recent research showing that abandoned roads, even well vegetated abandoned roads with 50 or more years of trees and shrubs, have levels of soil compaction, nutrients, and infiltration capacity similar to open and driveable roads (Lloyd et al, 2013; Foltz et al, 2007).

[hellip]Although soil recovery could still occur in remaining subsurface soils, the exceptionally high porosity and water-holding properties of the Mazama ash cap would likely be irrecoverable.

The Soil Report and EA are inconsistent in regards to ash cap soils. In some places the FS admits that loss of the ash cap due to erosion or displacement is essentially permanent (DSD), in other places it exclaims that the soils will recover so it won[rsquo]t be DSD. Such a gross inconsistency is a violation of NEPA.

The FS does not disclose the efficacy of particular BMPs for insuring post-project DSD levels are consistent with estimates or soil standards.

[ldquo]Most of the harvest in the Dead Laundry project area will be with skyline logging systems, so direct impacts to soil from machinery will be minimal and recovery will be relatively extensive and rapid.[rdquo] (Soil Report.) This illogically assumes that because DSD would occur over less areal extent, somehow the damage will recover more quickly. Where is the scientific basis for that?

It[rsquo]s also not clear if the amount of DSD attributable to temporary roads, swing trails and landings was included in activity area calculations, in conformance to R1 SQS methodology. The Soil Report does indicate, however, that impacts of motorized recreation is considered zero[mdash]without adequate basis.17

The arguments above call into question the clarity and consistency of the FS[rsquo]s Dead Laundry analysis and show noncompliance with NEPA's mandates for taking a hard look at impacts, and properly analyzing and clearly disclosing them.

17 [ldquo]Recreation activities, such as hunting, are expected to increase in the harvest units, so some soil disturbance may occur, probably from Off-Road Vehicles (OHV). Where, how much, and when OHV use may or may not occur is not predictable, and therefore not analyzed as part of cumulative effects.[rdquo] (Soil Report, emphasis added.)

Additionally, due to the above stated reasons, the FS fails to properly demonstrate consistency with the only quantitative standards for soils, in violation of NFMA.

B. Flawed Soil Quality Standards.

Next we examine the FS[rsquo]s methods for assuring the perpetual maintenance of soil productivity, which is what NFMA requires. The agency relies upon Region 1 Soil Quality Standards (R1 SQS) and forest plan standards that have not been properly validated for NFMA compliance.

The Forest Plan[rsquo]s definition of [ldquo]soil productivity[rdquo] is instructive:

The capacity of a soil to produce a specific crop such as fiber and forage, under defined levels of management. It is generally dependent on available soil moisture and nutrients and length of growing season.

Despite the Forest Plan definition's bias toward soils as mainly helping to produce lumber and beef, an implication for the myriad other resources18 that depend upon healthy soils is clear: the FS[rsquo]s ability to sustain all forest resources should at least begin with an understanding of the ability of the soil for producing the agency[rsquo]s favorite [ldquo]crops[rdquo], given that its management of timber inevitably and repeatedly damages soils, perpetually maintaining them in a damaged state. Ye the FS has little accounting of the extent of the accumulated damage.

In discussing the R1 SQS, USDA Forest Service, 2016a explains that a major cumulative effect they ignore is the indirect effect of soil damage, or DSD, on sustained yield. It states that the Soil Standards [ldquo]created the concept of [lsquo]Detrimental Soil Disturbance[rsquo] (DSD) for National Forests in Region One as a measure to be used in assessing potential loss of soil productivity resulting from management activities.[rdquo] USDA Forest Service, 2016a further explains (emphases added):

Without maintaining land productivity, neither multiple use nor sustained (yield) can be supported by our National Forests. Direct references to maintaining productivity are made in the Sustained Yield Act [ldquo][hellip]coordinated management of resources without impairment of the productivity of the land[rdquo] and in the Forest and Rangeland Renewable Resources Act [ldquo][hellip]substantial and permanent impairment of productivity must be avoided[rdquo].

Soil quality is a more recent addition to Forest Service Standards. The Forest and Rangeland Renewable Resources Act (1974) appears to be the first legal reference made to protecting the [ldquo]quality of the soil[rdquo] in Forest Service directives. Although the fundamental laws that directly govern policies of the U.S. Forest Service clearly indicate that land productivity must be preserved, increasingly references to land or soil productivity in Forest Service directives were being replaced by references to soil quality as though soil quality was a surrogate for maintaining land productivity. This was unfortunate, since although the two concepts are certainly related, they are not synonymous.

18 [ldquo]Soil is a critical component to nearly every ecosystem in the world, sustaining life in a variety of ways[mdash]from production of biomass to filtering, buffering and transformation of water and nutrients.[rdquo] Lacy, 2001.

Our understanding of the relationship between soil productivity and soil quality has continued to evolve since 1974. Amendments to the Forest Service Manual, Chapter 2550 [ndash] Soil Management in 2009 and again to 2010 have helped provide some degree of clarity on this issue and acknowledged that the relationship is not as simple as originally thought. The 2009 (2500-2009-1) amendment to Chapter 2550 of the Forest Service Manual states in section 2550.43-5, directs the Washington Office Director of Watershed, Fish, Wildlife, Air and Rare plants to [ldquo]Coordinate validation studies of soil quality criteria and indicators with Forest Service Research and Development staff to ensure soil quality measurements are appropriate to protect soil productivity[rdquo] (USFS-FSM 2009). Inadvertently this directive concedes that the relationship between soil productivity and soil quality is not completely understood. In the end, the primary objective provided by National Laws and Directives relative to the management of Forest Service Lands continues to be to maintain and where possible potentially improve soil productivity. (Emphases added.)

USDA Forest Service, 2007 states:

Sustained yield was defined in the Kootenai Forest Plan [hellip]as [ldquo]the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National

Forest System without permanent impairment of the productivity of the land.[rdquo] Sustained yield is based on the lands[rsquo] ability to produce.

That statement is on point: Since the FS has no idea how much soil has been permanently impaired either within the project area or forest-wide, [ldquo]sustained yield[rdquo] is an empty promise. We note that the FS's only quantitative measurement of soil conditions upon which its standards are based are, again, DSD. In other words, the FS is left depending upon data disclosing the amount of DSD, and upon standards limiting such damage. In other words, the FS adopted DSD as a proxy[mdash]a substitute[mdash]reductions in soil productivity caused by management. However, the FS doesn't cite any science as basis for explaining how its cap on activity area DSD to 15% corresponds to maintaining soil productivity in any meaningful ecological way.

Continual and repeated application of projects, hardly limited by the R1 SQS, will result in soils maintained at a damaged condition in perpetuity. The FS has no quantitative data or inventory of the continuous deficit of soil or land productivity. To the U.S. Department of Agriculture, accountability for losses of soil productivity on national forests is to be avoided.

Powers et al., 2005 explains:

(T)rying to measure the productive potential of a site directly by assaying trends in tree or stand growth is fraught with frustrations and uncertainty. Growth trends in operational stands vary with stand age, structure, stocking and treatment history, and usually lack reference controls for comparison. Alternatively, soil-based indices of productive potential have been proposed as a more objective measure of a site[rsquo]s capacity for vegetative growth. The USDA Forest Service has adopted this approach and first approximation working standards are in place throughout the federal regions. Meant as monitoring tools, these standards are presumed to reflect a site[rsquo]s potential, and to

mark thresholds for significantly impaired productivity. (Emphasis added; internal citations omitted.)

How and where these numerical thresholds are set is part of what we're questioning. The FS's favorite crop[mdash]trees[mdash]take decades to mature for harvest as lumber, and well over a century to collectively develop old-growth habitat character critical for the wildlife species discussed elsewhere in this objection.

Getting back to the origin of the 15% threshold the R1 SQS uses, there is another passage under the heading of Scientific Uncertainty and Controversy in the NPCNF[rsquo]s Johnson Bar FEIS:

Defining the threshold at which productivity is detrimentally disturbed is controversial. The rationale for the 15% limit of change in soil bulk density was largely based on the collective judgment of soil researchers, academics, and field practitioners, and the accepted inability to detect changes in productivity less than 15% using current monitoring methods (Powers 1990). Powers (1990) states that the soil quality guidelines are set to detect a decline in potential productivity of at least 15%. This statement does not mean that the Forest Service tolerates productivity declines at this level, but that it recognizes problems with detection limits.

This sidesteps most of the controversy of FS assessment of soils[mdash]that the limitations of soil productivity measurements are not why the R1 SQS standards were set at 15%. The FS knows that the R-1 SQS limits are based on the fact that it is not feasible to do much less damage than 15% of an activity area while carrying out industrial logging. USDA Forest Service, 2008b states:

The 15% change in aerial extent realizes that timber harvest and other uses of the land result in some impacts and impairment that are unavoidable. This limit is based largely on what is physically possible, while achieving other resource management objectives.

The R1 SQS were developed by the agency internally, without following the public processes such as Forest Planning, NEPA, or independent scientific peer review. In doing so, the FS obscures scientific and ecological deficiencies of the R1 SQS.

The FS chose 15% as its upper limit on soil damage within a unit merely because it believes that logging the merchantable trees and disposing of the slash often compacts or otherwise damages up to 15% of the areal extent of an [ldquo]activity area.[rdquo] This limit has nothing to do with the science of maintaining soil productivity. In other places (USDA Forest Service, 2008b) the FS considers and discloses this fact.

Nesser, 2002 makes a distinction between the threshold for which soil compaction is considered to be detectable (15% increase in bulk density) and the 15% areal limit for detrimental disturbance, which is the R1 SQS upper limit on the sum of the various kinds of DSD:

The 15% standard for increases in bulk density originated as the point at which we could reliably measure significant changes, considering natural variability in bulk density. It

may or may not mean that a 15% increase in BD is detrimental. That may depend on the soil and ecosystem in which it is found. (A)pplying the 15% areal limit for detrimental damage is not correct... (T)hat was never the intent of the 15%
limit ...and NFMA does not say that we can create up to 15% detrimental conditions, it says basically that we cannot create significant or permanent impairment, period. How that works out in terms of practicality is the

problem. (Emphasis added.)

So we have the R1 SQS 15% areal extent limit being based on mere feasibility rather than concerns over soil productivity, and additionally we have the 15% bulk density increase limit based upon the limitations of detection of available soil compaction measurement methods[mdash] not detection of reductions in soil productivity itself. The FS[rsquo]s failure to disclose this is a violation of NEPA.

The Soil Report states, [ldquo]The 5-year and ten-year results from the North American Long-Term Soil Productivity Study (LTSP) have been published (Powers et al., 2005; Page-Dumroese et al. 2006).[rdquo] It[rsquo]s now 2021; has the FS abandoned its [ldquo]Long-Term[rdquo] soil productivity study?

We also note that it doesn[rsquo]t matter how sensitive the soils, how steep the land, how poor the site is for growing trees, the varying aspects, the varying ratings of landslide or mass wasting potential, the varying ratings of erosion risk, the varying underlying geology, the varying presence of ash cap, the varying amounts of ground cover due to recent fire[mdash]the R1 SQS standard (15%) doesn[rsquo]t vary. This is consistent with its rigid basis in operational feasibility.

Page-Dumroese et al., 2000 emphasize that utilization of such thresholds does not account for these real-world variables:

Research information from short- or long-term research studies supporting the applicability of disturbance criteria is often lacking, or is available from a limited number of sites which have relative narrow climatic and soil ranges. [hellip]Application of selected USDA Forest Service standards indicate that blanket threshold variables applied over disparate soils do not adequately account for nutrient distribution within the profile or forest floor depth. These types of guidelines should be continually refined to reflect pre-disturbance conditions and site-specific information. (Emphasis added.)

To our knowledge, the refinement of the R1 SQS recommended by Page-Dumroese et al., 2000 has not occurred.

The Soil Report states, [ldquo]Landslide prone areas have been field verified and mapped with ArcMap. Unit boundaries have been altered so that harvest activities and temporary roads will avoid these unstable areas.[rdquo] Yet there[rsquo]s no basis in the report for that statement.

The FS does not disclose that the SQS methodology for [ldquo]activity areas[rdquo] inherently encourages gerrymandering. For example, areas not previously logged or less impacted can be lumped into project [ldquo]activity areas[rdquo] diluting existing DSD and creating a lower average.

The R1 SQS and Forest Plan standards also fail to specifically address the sensitive nature of postfire soils[mdash]the operational limits/standards remain the same. And it doesn't matter if [ldquo]High and moderate burn severity areas have 50 to 100 percent bare soil exposed; much of it with reduced capacity for water infiltration[rdquo] (Johnson Bar FEIS) or [ldquo]High severity [ndash] complete consumption of duff and mineral soil surface visibly reddish or orange color[rdquo] (Woodrat EA). Instead of considering these areas to have DSD of 50-100%, the FS underestimates the DSD.

The FS does not properly distinguish between the issues of soil disturbance and soil productivity. Whereas soil disturbance measures physical signs of potential soil productivity losses, the FS[rsquo]s measures of soil disturbance do not necessarily provide scientifically valid and reliable measures of soil productivity[mdash]the latter being the focus of NFMA requirements.

The DSD limits are the only quantitative standards the agency recognizes for the purposes of complying with NFMA[rsquo]s substantive mandate to insure against irreversible losses in soil productivity. The Forest Management Handbook at FSH 2509.18 recognizes the need to validate the assumptions underlying the R1-SQS thresholds for soils disturbance. It directs the Forest Service to perform validation monitoring to [ldquo]Determine if coefficients, S&Gs, and requirements meet regulations, goals and policy[rdquo] (2.1 [ndash] Exhibit 01). It asks what we ask: [ldquo]Are the threshold levels for soil compaction adequate for maintaining soil productivity? Is allowing 15% of an area to be impaired appropriate to meet planning goals?[rdquo] (Emphasis added.)

A Forest Service scientific report (Grier et al., 1989) proposed a measure of soil productivity: [ldquo]the total amount of plant material produced by a forest per unit area per year.[rdquo] They cite a study finding [ldquo]a 43-percent reduction in seedling height growth in the Pacific Northwest on primary skid trails relative to uncompacted areas[rdquo] for example. And in another Forest Service scientific report (Adams and Froehlich, 1981) states:

Measurements of reduced tree and seedling growth on compacted soils show that significant impacts can and do occur. Seedling height growth has been most often studied, with reported growth reductions on compacted soils from throughout the U.S. ranging from about 5 to 50 per cent.

Your Lolo Insect and Disease FEIS admits, [ldquo]Although soil recovery could still occur in remaining subsurface soils, the exceptionally high porosity and water-holding properties of the Mazama ash cap would likely be irrecoverable.[rdquo] However, the Dead Laundry EA and Soil Report fail to quantify these irreversible and irretrievable soil losses in the project area or forestwide.

The Forest Plan includes Forest Plan Monitoring Requirement 11, requiring monitoring of [ldquo]Site

Productivity[rdquo]19 to be measured annually, and contains a [ldquo]Research Need[rdquo] to [ldquo]Determine the effect of different fire intensities on basic soil fertility.[rdquo] Yet the EA and Soil Report don[rsquo]t cite any such monitoring or research.

19 Defined in the Forest Plan as [ldquo]Production capability of specific areas of land[rdquo], which is similar to the definition of soil productivity.

USDA Forest Service 2014a discusses and discloses the complexities of fire and management- induced changes on soils:

Management activities can result in both direct and indirect effects on soil resources. Direct and indirect effects may include alterations to physical, chemical, and/or biological properties. Physical properties of concern include structure, density, porosity, infiltration, permeability, water holding capacity, depth to water table, surface horizon thickness, and organic matter size, quantity, and distribution. Chemical properties include changes in nutrient cycling and availability. Biological concerns commonly include abundance, distribution, and productivity of the many plants, animals, microorganisms that live in and on the soil and organic detritus.

The R-1 SQS and definition of DSD consider alterations to physical properties, but not chemical or biological properties. The R-1 SQS does not adequately consider best available science, in violation of NEPA. One of these biological properties is partly represented by naturally occurring organic debris from dead trees. The R1 SQS recognize the importance of addressing potential long-term soil impacts due to losses of large woody debris, but include only discretionary guidelines to address the issue.

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

The ...descriptions of microbial structures and processes suggest that they are likely to provide highly critical conduits for the input and movement of materials within soil and between the soil and the plant. Nitrogen and carbon have been mentioned and are probably the most important. Although the movement and cycling of many others are mediated by microbes, sulfur phosphorus, and iron compounds are important examples.

The relation between forest soil microbes and N is striking. Virtually all N in eastside forest ecosystems is biologically fixed by microbes... Most forests, particularly in the inland West, are likely to be limited at some time during their development by supplies of plant-available N. Thus, to manage forest growth, we must manage the microbes that add most of the N and that make N available for subsequent plant uptake. (Internal citations omitted.)

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

Amaranthus, Trappe, and Molina (in Perry, et al., 1989a) recognize [ldquo]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.[rdquo]

Also:

[ldquo]The big trees were subsidizing the young ones through the fungal networks. Without this helping hand, most of the seedlings wouldn[rsquo]t make it.[rdquo] (Suzanne Simard: http://www.ecology.com/2012/10/08/trees-communicate/)

[ldquo]Disrupting network links by reducing diversity of mycorrhizal fungi[hellip] 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.[rdquo] (Simard et al., 2013.) (Also see the YouTube video [ldquo]Mother Tree[rdquo] embedded within the Suzanne Simard [ldquo]Trees Communicate[rdquo] webpage at: https://www.youtube.com/watch?v=-8SORM4dYG8&feature=youtu.be) and also this one on the [ldquo]Wood Wide Web[rdquo] on Facebook: https://www.facebook.com/BBCRadio4/videos/2037295016289614/.

Gorzelak et al., 2015:

[hellip]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 [ldquo]tree talk[rdquo] is a foundational process in the complex adaptive nature of forest ecosystems.

Also see: [ldquo]Trees Talk to Each Other in a Language We Can Learn, Ecologist Claims[rdquo].

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

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

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

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

USDA Forest Service, 2015a indicates:

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

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

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

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

We are concerned about are invasive species, specifically on this ranger district, and it seems like, for a purpose and need of forest health, logging would ignore these issues. For example, Friends of the Clearwater did a BioBlitz on the Palouse Ranger District in the fall of 2019. FOC took observations of the species observed in what you have marked as [ldquo]old growth,[rdquo] an area logged about twenty years ago, and an area logged within the past ten years. In the area logged within the past ten years, we found ventenata dubia, a noxious invasive grass that increases fire risk and has become a problem in the Pacific Northwest. We refer the North Fork District to our brief report on ventenata and the references cited, in the folder [ldquo]Hoots 2020 Ventanata report[rdquo] as part of our input on the District[rsquo]s White Pine project, for your review and consideration. There is nothing in the EA that considers, addresses, or mitigates the establishment of ventenata. Given it is already in the CNF, we want to know how the FS plans to address it.

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

C.  DSD improvements improperly attributed to mitigation.

The FS does not disclose the analytical data that supports proposed soil mitigation/remediation measures. NEPA requires the FS to specify the effectiveness of its mitigations. (40 C.F.R.

1502.16.)

The FS does not cite studies or monitoring verifying that design criteria and mitigations it proposes have been tested and validated by the Clearwater NF, especially in relation to numerical cause-and-effect assessments of DSD.

Mitigation and restoration actions are not demonstrated to truly be effective in reducing DSD and restoring soil productivity within a short time frame.

The Soil Report reveals existing DSD along with Dead Laundry timber sale activities will cause cumulative predicted DSD to exceed the threshold of 15%. Yet the FS concludes the DSD will be < 15% over some unspecified time frame because of mitigation. The FS also proposes to decompact decommissioned temporary roads. We note, however, the NPCNF[rsquo]s American River/Crooked River FEIS (USDA Forest Service, 2005d) states:

Decompaction can at least partly restore soil porosity and productivity. Soil displacement that mixes or removes the volcanic ash surface layer reduces soil moisture holding capacity, which may be irreversible and irretrievable. (Emphasis added.)

[ldquo]Road decommissioning has been effective in maintaining forest productivity (Lloyd et al, 2013).[rdquo] (Soil Report.) This is a curious cite, given the study is about restoring[mdash]not maintaining[mdash]soil functioning. We also note that Lloyd et al., 2013 did not utilize a measure of DSD corresponding to the FS proxy when assessing effectiveness of restoration.

Of decompaction as a mitigation, USDA Forest Service, 2015a admits:

Anticipated Effectiveness: Low to high. Many soil characteristics and operating decisions affect the outcomes of this feature. Forest plan monitoring has shown a 30-60 percent reduction in compaction as measured by bulk density of the soil.

USDA Forest Service, 2005b reports, [ldquo]It is acknowledged that the effectiveness of soil restoration treatments may be low, often less than 50 percent.[rdquo] (P.3.5-20.)

USDA Forest Service, 2005b states, [ldquo]Monitoring of winter-logging soil effects conducted by the Forest Soil Scientist on the Bitterroot National Forest over the past 14 years has shown that 58% of the ground-based, winter-logged units failed to meet the R1 SQS. Winter-logging resulted in an average of 16% detrimentally damaged soil.[rdquo] (P. 3.5-21.)

Forest Service Timber Sales Specialist Flatten, 2003 examines the practice of wintertime ground based logging and discusses what winter conditions provide the best protection for the soil resource. He points out the complexities and uncertainties of pulling off successful winter logging that effectively avoids of soil damage, which the FS does not consider. He concludes:

The conditions necessary to provide protection of the soil resource during winter logging can be both complex and dynamic. Guidelines that take a simplified approach, though well understood during project planning, will likely become problematic once operations begin. The result may be inadequate soil protection or unnecessary constraints on operations. Winter logging guidelines should be developed that incorporate the latest research on snowpack strength and frozen soil and provide measurable criteria for determining when appropriate conditions exist.

USDA Forest Service, 2007c admits that soil displacement is essentially permanent anyway, despite restoration:

Surface soil loss from roads through displacement and mixing with infertile substrata also has long lasting consequences for soil productivity because of the superiority of the volcanic ash surface layer over subsoils and substrata. (P. 4-76.)

NEPA requires the FS to specify the effectiveness of its mitigations. 40 C.F.R. 1502.16. The FS fails to specify the effectiveness of its mitigation of DSD. Given that consistency with the R1 SQS must be demonstrated by accurate estimates and measures of DSD, and that the FS claims the discretion to recognize no limits on amounts of activity area DSD after logging and before its [ldquo]restoration[rdquo] is implemented to supposedly nullify some percentage of that DSD, then any proof would have to be based upon quantitative, numerical measurements, not unsupported claims of improvement as found in project documents.

To be clear: we are not saying that mitigation and restoration are not effective to a degree. We are saying that the FS cannot attach specific DSD improvement percentages to its mitigation or restoration methodology. Given the critical role soils provide for the functioning of ecosystems[mdash]from the nutrients for the growing of trees and other vegetation that provides not only timber but habitat structure and forage for wildlife, filtering and holding of water, and native vegetation that resists invasive species[mdash]we firmly believe that the FS is recklessly risking soil productivity using vague, [ldquo]the check[rsquo]s in the mail[rdquo] mitigation and restoration. The FS isn't demonstrating consistency with forest plan soil standards or the R1 SQS, in violation of NFMA.

Ironically, with the FS vilifying the effects of natural processes throughout the EA (and using such characterizations as support for the project purpose and need) it is natural processes that are offered as the only reliable way to achieve soil recovery[mdash]but over an unspecified time period:

[middot]	[ldquo]Gradual, natural recovery of heavily compacted soils, such as old skid trails and temporary roads, would occur over the course of decades. (EA)

[middot]	[ldquo][hellip]soil recovery occurs over time[rdquo] (Soil Report)

[middot]	[ldquo]In situ soil disturbance can fully recover over time, eventually regaining its complete ecological function and usual productivity.

[middot]	[ldquo]The soil productivity associated with temporary roads and skid trails will eventually be restored.[rdquo] (Soil Report)

But seriously, does anyone really believe the FS won[rsquo]t want to be back into this project area with more tree farming, management meddling and associated new soil damage prior to the time it takes for natural recovery to mitigate the damage?

The FS certainly has no plans to monitor soil recovery. It only wants to see if the logging and burning activities violate the R1 SQS and Forest Plan long after anything can be done about it: [ldquo]Geir, et al., (2018) determined that a significant amount of soil recovery occurs 3-5 years after all activities have been completed.[rdquo] (Soil Report.)

Ultimately, managers refuse to face the fact that, as the Soil Report states, [ldquo]the effects due to soil loss from mass movement, erosion, or other displacement from a specific site can be considered permanent for the disturbed site.[rdquo] (Emphasis added.)

After over thirty years of implementing the Forest Plan (which includes Forest Plan monitoring requirement 11), the agency cannot specify DSD improvement percentages to its management methodology.

Any FS implication that its management actions will result in specific amounts of net improvement in percentages of DSD is arbitrary and capricious. The FS cites no quantitative monitoring data that demonstrates that its restoration activities have taken an activity area with DSD amounts violating a standard to an amount that no longer violates a standard.

D.  Failure to analyze and disclose the watershed level and cumulative implication of chronically compacted or otherwise detrimentally disturbed soils.

The FS[rsquo]s [ldquo]analysis area[rdquo] for soil productivity is individual treatment units and associated skid trails, landings, and temporary roads within the project area. Their logic is, there would be no indirect effects of damaged soils, outside those specific locations. And therefore certainly no cumulative effects from previously damaged soils, outside those specific locations. Yet the FS contracts what it writes in several other places. For example, from USDA Forest Service, 2008f:

Many indirect effects are possible if soils are detrimentally-disturbed[hellip] Compaction can indirectly lead to decreased water infiltration rates, leading to increased overland flow and associated erosion and sediment delivery to stream. Increased overland flow also increases intensity of spring flooding, degrading stream morphological integrity and low summer flows.

But no matter how compacted the soils are outside the proposed individual treatment units and associated skid trails, landings, and temporary roads, the fact that reduced water infiltration in those other locations is contributing to increased water yield and erosion during storm events[mdash] so what? And if the previous logging in those other locations resulted in a paucity of legacy wood that, if present, would be incorporated into the soil and hold water and transmit nutrients for the next generation[rsquo]s timber stand[mdash]so what?

And if those previously disturbed areas outside the proposed individual treatment units and associated skid trails, landings, and temporary roads have become prime growing sites for noxious weeds[mdash]many species of which are well-adapted to disturbed sites and some of which actively inhibit native vegetation from recovering and therefore the sites exhibit reduced productivity[mdash]so what?

The FS fails to disclose how widespread project area DSD is, only focusing on the proposed individual treatments, in violation of NEPA. The FS fails to consider and use best available science, in violation of NFMA and additionally, NEPA's requirements for scientific integrity. See 36 C.F.R. 219.3; 40 C.F.R. 1502.24.

The NPCNF conducted such an analysis with the American River/Crooked River project FEIS (USDA Forest Service, 2005d), which stated:

Cumulative effects may also occur at the landscape level, where large areas of compacted and displaced soil affect vegetation dynamics, runoff, and water yield regimes in a subwatershed. About 4,849 acres are currently estimated to have sustained detrimental compaction or displacement in the American River watershed due to logging, mining, or road construction. [hellip] About 4,526 acres are currently estimated to have sustained detrimental compaction or displacement in the Crooked River watershed due to logging, mining, and road or trail construction.

(Emphasis added.) USDA Forest Service, 2005d also disclosed:

An estimated 73 percent (208) of past activity areas on FS lands in American River (and an estimated 69 percent (166) of past activity areas on FS lands in Crooked River) today would show detrimental soil disturbance in excess of 20 percent.

American River (and most of Crooked River) is considered similar in soils and logging history to Red River, where 80 percent of sampled tractor logged activity areas did not meet Forest Plan standards. In many instances, these impacts occurred prior to forest plan implementation, but monitoring of more recent activities shows inconsistent improvement in practices. This degree of soil damage is consistent both with other Forest monitoring (USDA FS 1988a, 1990, 1992), and research (Krag, 1991; Froehlich, 1978;

Davis, 1990, Alexander and Poff, 1985).

Indirect effects of soil surface and substratum erosion include effects to vegetation and hydrologic processes.

The point is for the FS to account for all soil damage in a project area, including the cumulative effects of fire, past management, and other anthropogenic causes. We object to the FS[rsquo]s failure to incorporate the best available science and then disclose the full extent of soil restoration needs in these watersheds. USDA Forest Service, 2009c states, in regards to project area sites where DSD soils were not to be restored by active management: [ldquo]For the [hellip]severely disturbed sites,[hellip] [ldquo]no action[rdquo] [hellip]would create indirect negative impacts by missing an opportunity to actively

restore damaged soils. These sites would naturally recover in time, approximately 60 to 80 years.[rdquo] (Emphasis added.)

Again, much of this comes from FS[rsquo]s experts. The Bitterroot National Forest admits that subwatersheds which have high levels of existing soil damage could indicate a potential for hydrologic and silviculture concerns. (USDA Forest Service, 2005b, p. 3.5-11, 12.) The Idaho Panhandle National Forests (USDA Forest Service, 2007c) acknowledge that soil conditions affect the overall hydrology of a watershed:

Alteration of soil physical properties can result in loss of soil capacity to sustain native plant communities and reductions in storage and transmission of soil moisture that may affect water yield and stream sediment regimes.

(P. 4-76, emphasis added.)

Nothing in the Dead Laundry watershed analysis section specifically addresses the hydrological implications of the cumulative soil damage caused by past management added to timber sale- induced damage in project area watersheds. The FS fails to consider and use the best available science, in violation of NFMA and additionally, NEPA's requirements that the FS demonstrate scientific integrity. See 36 C.F.R. 219.3; 40 C.F.R. 1502.24.

USDA Forest Service, 2009c states:

Compaction can decrease water infiltration rates, leading to increased overland flow and associated erosion and sediment delivery to streams. Compaction decreases gas exchange, which in turn degrades sub-surface biological activity and above-ground forest vitality. Rutting and displacement cause the same indirect effects as compaction and also channel water in an inappropriate fashion, increasing erosion potential.

Kuennen et al., 2000 (a collection of Forest Service soil scientists) state:

An emerging soils issue is the cumulative effects of past logging on soil quality. Pre- project monitoring of existing soil conditions in western Montana is revealing that, where ground-based skidding and/or dozer-piling have occurred on the logged units, soil compaction and displacement still are evident in the upper soil horizons several decades after logging. Transecting these units documents that the degree of compaction is high enough to be considered detrimental, i.e., the soils now have a greater than 15% increase in bulk density compared with undisturbed soils. Associated tests of infiltration of water into the soil confirm negative soil impacts; the infiltration rates on these compacted soils are several-fold slower than rates on undisturbed soil.

[hellip]The effects of extensive areas of compacted and/or displaced soil in watersheds along with impacts from roads, fire, and other activities are cumulative. A rapid assessment technique to evaluate soil conditions related to past logging in a watershed is based on a step-wise process of aerial photo interpretation, field verification of subsamples, development of a predictive model of expected soil conditions by timber stand, application of this model to each timber stand through GIS, and finally a GIS summarization of the predicted soil conditions in the watershed. This information can

then be combined with an assessment of road and bank erosion conditions in the watershed to give a holistic description of watershed conditions and to help understand cause/effect relationships. The information can be related to Region 1 Soil Quality Standards to determine if, on a watershed basis, soil conditions depart from these standards. Watersheds that do depart from Soil Quality Standards can be flagged for more accurate and intensive field study during landscape level and project level assessments. This process is essentially the application of Soil Quality Standards at the watershed scale with the intent of maintaining healthy watershed conditions. (Emphases added.)

Kootenai National Forest hydrologist Johnson, 1995 noted this effect from his reading of the scientific literature: [ldquo]Studies by Dennis Harr have consistently pointed out the effects of the compacted surfaces (roads, skid trails, landings, and firelines) on peak flows.[rdquo] Elevated peak flows harm streams and rivers by increasing both bedload and suspended sediment, which is not adequately analyzed in the FS[rsquo]s watershed analysis.

It is clear that the R1 SQS intend the FS to consider the cumulative effects of past and proposed soil disturbances to assure that soil productivity will be maintained. This includes impacts from activities that include logging, motorized vehicle use, livestock grazing, etc. Such cumulative effects analysis found in the Soil and Water Conservation Practices Handbook (FSH 2509.22), which states:

Practice 11.01 [ndash] Determination of Cumulative Watershed Effects

OBJECTIVE: To determine the cumulative effects or impact on beneficial water uses by multiple land management activities. Past, present, or reasonably foreseeable future actions in a watershed are evaluated relative to natural or undisturbed conditions.

Cumulative impacts are a change in beneficial water uses caused by the accumulation of individual impacts over time and space. Recovery does not occur before the next individual practice has begun.

EXPLANATION: The Northern and Intermountain Regions will manage watersheds to avoid irreversible effects on the soil resource and to produce water of quality and quantity sufficient to maintain beneficial uses in compliance with State Water Quality Standards. Examples of potential cumulative effects are: 2) excess sediment production that may reduce fish habitat and other beneficial uses; 3) water temperature and nutrient increases that may affect beneficial uses; 4) compacted or disturbed soils that may cause site productivity loss and increased soil erosion; an 5) increased water yields and peak flows that may destabilize stream channel equilibrium.

IMPLEMENTATION: As part of the NEPA process, the Forest Service will consider the potential cumulative effects of multiple land management activities in a watershed which may force the soil resource[rsquo]s capacity or the stream[rsquo]s physical or biological system beyond the ability to recover to near-natural conditions. A watershed cumulative effects feasibility analysis will be required of projects involving significant vegetation removal, prior to including them on implementation schedules, to ensure that the project, considered with other activities, will not increase sediment or water yields beyond or

fishery habitat below acceptable limits. The Forest Plan will define these acceptable limits. The Forest Service will also coordinate and cooperate with States and private landowners in assessing cumulative effects in multiple ownership watersheds.

Booth, 1991 further explains the relationship between soil quality conditions and hydrology:

Drainage systems consist of all of the elements of the landscape through which or over which water travels. These elements include the soil and the vegetation that grows on it, the geologic materials underlying that soil, the stream channels that carry water on the surface, and the zones where water is held in the soil and moves beneath the surface. Also included are any constructed elements including pipes and culverts, cleared and compacted land surfaces, and pavement and other impervious surfaces that are not able to absorb water at all.

[hellip]The collection, movement, and storage of water through drainage basins characterize the hydrology of a region. Related systems, particularly the ever-changing shape of stream channels and the viability of plants and animals that live in those channels, can be very sensitive to the hydrologic processes occurring over these basins. Typically, these systems have evolved over hundreds of thousands of years under the prevailing hydrologic conditions; in turn, their stability often depends on the continued stability of those hydrologic conditions.

Alteration of a natural drainage basin, either by the impact of forestry, agriculture, or urbanization, can impose dramatic changes in the movement and storage of water.

[hellip]Flooding, channel erosion, landsliding, and destruction of aquatic habitat are some of the unanticipated changes that [hellip]result from these alterations.

[hellip]Human activities accompanying development can have irreversible effects on drainage-basin hydrology, particularly where subsurface flow once predominated. Vegetation is cleared and the soil is stripped and compacted. Roads are installed,

collecting surface and shallow subsurface water in continuous channels. [hellip]These changes produce measurable effects in the hydrologic response of a drainage basin.

The FS fails to consider and use the best available science, in violation of NFMA and additionally, NEPA's requirements for scientific integrity. See 36 C.F.R. 219.3; 40 C.F.R. 1502.24.

VISUAL QUALITY

The EA concluded that Visual Quality Objective (VQOs) would be met despite the massive clearcutting and burning, including several clearcuts over the generally accepted 40-acre limit. Either VQOs are rather meaningless, or more likely the EA does not present an analysis consistent with more logical interpretations of

VQOs and Forest Plan requirements.

In conclusion, it is clear the FS must prepare an Environmental Impact Statement in order to correct the problems we[rsquo]ve identified in these comments. Please keep each of our organizations on the list to receive all communications concerning the Dead Laundry timber sale proposal.

Sincerely submitted,

Jeff Juel, Montana Policy Director Friends of the Clearwater

And on behalf of:

| | |
|---|---|
| Adam Rissien, ReWilding Advocate | Mike Garrity |
| WildEarth Guardians | Alliance for the Wild Rockies |

References cited

This list will be provided shortly.