September 22, 2019

Forest Supervisor, Objection Reviewing Officer
Colville National Forest Supervisor's Office
ATTN: Objections
765 South Main
Colville, WA 99114

Subject: OBJECTION to Boulder Park Ecological Restoration Project

Sent via email to: objections-pnw-colville@usda.gov

Pursuant to 36 CFR 218 regulations, this is an objection to the draft Decision Notice (DN) proposing to implement the Proposed Action Alternative from the August 2019 Boulder Park Ecological Restoration Project Environmental Assessment (Boulder Park EA) on the Newport Ranger District, Colville National Forest (CNF). The Responsible Official is District Ranger Gayne Sears. This objection is filed on behalf of Objectors Upper Columbia River Group - Sierra Club (UCRG), Alliance for the Wild Rockies (AWR) and Paul Sieracki.

The DN would authorize 9,010 acres of logging: 4,480 acres or seven square miles of "shelterwood" which is a type of clearcutting where the loggers would "harvest all trees except about 12-25 trees per acre"; 4,480 more acres of "commercial thin"; and 50 acres of "group selection" which is made up of small clearcuts.

The DN would also authorize construction of 11 miles of new National Forest road and 13 miles of "temporary" road; removal of approximately 22 miles of closed roads and 3 miles of open roads from the Forest transportation system; and "closure" and "storage" (place in maintenance level 1 status) of approximately 12 miles of open National Forest road post-project using gates or other means—the majority of which are dead-end spurs that are currently un-drivable.

The DN would also authorize "approximately 25 miles of FS system roads will be decommissioned."[1]

DN Appendix B – Response to Public Comments refers to public input: "Most concerns about the project centered on recreational access, road management, forest health treatments, and treatments in sensitive areas. However, other concerns included treatment of noxious weeds, effects of uncontrolled wildfire on private property, and the socio-economic impact of the project." This misses most of the issues Objectors raised in comments. And reading the responses reveals a further lack of acknowledgment of our issues. Many comments were entirely ignored. Our citing of peer reviewed scientific research in comments was met mostly with stony silence. Whereas many of the scientific conclusions in research articles we cited contrast to those found in the EA, the Forest Service never attempted to reconcile the difference or even state why

[1] However, DN Appendix B indicates that the implementation of this road decommissioning is not guaranteed due to uncertainties of funding sources.

those scientists' conclusions wouldn't apply to the project area. So we incorporate by reference into this Objection our April 18, 2019 comment letter (UCRG/AWR EA comments) as well as the comment letter submitted on April 14, 2019 by Paul Sieracki on behalf of himself and AWR (Sieracki/AWR EA comments). Note that the purple text in this Objection is text repeated verbatim from UCRG/AWR EA comments and the blue text is text repeated verbatim from Sieracki/AWR EA comments.

ENVIRONMENTAL ASSESSMENT VIOLATES NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

This issue was raised in UCRG/AWR EA comments at pp. 3-4.

The Environmental Assessment (EA) includes Section 3: "Environmental Impacts of the Proposed Action" but contains no analysis or comparison of alternatives. NEPA regulations at 40 CFR § 1508.9 state:

> *Environmental assessment*
> (a) Means a concise public document for which a Federal agency is responsible that serves to (1) Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.
> (b) Shall include brief discussions of the need for the proposal, of alternatives as required by section 102(2)(E), of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted.

The cover letter announcing the comment period states, "The **environmental assessment** in snow available for a 30-day comment period" (emphasis added). The legal notice states the "EA is now available for public review" but later says, "The purpose of this comment period is to provide an opportunity for the public to review and comment **on a proposed action**…" (emphasis added). We already commented on the Proposed Action—that's what the FS requested on April 12, 2018. The legal notice also indicates the EA "analyzes one action alternative…" but doesn't mention a no-action alternative—because there isn't any. The EA is basically an expanded "Proposed Action" which is why the legal notice calls it that. The EA does not conform to the regulations, nor to USDA regulations at 36 CFR § 220.

The DN Appendix B responds, "Per 36 CFR 220.7(b) - The EA may document consideration of a no-action alternative through the effects analysis by contrasting the impacts of the proposed action and any alternative(s) with the current condition and expected future condition if the proposed action were not implemented." First, the FS is not free to make up regulations that violate NEPA. Second, the EA still fails to perform the contrast DN Appendix B claims the agency is allowed to do.

So we have the EA claiming "a need to improve the Batey-Bould Motorcycle Trail to increase user safety and protect soil and water resources" and listing actions in response, specifically:

- Reconstruct or replace 3 or more bridges as safety concerns are identified (e.g., rotting structures, stream blockages) following aquatic, cultural and botany clearances.

- Sections of trail exhibiting unacceptable resource impacts (e.g., deep rutting, unauthorized reroutes) may be rerouted up to 75 feet from the existing trail following cultural and botany clearances. The abandoned section of the trail would be restored.

However, the EA complete fails to analyze and disclose the **environmental impacts** of those proposed actions. Nor does the EA analyze and disclose why the ongoing **environmental impacts** are so "unacceptable". This leaves that portion of the Purpose and Need without any justification.

The EA states, "To meet the project's purpose and need, the Colville National Forest reviewed both the existing forest plan (1988, as amended) and the revised plan currently under development." Apparently, the FS is planning for the possibility that the Revised Forest Plan will be signed before a decision on the Boulder Park project (timber sale) is made. The EA makes vague statements such as "The actions described in this EA are consistent with the direction that is currently being evaluated within the revised plan" and "The proposed revised forest plan addresses similar conditions and management actions as the existing plan." Apparently, the FS doesn't believe the new Forest Plan would set significant new direction, which is disturbing to all of us who have engaged during the years of public planning process.

Adding to that agency disdain for public involvement and NEPA, there's the EA's overall lack of reference to existing forest plan direction after the beginning of page 6. The EA does not demonstrate the proposed action is consistent with all applicable Forest Plan direction, including standards and guidelines. It cannot do so because it doesn't state what those applicable standards and guidelines are, let alone explain how project actions would be consistent with them.

So for example, nothing in the EA addresses scenic integrity requirements of the Forest Plan.

The Boulder Park EA is also oblivious to the needs for changes to the forest plan, as identified during the Forest Plan revision process.

DN Appendix B states, "The Boulder Park project is consistent with both the 1988 Forest Plan and the 2019 Revised Land Management Plan being signed by the responsible official." It is not possible for the public to know if the project is consistent with a Plan that has not been finalized. The FS continuously flaunts NEPA.

The EA states at p. 5, "Management direction for each management area (MA) is provided by the forest plan, which describes the goals, objectives, standards, guidelines, and management prescriptions..." EA Table 1 lists the "emphasis of each MA" for the various 1988 Forest Plan Management Allocations found in the Boulder Park project area. We find no analysis of the degree to which the FS has met those goals, objectives, standards and guidelines over 30+ years of Forest Plan implementation.

EA Table mentions, "Old growth dependent species habitat" management emphasis for MA-1, and later states, "Old growth dependent species habitat (MA-1), pine marten, and pileated woodpecker habitat, areas with lynx range, and areas without road access not treated would remain at risk to future insect and disease outbreaks." However, nowhere does the EA disclose

what management actions are proposed for MA-1, in response to its Forest Plan "management emphasis." The EA is, as we stated above, little but a glorified Proposed Action that fails to conform to NEPA.

There is little difference, if any, between the alternative proposed in the Scoping Notice to the draft proposed action in the Boulder-Park EA. These comments incorporate the author's (Paul Sieracki) Scoping Notice comments (Attached) and comments for the embedded Packer Meadow Riparian Pasture and Meadow "Enhancement" project. Additional comments are below, the issues brought up in the Scoping Notice are not addressed in the EA. There are numerous violations of NEPA especially the lack of cumulative effects analysis and erroneous application of research paper recommendations.

NEPA's objectives are (1) to ensure that agencies take a "hard look" at every significant aspect of the environmental impact of a proposed action, and (2) to guarantee that relevant information is available to the public to promote well-informed public participation. "NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken." 40 C.F.R. § 1500.1(b) . An agency cannot take any action or make any commitment of resources before making its final decision that would have an adverse environmental impact or prejudice or limit the choice of reasonable alternatives.

This comment letter demonstrates that, if implemented, the decision would have an adverse environmental impact and that Extraordinary Circumstances would exist. Significant impacts to the sensitive Northern Goshawk will occur from logging and implementation of the HRV concept within nesting territories. Because of global heating and the high risk of eliminating subalpine habitats from logging, using the Canada lynx management guidelines may negatively impact the ESA listed lynx, wolverine and other associated species of boreal habitats. Clearly because of the significant impact to the environment an EIS has to be prepared.

Some major issues include not developing the promised HRV for old growth, lack of cumulative effects to northern goshawk habitat, lack of surveys for other raptors and the *glaring lack of analysis of fisher habitat* because it was delisted from sensitive species consideration due to it's impact on timber outputs. The author is more than willing to do a field visit to confirm old growth or to field review any other issue the USFS has questions about.

The information presented in the proposed action is insufficient to prepare substantive comments. Despite three public meetings and a field trip, the scoping notice does not portray the existing condition of the various topics required to be addressed in the NEPA document, especially wildlife and old growth. There was little data presented on the occurrence of sensitive threatened and endangered species based on fresh wildlife surveys. The fisheries biologist could not indicate based on fish surveys if there were pure strains of cutthroat trout above barriers to brook trout in streams that area currently blocked from the main stream from fish barriers. The silviculturalist could not provide stand exams for the area being proposed for logging and later provided stand exams for a few stands.

In conclusion, the Newport Ranger District was unresponsive to input from interested publics during the 3 public meetings and one field trip and only minimally modified their proposed action.

Remedy:

ILLEGITIMATE COLLABORATION PROCESS

This issue was raised in UCRG/AWR EA comments at pp. 1-2 and Sieracki/AWR comments at 17-18.

The EA states, "An Interdisciplinary Team (IDT) identified opportunities for actions in the Boulder Park Ecological Restoration Project area and presented them to a collaborative group including the Kalispel Tribe, Northeast Washington Forestry Coalition (NEWFC), Pend Oreille County Commissioners, and off-highway vehicle (OHV) group representatives at meetings in January and July of 2018." Local special interests are prioritized over the interests of the U.S. public—regardless of where those Americans live or whether or not they can attend collaborative meetings to make sure their interests are being heard. Dukes and Firehock, 2001 wrote a guide for environmental advocates which includes a set of principles. None of the collaborative entities mentioned in the EA would subscribe to those collaborative, democratic principles.

This "collaboration" is actually collusion among special interest groups and set the stage for the FS's skewed proposed action. So we have a massive road building (11 miles of "new system" roads and 13 miles of "new temporary" roads) and logging (9,010 acres) proposal for our national forest land.

The Colville National Forest should use a Science Consistency Review Group instead of a biased timber output Collaborative process.

The Northeastern Washington Forest Coalition is Not a Science Consistency Review Group. We urge the FS utilize its own non -collaborative process, the Science Consistency Review, to evaluate this alternative along with your PA. Guldin et al. (2003) state that:

> *...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.***

The FS would enlist objective, independent peer review to evaluate its PA and the alternative we request. Such an undertaking would also assist the public, per NEPA direction, in understanding best available science.

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

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

- The under-representation of conservation interests in many collaborative efforts, a perception that there is a heavy skew of the membership of the group against conservation and in favor of the folks who are impacting the environment.

- An inappropriate and often dominant role played by the Forest Service in some collaborative processes.

- Those making a profit from federal lands will dominate these processes because they have the organizational and financial capacity and resources to participate over the long haul.

- Collaboration sets up two classes of citizens, those who are part of the process and those who aren't, even if the latter participate fully in the NEPA process.

- Collaboration weeds out dissent and opposition and is most conducive to defending the status quo.

- Collaboration is undermining, subverting, and disempowering the more democratic NEPA process.

- There is a contrast between an exclusive and self-selected set of (often) paid interest groups participating in a collaborative versus a more broad-based and inclusive public participation process governed by NEPA.

- Collaborative groups having a disproportionate amount of influence with the Forest Service.

- Collaborative group recommendations precede NEPA analysis, and there is an implicit understanding the collaborative group's recommendation will be implemented, rendering the NEPA process a pro forma exercise.

- Laws such as the ESA are designed to be used and enforced by citizens, who forgo such rights by being included in collaborative groups.

- Collaborative groups do not consider the best available science on resource management.

- Collaborative groups promote logging which is a pretense or price to be paid for genuine forest restoration.

Remedy: Select the No-Action alternative.

INADEQUATE EMPHASIS ON RESTORATION

This issue was raised in UCRG/AWR EA comments at pp. 2, 4-5, 10, 11, 15, 17, 21, 32, 37-38, 42, 72, 76, 77, 79, 80 and Sieracki/AWR EA comments at p. 2.

It is extremely offensive that the Forest Service (FS) refers to this massive timber sale proposal as "ecological restoration." True restoration of already heavily logged and roaded watersheds would prioritize removing the impediments to natural recovery. The Montana Forest Restoration Committee adopted 13 Principles, written collaboratively by a diverse set of stakeholders which included two national forest supervisors along with representatives from timber and forest products industries, conservation groups, recreation interests, and others.

Boulder Park Proposed Logging is not Restoration

Regeneration and commercial thin logging will cause stand level forest simplification. Early seral stages created by fire are structurally complex and biologically diverse. Early seral plantations created through logging loose that structural and biological complexity, by leaving a minimal amount of snags and recruitment trees. "Parking" out mature or old growth moist site stands will reduce vertical and horizontal diversity, homogenizing the stand. For example the Pacific Wren reaches it's highest density in moist old growth stands. The Varied Thrush's nest is "usually placed in conifer, at base of branches against trunk, 5-15' above the ground" (http://www.audubon.org/field-guide/bird/varied-thrush). It will reduce the stand's suitability for ground and understory nesting songbirds. This would occur at a large landscape level with implementation of the existing and proposed new Forest Plans. Natural succession which provides habitat for early successional species will be truncated by the almost immediate tree planting of commercial, genetically selected trees. The solution to biodiversity loss is a rewilding program where roads are eliminated, and fire is introduced and commercial logging eliminated.

Frissell and Bayles, 1996 state: "If natural disturbance patterns are the best way to maintain or restore desired ecosystem values, then nature should be able to accomplish this task very well without human intervention."

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

ALTERNATIVES

UCRG/AWR EA comments made detailed suggestions for a set of alternative management actions at pp. 4-7, and similarly in UCRG/AWR May 14, 2018 comments on the Proposed Action.

Our request for consideration of an alternative with features as we presented them was ignored and dismissed without sufficient reasoning or discussion. The EA violates NEPA.

The Montana Forest Restoration Committee adopted 13 Principles, written collaboratively by a diverse set of stakeholders which included two national forest supervisors along with representatives from timber and forest products industries, conservation groups, recreation interests, and others. Principle #3 states:

> Use the appropriate scale of integrated analysis to prioritize and design restoration activities: Use landscape, watershed and project level ecosystem analysis in both prioritization and design of projects unless a compelling reason to omit a level of analysis is present. While economic feasibility is essential to project implementation, **priorities should be based on ecological considerations and not be influenced by funding projections.** (Emphases added.)

Consistent with this principle, the FS would first publish a landscape assessment so a genuine public scoping process could help determine project priorities. Instead, the FS promoted Congress's ill-informed priorities for this project area (logging) to subsidize narrow special interests. Concerns for such important issues as maintaining and restoring wildlife and fish populations, habitat security, water quality, and soil productivity have not been properly considered.

We support some of the actions proposed, specifically those reducing road density and restoring aquatic habitat and watersheds, including decommissioning "nearly six miles of road segments within RHCAs." However, the EA's only alternative fails to take a genuinely comprehensive approach to restoring aquatic habitat and watersheds. It fails to analyze an alternative that results in a road system which is fully affordable to maintain on an annual basis, within all of the watersheds affected by the proposal. The level of expected appropriations would be the yardstick to measure "affordable", based on recent years' funding levels.

The actions needed to reduce the road system to this affordable level need not themselves be within expected budgets. Indeed, few restoration projects proposed or implemented by the FS are fully funded by appropriated dollars. Figuring out a way to fund road decommissioning would follow from a Decision to implement it. That would be a way to truly collaborate.

In analyzing such an alternative, it may turn out that some of the proposed road work would be unnecessary or would be modified. For example, some roads proposed for maintenance or upgrading may not be affordable to maintain, or may be located where chronic sedimentation into streams persists. In such cases consideration of highest restoration priorities would require full road obliteration. This alternative would construct no new roads (temporary or system recognition of the long term ecological and financial liabilities they pose. The alternative would reduce the road network in the project area watersheds consistent with the forest plan and with best available science for maintaining robust populations of native fish. By reducing the footprint of roads, such an alternative would reduce the spread of noxious weeds and their associated costs and environmental damage.

Such an alternative would be in compliance with the Travel Management Rule 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. This alternative would be consistent with Montana Forest Restoration Committee Principle #13, which is to "Establish and maintain a safe road and trail system that is ecologically sustainable."

Such an alternative would fully decommission/obliterate the entire length of any unauthorized ATV/OHV routes on national forest land in the project area to restore hydrologic functioning and soil productivity, reduce spread of noxious weeds, and promote ecosystem integrity.

Such an alternative would not log, mechanically treat or build roads within unroaded/roadless areas. The Scientific Assessment which was a basis for the ICBEMP EIS, along with volumes of other scientific research, point out that Wilderness and roadless areas already have the highest ecological integrity of all national forest lands.

Such an alternative would maximize the short-term sequestration of carbon in the forest, because already dangerously elevated greenhouse gases are an immediate issue that must be addressed. The Committee of Scientists, 1999 recognize the importance of forests for their contribution to global climate regulation and the 2012 Planning Rule defines *Ecosystem services* partially as the "Benefits people obtain from ecosystems, including: (2) *Regulating services,* such as long term storage of carbon; climate regulation…"

Such an alternative would be consistent with the findings by Bradley, et al. 2016 who "found forests with higher levels of protection had lower severity values even though they are generally identified as having the highest overall levels of biomass and fuel loading." Among the major findings were that areas undisturbed by logging experienced significantly less intensive fire compared with areas that have been logged. From a news release announcing the results of the study (http://www.biologicaldiversity.org/publications/papers/):

> "We were surprised to see how significant the differences were between protected areas managed for biodiversity and unprotected areas, which our data show burned more severely," said lead author Curtis Bradley, with the Center for Biological Diversity.
>
> The study focused on forests with relatively frequent fire regimes, ponderosa pine and mixed-conifer forest types; used multiple statistical models; and accounted for effects of climate, topography and regional differences to ensure the findings were robust.
>
> "The belief that restrictions on logging have increased fire severity did not bear out in the study," said Dr. Chad Hanson, an ecologist with the John Muir Project. "In fact, the findings suggest the opposite. The most intense fires are occurring on private forest lands, while lands with little to no logging experience fires with relatively lower intensity."
>
> "Our findings demonstrate that increased logging may actually increase fire severity," said Dr. Dominick A. DellaSala, chief scientist of Geos Institute. "Instead, decision-makers concerned about fire should target proven fire-risk reduction measures nearest homes and keep firefighters out of harm's way by focusing fire suppression actions near towns, not in

the back country."

We urge the FS to utilize its own process, the Science Consistency Review, to evaluate our suggested alternative along with the EA's only alternative. Guldin et al. 2003:

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

The FS would enlist objective, independent peer review to evaluate its action alternative, and the alternative we request. Such an undertaking would also assist the public, per NEPA direction, in understanding best available science.

The second Purpose and Need is "There is a need to improve stream habitat connectivity and provide quality pool habitat for bull trout and westslope cutthroat trout. There is a need to remove or relocate road segments that are impacting riparian habitats and water quality. … There is a need to reduce the high open road densities in the project area to improve seclusion for big game and for rare species such as grizzly bears and wolverines." What would it cost to complete those actions alone? Likewise, what would be their economic effects, in terms of jobs and other ripple effects to the local and regional economy?

Because this alternative is skewed towards logging and illegal if implemented we encourage the USFS to develop and select an alternative the truly represents forest and ecosystem restoration through road removal, introduction of fire in appropriate areas, preservation of existing goshawk PFA's, endangered species and subalpine habitats.

Requests

First and formost, rewild the landscape. If the USFS refused this request the following is requested. This list is partial and does not include all the requests in the text above.

- Fire refugias (areas on the landscape where stand replacing fire is less likely) be delineated.
- Old growth be quantitatively mapped and recruitment stands be designated to the 30% level.
- Carbon offset purchases be required.
- Electric logging equipment be used.
- The cattle allotment be bought out or terminated (see attached comments for that CE).
- No logging in subalpine habitats except for daylight clearing around whitebark pine.
- Please provide stand exam data showing which areas allocated for late successional species actually meet the criteria and are therefore functioning.

- Please provide site specific data on which allocated areas are being currently being utilized by pileated woodpeckers for nesting, disclosing the effectiveness of the late successional area allocations.
- The commentors request that three-toed woodpecker habitat be mapped and that spatially explicit habitat modeling be utilized to display the existing condition and disclose the effects of the alternatives.
- The commentors request that host – parasite relationships involving western larch and dwarf mistletoe be retained in all units and areas of dwarf mistletoe concentration be mapped and retained.
- Disclose the results of monitoring primary excavator habitat at the Forest Level and disclose the snag densities in the Project area, and the method used to determine those densities.
- Please spatially model potential and suitable dusky grouse habitat for existing condition and alternatives including projections into the future based on a range of climate models.
- Please conduct an additional northern goshawk survey as repetitive surveys may reveal missed active nesting territories.
- The commentors request that a spatial analysis be completed identifying potential nesting areas along with an in depth goshawk survey.
- Please disclose Forest Plan monitoring results for the goshawk.
- The commentors do not support the construction of any temporary roads for the project.
- That total road densities in the analysis area be reduced to 0.5 miles per square mile to provide reduced human disturbance for abundant and resilient wildlife populations especially old growth asssociated ones..
- The commentors request that proposed units that are contiguous or near pine marten, barred owl and MA1's be removed or adjusted to optimize pine marten habitat patches. Utilizing commercial thins and regeneration logging adjacent to these areas will reduce structural complexity and result in marten avoidance of these units.
- Fisher and pine marten habitat should be mapped in the analysis area.
- Bait stations and cameras should be used to continually attempt to discover presence of fisher.
- An area closure on trapping be implemented until fisher populations are documented, rebound or are reintroduced.
- Elimination of all poisoning of pocket gophers or other small mammals in plantations to prevent biological magnification and the loss of predatory species.
- WDFW be included in collaboration meetings in relation to reintroducing and recovering the fisher population.

Remedy: Select the No Action alternative. Alternatively, prepare an EIS that addresses issues we've raised at every stage of public involvement by fully analyzing such an alternative as previously outlined.

ILLEGITIMATE "DESIRED CONDITIONS"

This issue was raised in UCRG/AWR EA comments at pp. 4, 8-9; also at pp. 7-9 (Resilience).

The EA makes statements such as "The Boulder Park Ecological Restoration Project moves the area toward desired conditions" but doesn't state where it gets its "desired conditions." There is little specific direction in the Forest Plan.

DN Appendix B failed to clarify the source of the EA's desired conditions. The FS has adopted them as management direction in the absence of NEPA procedures, which is illegal.

The EA's first Purpose and Need statement includes, "The intent would be to make the landscape more resilient and compatible with characteristic disturbance processes such as wildland fire, insects, and diseases, and provide habitat diversity for wildlife."

A plethora of scientific evidence directs that DCs be more properly stated in terms of **desired future dynamics**, much in line with evolving science. Hessburg and Agee (2003) for example, state:

> Patterns of structure and composition within existing late-successional and old forest reserve networks will change as a result of wildfires, insect outbreaks, and other processes. What may be needed is an approach that marries a short-term system of reserves with a long-term strategy to convert to a continuous network of landscapes with dynamic properties. In such a system, late-successional and old forest elements would be continuously recruited, but would shift semi-predictably in landscape position across space and time. Such an approach would represent a planning paradigm shift from NEPA-like desired future conditions, to planning for landscape-scale **desired future dynamics**.

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

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

(Emphasis added.) There is plenty of support for such an approach in the scientific literature. Noss 2001, for example, believes "If the thoughtfully identified critical components and **processes of an ecosystem are sustained**, there is a high probability that the ecosystem as a whole is sustained." (Emphasis added.)

Noss 2001 describes basic ecosystem components:

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

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

> **Composition** includes the kinds of species present in an ecosystem and their relative abundances, as well as the composition of plant associations, floras and faunas, and

habitats at broader scales. We might describe the composition of a forest, from individual stands to watersheds and regions.

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

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

(Emphasis added.) Hutto, 1995 also addresses natural processes, referring specifically to fire: Fire is such an important creator of the ecological variety in Rocky Mountain landscapes that the conservation of biological diversity [required by NFMA] is likely to be accomplished only through **the conservation of fire as a process**…Efforts to meet legal mandates to maintain biodiversity should, therefore, be directed toward **maintaining processes like fire**, which create the variety of vegetative cover types upon which the great variety of wildlife species depend.

(Emphases added.) Kauffman, 2004 states:

> 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.

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

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

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

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

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

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

Hessburg and Agee 2003 also emphasize the primacy of natural processes for management purposes:

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

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

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

Now we examine what the Colville NF means by the term, "resilience." The EA fails to disclose an objective, measurable definition of "resilience." On page 5 of the Colville NF's Sanpoil EA is a shaded text block headed by the question, "What is Resilience?" After citing some sources the text block answers, "***the ability of a forested area to survive a disturbance event, specifically wildfire and insect attack, relatively intact and without large scale tree mortality***" (emphasis in original). It also emphasizes the intent of management is to "set the area on a trajectory to where natural processes such as fire and insects can play a role in the system without causing large scale mortality." The FS thus demonizes disturbance events that result in a lot of tree mortality. Whereas that perspective is consistent with the idea of growing timber for industrial production

(i.e., tree farming), it's at odds with best available science and ecological knowledge—and conflicts with the most of the values national forests were established to protect, those which don't involve resource extraction.

Also, despite using the term "forest health" quite extensively in the EA, the FS never defines it.

The EA likewise presents false and misleading information on the insect causes and effects of tree mortality, demonizing yet another natural process. Whereas effects on trees from insects and fire might be negative from a tree farming perspective, this is a national forest—not a tree farm. The agency is constantly forgetting the more important values.

"Resiliency" tends to be a "black box" or red herring used by the FS to claim the forest isn't healthy without any data to back up such claims. Please fully disclose the metrics the agency uses to measure resiliency, so that objective measures of resiliency can be applied by a scientist or any rational person to the Boulder Park project area now, immediately after the project is completed, and at 10-year intervals hence.

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

The project is claimed to reduce insect and disease problems, but the EA does not reconcile such statements with the following best available science concerning forests:

> "(A)ttributes such as decadence, dead trees …are important…" (Green et al., 1992).
> "Accumulations of large-size dead standing and fallen trees that are high relative to earlier stages." (Id.)
> "Decadence in the form of broken or deformed tops or bole and root decay." (Id.)
>
> "The big trees were subsidizing the young ones through the fungal networks. Without this helping hand, most of the seedlings wouldn't make it." (Suzanne Simard: http://www.ecology.com/2012/10/08/trees-communicate/)
> "Disrupting network links by reducing diversity of mycorrhizal fungi… can reduce tree seedling survivorship or growth (Simard et al, 1997a; Teste et al., 2009), ultimately affecting recruitment of old-growth trees that provide habitat for cavity nesting birds and mammals and thus dispersed seed for future generations of trees." (Simard et al., 2013.)
> (Also see the YouTube video "Mother Tree" embedded within the Suzanne Simard "Trees Communicate" webpage at: https://www.youtube.com/watch?v=-

8SORM4dYG8&feature=youtu.be) and also this one on the "Wood Wide Web" on Facebook: https://www.facebook.com/BBCRadio4/videos/2037295016289614/.

Gorzelak et al., 2015:

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

Also see: "Trees Talk to Each Other in a Language We Can Learn, Ecologist Claims".

"It is also important to note that heterogeneity or homogeneity at one scale does not necessarily result in heterogeneity or homogeneity at larger scales (Hessburg et al. 2015)." Where does the EA analyze heterogeneity or homogeneity at **any** scale?

The EA states, "Stands that currently exhibit late structure or old-growth characteristics would not be treated…" What are the metrics the FS is using to determine if a stand is "late structure" or "old-growth characteristics"? And if that statement is true, why does Table 9 show a loss of 2 acres of "Late Closed" structural stage after logging?

"Approximately 515 treated acres from past projects contributes to the continuity of the proposed treatment area." The EA fails to explain the locations and relevance of these 515 acres.

Frissell and Bayles (1996) ask:

> Is the *range* of variability in ecosystems conditions really what we seek to emulate, or is it more important to maintain in a broader sense the full patter of states and successional trajectories (Frissell et al., in press)? Strictly speaking, the range of variability is defined by extreme states that have occurred due to climatic or geologic events over long time spans. Nothing says these extreme states were favorable for water quality or aquatic biodiversity, and in fact such natural-historical extremes were probably no more favorable for these values than present-day extremes. From the point of view of many aquatic species, the range of natural variability at any one site would doubtless include local extirpation. At the scale of a large river basin, management could remain well within such natural extremes and we would still face severe degradation of natural resource and possible extinction of species (Rhodes et al., 1994). The missing element in this concept is the landscape-scale *pattern* of occurrence of extreme conditions, and patterns over space and time of recovery from such stressed states. How long did ecosystems spend in extreme states vs. intermediate or mean states? Were extremes chronologically correlated among adjacent basins, or did asynchrony of landscape disturbances provide for large-scale refugia for persistence and recolonization of native species? These are critical questions that are not well addressed under the concept of range of natural variability as it has been framed to date by managers.

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

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

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

The FS has recognized that natural processes are vital for achieving ecological integrity. USDA Forest Service, 2009a incorporates "ecological integrity" into its concept of "forest health" thus:

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

The FS's strategy to move towards desired future vegetation conditions focuses on achieving static conditions, instead of fostering the natural dynamic characteristics of ecosystems. An abundance of scientific evidence indicates the FS's static desired conditions must be rejected in favor of desired future dynamics to align with best available science. FS researcher Everett (1994) states, "To prevent loss of future options we need to simultaneously **reestablish ecosystem processes and disturbance effects that create and maintain desired sustainable ecosystems**, while conserving genetic, species, community, and landscape diversity and long-term site productivity." (Emphasis added.) Hessburg and Agee 2003 also emphasize the primacy of natural processes for management purposes:

> Ecosystem management planning must acknowledge **the central importance of natural processes and pattern–process interactions, the dynamic nature of ecological systems**

> (Attiwill, 1994), the inevitability of uncertainty and variability (Lertzman and Fall, 1998) and cumulative effects (Committee of Scientists, 1999; Dunne et al., 2001). (Emphasis added.)

The Boulder Park EA claims, "There is a need for trending forest stands toward the historical range of variation for structure, patch size, tree species composition, and distribution." Yet the EA presents almost no data on these metrics of HRV for the project area. Not historically, not currently. The EA states, "It is … important to note that heterogeneity or homogeneity at one scale does not necessarily result in heterogeneity or homogeneity at larger scales (Hessburg et al. 2015)." Yet the EA only apparently considers one scale—" The historical range of variability (HRV) of stand structural stages were analyzed at the scale of the Tacoma and Cusick Creek Watersheds, which entirely encompass the Boulder Park Ecological Restoration Project Area."

The EA has nothing about "patch size." The EA mentions "Stand Density (BA, TPA, SDI)" but has no credible data on historic or current conditions.

The EA contains no cite of a credible source that describes "historic conditions" in the project area, in violation of NEPA.

Remedy: Select the No Action alternative. Alternatively, prepare an EIS that addresses these issues.

CLIMATE CHANGE AND CARBON SEQUESTRATION

This issue was raised in UCRG/AWR EA comments at pp. 10, 16-19 and in Sieracki scoping comments.

This planet is in a climate change emergency and is entering a period called the 6th great extinction, because of this complete emphasis must be placed on restoring healthy and resilient populations of wildlife in the context of combating climate change and biodiversity loss. Logging should be eliminated from National Forests as it causes a carbon deficit. Dr. Rees, professor of human ecology and ecological economics states that "Humans are Blind to Imminent Environmental Collapse" and that governments are dismissing scientists warning to humanity.

> *"Bottom line? The world seems in denial of looming disaster; the "C" word remains unvoiced. Governments everywhere dismissed the 1992 scientists'* Warning to Humanity *that "...a great change in our stewardship of the Earth and the life on it is required, if vast human misery is to be avoided" and will similarly ignore the scientists'* "second notice*." (Published on Nov. 13, this warning states that most negative trends identified 25 years earlier "are getting far worse.")"*
> *https://thetyee.ca/Opinion/2017/11/16/humans-blind-imminent-environmental-collapse/*

Edward O. Wilson is a professor emeritus at Harvard University and a two-time Pulitzer Prize winner supports the half earth concept, expanding the existing system of biological reserves.

> *"Only by committing half of the planet's surface to nature can we hope to save the immensity of life-forms that compose it. Unless humanity learns a great deal more about*

global biodiversity and moves quickly to protect it, we will soon lose most of the species composing life on Earth. The Half-Earth proposal offers a first, emergency solution commensurate with the magnitude of the problem: By setting aside half the planet in reserve, we can save the living part of the environment and achieve the stabilization required for our own survival.

Why one-half? Why not one-quarter or one-third? Because large plots, whether they already stand or can be created from corridors connecting smaller plots, harbor many more ecosystems and the species composing them at a sustainable level. As reserves grow in size, the diversity of life surviving within them also grows. As reserves are reduced in area, the diversity within them declines to a mathematically predictable degree swiftly—often immediately and, for a large fraction, forever." E. O. Wilson

Federal Lands are an important component providing large landscapes for biodiversity maintenance and carbon storage. This sale is not ecosystem restoration as touted, but an ecological disaster in the making. ***Conserving biodiversity and carbon must be the first and foremost mission of the USFS.***

Local Climate Change

Predictive modeling indicates that Boulder Park area will have: hotter summers, warmer wetter winters and more variability; novel climates may emerge. Predictions based on RPC 8.5 for the Tacoma Ck. drainage indicate that summer temperatures are going to spike, summer precipitation may decrease, winter precipitation will increase and stress caused by summer evapotranspiration will increase (Appendix B, Climate Projections, source https://climatetoolbox.org/tool/Future-ClimateLocation: 48.36o N, 117.50o W). Selecting a more southerly aspect shows even more change in extremes values. RPC 8.5 is widely regarded as the minimum or more likely climate change trajectory than more moderate projections given the current lack of urgency to reduce CO2 and Methane emissions.

Local climate change projections will negatively effect migratory songbird species.

Boyle and Martin (2015) found that high elevation habitats are very important for migratory birds in British Columbia. Logging must be eliminated in high elevation habitats (subalpine) to provide natural habitats for songbirds and to reduce increased stress from un-natural design-a-stand approaches.

"Most species exhibited strong temporal variation in patterns of abundance that were related to migratory behavior. From an extensive literature-based survey, we found that ~35% of North America's breeding bird species use high elevations, and that all primary high elevation habitats are important for full life-cycle conservation of this avifauna. Our findings highlight the importance of high elevation habitats to migrating birds from wide-ranging breeding distributions for at least three months of the year, a period equivalent to the length of the breeding season for most species. These results emphasize the need for effective conservation of fragile alpine and other high elevation habitats that are increasingly threatened by local, regional, and global anthropogenic disturbance." (Boyle, W. A. and Martin, K., 2015. The conservation value of high elevation habitats to North American migrant birds. Biological Conservation 192 (2015) 461–476. http://dx.doi.org/10.1016/j.biocon.2015.10.008)

They found that 25 species using high elevation habitats were of concern:

> *"Over 26% of the species (n = 25) detected on our surveys were birds listed by North American and local conservation planning and management agencies including five Red-listed and eight Blue-listed species or subspecies"*

Cambell et al. (1997 in Boyle and Martin, 2015) found that chestnut-backed chickadees, which also occur in the project area, exhibited altitudinal migration, breeding at low elevations, moving upslope in late summer, then winter at lower elevations. These complex patterns of elevational and distance migratory behaviours that many bird species have need to be addressed to maintain these species over the long term especially with increasing climate change stressors.

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

The EA fails to consider that the effects of climate change on the project area, including that the "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 desired conditions are in the context of a rapidly changing climate, along an unpredictable but changing trajectory.

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

It's clear that the FS"s desired conditions are based upon a historical range of variability (HRV) or "reference conditions" which are no longer valid conceptually as a management target. Pederson et al. (2009) note that western Montana has already passed through 3 important, temperature-driven ecosystem thresholds. Westerling, et al. 2006 state:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

KEY MESSAGES

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

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

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

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

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

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

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

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

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

The FS's position on project impacts on climate change is that the project would have a miniscule impact on global carbon emissions. The obvious problem with that viewpoint is, once can say the same thing about every source of carbon dioxide and other greenhouse gas emission on earth, and therefore justify inaction. In their comments on the Kootenai NF'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. We would add that, if the FS wants to refer to a wider scope to analyze its carbon footprint, we suggest that it actually conduct such a cumulative effect analysis and disclose it in a NEPA document.

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

The EA ignores scientific opinion on forest management's negative effects on carbon sequestration. The Kootenai NF's forest plan FEIS states, "Carbon sequestration is the process by which atmospheric carbon dioxide is taken up by vegetation through photosynthesis and stored as carbon in biomass (trunks, branches, foliage, and roots) and soils." Best available science supports the proposition that forest policies must shift away from logging if a priority is carbon sequestration. Forests should be preserved indefinitely for their carbon storage value.

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

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

Courtesy Kim Davis

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

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

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

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

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

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

"There used to be enough variability in seasonal conditions that seedlings could make it across these fixed thresholds," Dobrowski said. "After the mid-'90s, those windows have been closing more often. We're worried we'll lose these low-elevation forests to shrubs or grasslands. That's what the evidence points to."

After a fire, all kinds of grasses, shrubs and trees have a blank slate to recover. But trees, especially low-elevation species, need more soil moisture and humidity than their smaller plant cousins. Before the mid-90s, those good growing seasons rolled around every three to five years. The study shows such conditions have evaporated on virtually all sites since 2000.

"The six sites we looked at in the Bitterroots haven't been above the summer humidity threshold since 1997," Higuera said. "Soil moisture hasn't crossed the threshold since 2009."

The study overturns some common assumptions of post-fire recovery. Many historic analyses of mountain forests show the hillsides used to hold far fewer trees a century ago, and have become overstocked due to the efforts humans put at controlling fire in the woods. Higuera explained that some higher elevation forests are returning to their more sparse historical look due to increased fires.

"But at the lower fringes, those burn areas may transition to non-forest types," Higuera said, "especially where climate conditions at the end of this century are different than what we had in the early 20th Century."

The study also found that soil sterilization wasn't a factor in tree regrowth, even in the most severely burned areas. For example, the 2000 Sula Complex of fires stripped forest cover in the southern end of the Bitterroot Valley. While the lodgepole pine stands near Lost Trail Pass have recovered, the lower- elevation Ponderosa pine and Douglas firs haven't.

Another factor driving regeneration is the availability of surviving seed trees that can repopulate a burn zone. If one remains within 100 meters of the burned landscape, the area can at least start the process of reseeding. Unfortunately, the trend toward high-severity fires has reduced the once-common mosaic patterns that left some undamaged groves mixed into the burned areas.

Higuera said he hoped land managers could use small or prescribed fires to make landscapes more resilient, as well as restructure tree-planting efforts to boost the chances of heavily burned places.

The Resources Planning Act of 1974 (RPA) and National Forest Management Act of 1976 (NFMA) mandate long-range planning which impose numerous limitations on timber extraction practices and the amount of timber sold annually. These long range plans are based on assumptions, which are based on data, expert opinion, public participation and other factors

which mostly view from a historical perspective. So it's time to peer into the future to examine closely (NEPA: "take a hard look at") those assumptions.

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

The EA and Forest Plan FEIS fail to reexamine the assumptions relating to timber suitability, resilience and sustainability as a result of recent fires, past regeneration success/failures, and climate-risk science.

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

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

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

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

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

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

Funk et al., 2014 indicate that at least five common tree species, including aspens and four conifers, are at great risk unless atmospheric greenhouse gases and associated temperatures can

be contained at today's levels of concentration in the atmosphere. It is indeed time to speak honestly about unrealistic expectations relating to desired conditions.

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

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

PNW climate projections are high risk to Spruce - Fir Forests.
The commentors must repeatedly state to the USFS that subalpine habitats area under extreme risk of change from global heating. Actions must be taken to preserve these habitats, **meaning no logging in Spruce-Fir even if it violates directions for Canada lynx in non critical habitat with the exception of daylighting whitebark pine.**

> *"Subalpine forests and alpine ecosystems are especially at risk and may undergo almost complete conversion to other vegetation types by the 2080s (A2 and B1;104 A2;105 Ensemble A2, B1, B2;106)." Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014*

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

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

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

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

The EA doesn't address the question of how lands were determined to be suitable for the type of management ongoing or proposed.

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

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

The EA does not disclose restocking monitoring data and analysis.

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

The Forest Plan and EA are based on assumptions largely drawn from the past. These assumptions must be rejected where overwhelming evidence demonstrates a change of course is critical. It is time to take a step back, assess the future and make the necessary adjustments, all in full public disclosure to the Congress and the public.

The FS must finally accept scientific research and opinion that recognizes the critical challenge posed by climate change to global ecosystems and the Colville NF.

The EA fails to analyze how proposed management actions would be affected by likely climate change scenarios, nor does it quantify all human-caused CO_2 emissions for all project activities. The EA fails to disclose how climate change has affected ecological conditions in the project area, and analyze these conditions under climate change scenarios.

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

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

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

There exists no temporal cumulative effects analysis of the Colville NF's carbon sequestration.

Respected experts say that the atmosphere might be able to safely hold 350 ppm of CO_2.[2] So when the atmosphere was at pre-industrial levels of about 280 ppm, there was a cushion of about 70 ppm which represents millions of tons of greenhouse gas emissions. Well, now that cushion is completely gone. The atmosphere is now over 400 ppm CO_2 and rising. Therefore the safe level of additional emissions (from logging or any other activity) is negative. There is no safe level of additional emissions that our earth systems can tolerate. We need to be removing carbon from the atmosphere—not adding to it.[3] How? By allowing forest to grow. Logging moves us away from our objective while conservation moves us toward our objective.

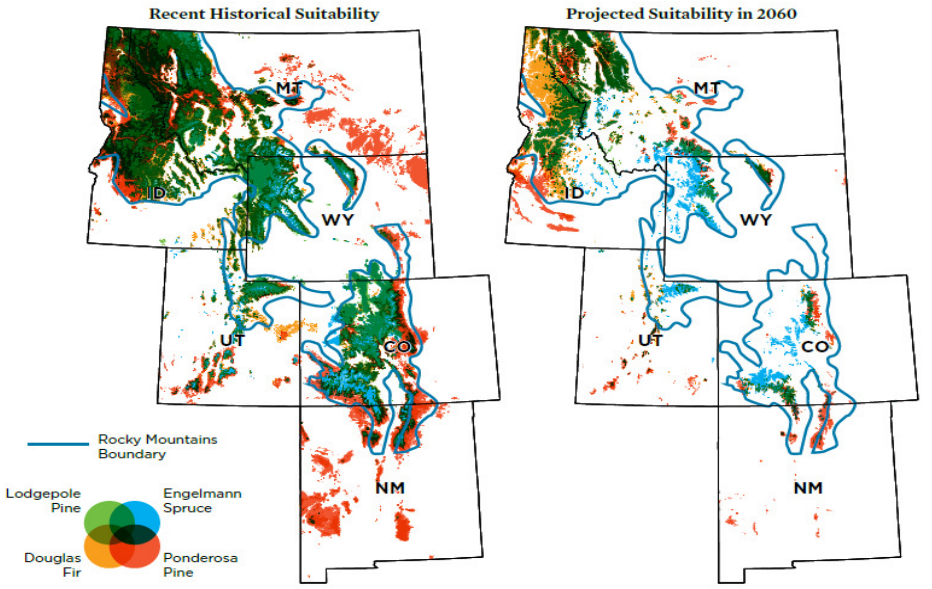
Pecl, et al. 2017 "review the consequences of climate-driven species redistribution for economic development and the provision of ecosystem services, including livelihoods, food security, and culture, as well as for feedbacks on the climate itself." They state, "Despite mounting evidence for the pervasive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

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

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

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

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



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

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

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

Pecl, et al. 2017 conclude:

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

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

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

Like all forests, the Colville NF is an important part of the global carbon cycle. Clear scientific information reinforces the critical need to conserve all existing stores of carbon in forests to keep it out of the atmosphere. Given that forest policies in other countries and on private lands are

politically more difficult to influence, the FS must take a leadership role to maintain and increase carbon storage on publicly owned forests, in order to help mitigate climate change effects.

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

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

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

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

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

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

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

twice that in related transportation. So that adds up to 9.6 million gallons of fuel consumed in the pursuit of snowmobiling each year in Montana alone. Multiply that by 20 pounds of carbon dioxide per gallon of gas (diesel pickups spew 22 pounds per gallon) and snowmobiling releases 192 million pounds (96 thousand tons) of climate-warming CO_2 per year into the atmosphere. Can we really afford this?

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

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

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

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

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

Moomaw and Smith, 2017 state:

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

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

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

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

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

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

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

Keith et al., 2009 state:

> Both net primary production and net ecosystem production in many old forest stands have been found to be positive; they were lower than the carbon fluxes in young and mature stands, but not significantly different from them. Northern Hemisphere forests up to 800 years old have been found to still function as a carbon sink. Carbon stocks can continue to accumulate in multi-aged and mixed species stands because stem respiration rates decrease with increasing tree size, and continual turnover of leaves, roots, and woody material contribute to stable components of soil organic matter. There is a growing body of evidence that forest ecosystems do not necessarily reach an equilibrium between assimilation and respiration, but can continue to accumulate carbon in living biomass, coarse woody debris, and soils, and therefore may act as net carbon sinks for long periods. Hence, process-based models of forest growth and carbon cycling based on an assumption that stands are even-

aged and carbon exchange reaches an equilibrium may underestimate productivity and carbon accumulation in some forest types. Conserving forests with large stocks of biomass from deforestation and degradation avoids significant carbon emissions to the atmosphere. Our insights into forest types and forest conditions that result in high biomass carbon density can be used to help identify priority areas for conservation and restoration.

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

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

Campbell et al., 2011 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.

We are in a global ecological crisis, and the Colville National Forest is NOT doing its part curtailing logging to provide for carbon sequestration. Even burned or insect killed snag forests retain a substantial amount of carbon when compared to logging operations. Fixing carbon has to be the purpose and need of this project because of the global heating emergency.

> *"But the promotion of logging to supposedly curb carbon emissions is just part of the Administration's ongoing alignment with industry and troubling pattern of climate science denial. Carbon emissions from logging in the US* are ten times higher *than the combined emissions from wildland fire and tree mortality from native bark beetles. Fire only consumes a minor percentage of forest carbon, while improving availability of key nutrients and stimulating rapid forest regeneration. Within a decade after fire,* more carbon *has been pulled out of the atmosphere than was emitted. When trees die from*

drought and native bark beetles, no carbon is consumed or emitted initially, and carbon emissions from decay are extremely small, and slow, while decaying wood helps keeps soils productive, which enhances carbon sequestration capacity over time.

On the other hand, industrial logging — even when conducted under the euphemism of "thinning" — results in a large net loss of forest carbon *storage, and a substantial overall increase in carbon emissions that can take decades, if not a century, to recapture with regrowth. Logging also tends to make* fires burn faster and more intensely *while degrading a forest ecosystem's ability to provide natural protections against extreme weather events.*

Consider this: About 28 percent of tree carbon is contained in branches*, and this is emitted when they are burned after logging operations. An additional 53 percent of the carbon in trees removed from forests is* emitted as waste *in the manufacturing and milling process. Overall, about two-thirds of the carbon in trees that are logged for lumber quickly become greenhouse gas emissions. " Smith, Dr. Hanson and Kohler. 2019. https://www.counterpunch.org/2019/04/10/logging-is-the-lead-driver-of-carbon-emissions-from-us-forests/*

and from an Oregon report:

"Based on credible evidence today, forest harvest does not appear to result in net carbon conservation when compared to carbon retention in unharvested forests.

The evidence is that significant amounts of carbon are lost at each stage in timber harvest and processing into wood products, and in decomposition at the end of useful product life. Meanwhile, trees remaining in forests are actively withdrawing carbon from the atmosphere. The forest stores and conserves carbon more effectively and for longer periods of time than do most products derived from harvested trees." OGWC – 2018 Forest Carbon Accounting Project Report Page 5 retrieved from https://www.keeporegoncool.org/forest-carbon

Boulder Park EA is located in the inland temperate rainforest, is part of the Selkirk Ecosystem and is ecologically similar to the west wide forests in moist sites. Clearly, logging is not the best way to provide for carbon storage desperately needed in this planetary emergency.

Creating plantations by regeneration logging is not "forest or ecosystem restoration" as claimed by the attempt of the USFS to control the narrative.

"Lead author, Professor of Global Change Science, Simon Lewis (UCL Geography) said, "There is a scandal here. To most people forest restoration means bringing back natural forests, but policy makers are calling vast monocultures 'forest restoration'. And worse, the advertised climate benefits are absent." https://phys.org/news/2019-04-natural-forests-global-climate-goals.html?fbclid=IwAR04z2DKRheo-7WMRIrOb0dHinvkwkCjYid3_WEvTunWTtEGWpeNRSPtmIo

Please develop an alternative reflective of supporting carbon storage, wildlife and fisheries, not converting native stands to industrial plantations like the current alternative is doing.

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.

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

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

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

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

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

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

Heat, a long-established topic of physics, plays an equally important role at the level of plant and animal physiology—every organism only survives and thrives within thermal limits. For example, Pörtner et al. (2008) point out, "All organisms live within a limited range of body temperatures… Direct effects of climatic warming can be understood through fatal decrements in an organism's performance in growth, reproduction, foraging, immune competence, behaviors and competitiveness." The authors further explain, "Performance in animals is supported by aerobic scope, the increase in oxygen consumption rate from resting to maximal." In other words, rising heat has the same effect on animals as reducing the oxygen supply, and creates the

same difficulties in breathing. But breathing difficulties brought on by heat can have important consequences even at sub-lethal levels. In the case of grizzly bears, increased demand for oxygen under increasing heat has implications for vigorous (aerobically demanding) activity including digging, running in pursuit of prey, mating, and the play of cubs.

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

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

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

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

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

> Patterns, mechanisms, projections, and consequences of tree mortality and associated broad-scale forest die-off due to drought accompanied by warmer temperatures—hotter drought", an emerging characteristic of the Anthropocene—are the focus of rapidly expanding literature.
>
> …(R)ecent studies document more rapid mortality under hotter drought due to negative tree physiological responses and accelerated biotic attacks. Additional evidence suggesting greater vulnerability includes rising background mortality rates; projected increases in drought frequency, intensity, and duration; limitations of vegetation models

such as inadequately represented mortality processes; warming feedbacks from die-off; and wildfire synergies.

…We also present a set of global vulnerability drivers that are known with high confidence: (1) droughts eventually occur everywhere; (2) warming produces hotter droughts; (3) atmospheric moisture demand increases nonlinearly with temperature during drought; (4) mortality can occur faster in hotter drought, consistent with fundamental physiology; (5) shorter droughts occur more frequently than longer droughts and can become lethal under warming, increasing the frequency of lethal drought nonlinearly; and (6) mortality happens rapidly relative to growth intervals needed for forest recovery.

These high-confidence drivers, in concert with research supporting greater vulnerability perspectives, support an overall viewpoint of greater forest vulnerability globally. We surmise that mortality vulnerability is being discounted in part due to difficulties in predicting threshold responses to extreme climate events. Given the profound ecological and societal implications of underestimating global vulnerability to hotter drought, we highlight urgent challenges for research, management, and policy-making communities.

Moomaw and Smith, 2017 conclude:

With the serious adverse consequences of a changing climate already occurring, it is important to broaden our view of sustainable forestry to see forests …as complex ecosystems that provide valuable, multiple life-supporting services like clean water, air, flood control, and carbon storage. We have ample policy mechanisms, resources, and funding to support conservation and protection if we prioritize correctly.

…We must commit to a profound transformation, rebuilding forested landscapes that sequester carbon in long-lived trees and permanent soils. Forests that protect the climate also allow a multitude of species to thrive, manage water quality and quantity and protect our most vulnerable communities from the harshest effects of a changing climate.

Protecting and expanding forests is not an "offset" for fossil fuel emissions. To avoid serious climate disruption, it is essential that we simultaneously reduce emissions of carbon dioxide from burning fossil fuels and bioenergy along with other heat trapping gases and accelerate the removal of carbon dioxide from the atmosphere by protecting and expanding forests. It is not one or the other. It is both!

Achieving the scale of forest protection and restoration needed over the coming decades may be a challenging concept to embrace politically; however, forests are the only option that can operate at the necessary scale and within the necessary time frame to keep the world from going over the climate precipice. Unlike the fossil fuel companies, whose industry must be replaced, the wood products industry will still have an important role to play in providing the wood products that we need while working together to keep more forests standing for their climate, water, storm protection, and biodiversity benefits.

It may be asking a lot to "rethink the forest economy" and to "invest in forest stewardship," but tabulating the multiple benefits of doing so will demonstrate that often a forest is worth

> much more standing than logged. Instead of subsidizing the logging of forests for lumber, paper and fuel, society should pay for the multiple benefits of standing forests. It is time to value U.S. forests differently in the twenty-first century. We have a long way to go, but there is not a lot of time to get there.

Please consider that the "desired" vegetation conditions may not be achievable or sustainable. Please conduct an analysis as to how realistic and achievable Forest Plan desired conditions are in the context of a rapidly changing climate, along an unpredictable but changing trajectory.

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

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

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

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

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

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

Best available science supports the proposition that forest policies must shift away from logging if carbon sequestration is prioritized. 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.

The Boulder Park EA fails to provide an analysis and disclosure of how project and FS activities affect the dynamic balance of carbon sequestration and emit greenhouse gasses. There is no cumulative effects analysis of CNF carbon sequestration and greenhouse gas emission over time.

The Boulder Park EA fails to provide estimates of the total amount of CO_2 or other greenhouse gas emissions caused by FS management actions and policies—forestwide, regionally, or nationally. Instead, agency policymakers seem comfortable maintaining a position that they need not take any leadership on this issue, and obfuscate via this EA to justify their failures.

The best scientific information strongly suggests that management that involves removal of trees and other biomass increases atmospheric CO_2. The Boulder Park EA doesn't state that simple fact. The Boulder Park EA fails to present any modeling of forest stands under different management scenarios. The FS should model the carbon flux over time for its proposed stand management scenarios and for the various types of vegetation cover found on the Colville NF.

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

The EA fails to even delineate the cumulative effects analysis area for climate change or carbon sequestration. Hanson, 2010 addresses some of the false notions often misrepresented as "best science":

> 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.

Johnson, 2016 states:

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

USDA Forest Service, 2017b discusses some effects of climate change on forests, including: "In many areas, it will no longer be possible to maintain vegetation within the historical range of variability." With the Boulder Park analysis, the FS ignores such straightforward climate science either and pretends the historical range of variability (HRV) is either not affected by climate change, or that how the HRV has changed is not relevant.

The EA states, "Wildfire resilience can be defined as the ability of a forest or ecosystem to function after a fire that is characteristic of the local fire regime occurs." Yet due to climate change, the FS needs to update its understanding of the local fire regime and ecosystem function after a fire or logging.

The assumption(s) made in the EA, presumably tiered to, and consistent with, the Forest Plan, relating to desired future condition are incorrect. NEPA requires a "hard look" at the best available science relating to future concentrations of greenhouse gasses and gathering climate risk as we move forward into an increasingly uncertain and uncharted climate future. This has not been done either at the programmatic or project level of analysis.

Scientific research indicates that increasing CO_2 and other greenhouse gas concentrations may preclude attaining the anticipated "desired" future condition, not only in the project area, and the Colville NF, but most likely across the entire bioregion and beyond. The Boulder Park ID Team seem unaware of the likelihood that desired (forest) conditions are at great risk.

No amount of logging, thinning and prescribed burning will cure the cumulative effects (irretrievable loss) ALREADY baked into today's climate reality.

NEPA requires analysis of an alternative that reflects our common understanding of climate risk. A considerable amount of data and scientific research repeatedly confirms the FS is looking in the wrong direction (back into history) as a basis to understand our forest future.

Please disclose that at least five common tree species, including aspens and four conifers, are at great risk unless atmospheric greenhouse gases and associated temperatures can be contained at today's levels of concentration in the atmosphere. It is time to speak honestly about unrealistic expectations relating to your desired future condition.

According to scientific literature it is highly unlikely that greenhouse gas concentrations and the heat they trap in the atmosphere will be held at current levels. Is this relevant to forest planning or vegetation management for the project area?

What conditions can we expect (realistically) as heat trapped by increasing greenhouse gas concentrations steadily tightens its grip–and impacts–on forests locally, regionally, nationally, and globally?

Please publicly disclose the current and future impacts of climate risk to national forests. More specifically, NEPA requires cumulative effects analysis at the programmatic (Colville NF) level, and in this project-level NEPA document. Please assess and disclose all risks associated with vegetative-manipulation units in the project area in the proper climate-risk context/scenario.

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

Golladay et al., 2015 state:

> In an uncertain future of rapid change and abrupt, unforeseen transitions, adjustments in management approaches will be necessary and some actions will fail. However, it is increasingly evident that the greatest risk is posed by continuing to implement strategies inconsistent with and not informed by current understanding of our novel future....

Isn't it time to analyze and disclose the fact that the Colville NF can no longer "insure that timber will be harvested from the National Forest system lands only where…there is assurance that such lands can be restocked within five years of harvest"? [NFMA §6(g)(3)(E)(ii)].

Does the FS believe that the Forest Plan and Boulder Park project are consistent with NFMA's "adequate restocking" requirement? If yes, how will that be accomplished?

Davis, et al., 2019 state:

> At dry sites across our study region, seasonal to annual climate conditions over the past 20 years have crossed these thresholds, such that conditions have become increasingly unsuitable for regeneration. High fire severity and low seed availability further reduced the probability of postfire regeneration. Together, our results demonstrate that climate change combined with high severity fire is leading to increasingly fewer opportunities for

seedlings to establish after wildfires and may lead to ecosystem transitions in low-elevation ponderosa pine and Douglas-fir forests across the western United States.

The EA cites no restocking monitoring data or analysis. If monitoring has been done, as advertised in the Forest Plan, is there sufficient evidence to document the scope and probability of post-logging regeneration failures in the project area? Please cite your analysis process and estimate the risks.

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

EXCESSIVE ROAD NETWORK AND TRAVEL MANAGEMENT

This issue was raised in UCRG/AWR EA comments at pp. 14-16; also p. 32.

This project, proposing 16.6 square miles of logging divided about 50:50 between regeneration and commercial thinning will negatively affect biodiversity. This is about 1/3 of their project area. The existing road density is extreme at 7.36 miles of road per square mile based on information in the Scoping Notice/Proposed Action. The Colville National Forest (CNF) proposes constructing 13.5 miles of additional roads in a highly roaded landscape with 370 miles of existing roads in a 32164 acre (50.25 sq miles) analysis area. The new roads would access new areas and the USFS will try to compensate by closing additional roads. The additional sedimentation from all the new roadbuilding will impact water quality.

The existing road network is impairing ecosystem health and the CNF is proposing to do almost nothing to alleviate these effects. The following table shows road density metrics for their Project Area.

	Miles of road	**Road Density in miles/sq. mile**
Road miles in the proposed action	370	7.36
"open road" density from the CNF gis database.	168.6	3.6
Roads in RHCA	37 (36.99)	4.16

Road densities will be discussed below. When asked about removing roads from the RHCA the District Ranger stated that they were County roads and the last time they attempted that the County did not act on the road relocation. Removing roads is integral to rewilding ecosystems. Failure to effectively deal with difficult Commissioners should not be an excuse for not moving roads out of RHCA's.

The FS promulgated the Roads Rule (referred to as "subpart A") in 2001 to address its unsustainable and deteriorating road system. The rule directs each national forest to conduct "a science-based roads analysis," generally referred to as the "travel analysis process." The Forest Service Washington Office, through a series of directive memoranda, instructed forests to use the Subpart A process to "maintain an appropriately sized and environmentally sustainable road system that is responsive to ecological, economic, and social concerns." These memoranda also outline core elements that must be included in each Travel Analysis Report.

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

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

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

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

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

DN Appendix B states, "The Boulder Park Ecological Restoration Project is consistent with 36 CFR 212 Subparts A, B, and C." However that is a false statement. For example, Travel Management Regulations at 36 CFR § 212.5 state:

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

The EA fails to explain how the FS is managing specifically consistent with that section of the Travel Management Rule, as well as other sections.

The June 2014 Colville National Forest Forest-wide Travel Analysis Report (TAR) states:

> How the Report Will Be Used: Travel analysis process results will assist the Colville National Forest in addressing issues related to roads. It will be used to inform future analyses, decisions, and specific actions.

The TAR Appendix C Public Involvement and Collaboration indicates that the CNF only contacted a narrow segment of the public. Likewise, none of the travel analysis documents cited above underwent any sort of public involvement.

The Travel Management Regulations (36 CFR 212) Subpart A requires the FS to identify the minimum road system needed to manage the Forest sustainably. The Boulder Park EA does not demonstrate how it is minimizing the road system in compliance with the Travel Management Regulations and related Directives.

The Boulder Park EA does not incorporate the required science-based transportation analysis, and so there was no assessment that identified unneeded roads. The process the FS used is not consistent with requirements to involve the public in a science-based Travel Analysis Process, create a Travel Analysis Report, and identify roads likely not needed to manage the forest, as required under the Regulations and in the Directives.

In failing to truly inform the Boulder Park project with its forest-level TAR, the EA violates NEPA. The EA violates the Travel Management Regulations at 36 CFR § 212. It also violates NEPA by failing to use the best available science, and by failing to disclose project inconsistency with the Travel Management Regulations.

The Boulder Park EA fails to disclose the temporal effectiveness or non-effectiveness of the road maintenance and upgrading, merely assuming that the proposed actions will forever mitigate the problems they now exhibit. Without the sufficient funding to maintain its road system in a timely manner, all the BMP implantation that can be mustered in the context of a project such as this will only be a short-term fix, and the road system will remain an ecological liability. The FS admits such problems in a non-NEPA context (USDA Forest Service, 2010t):

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

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

The EA fails to recognize the ongoing ecological damage of roads—regardless of the adequacy of maintenance funding:

> Undesirable consequences include adverse effects on hydrology and geomorphic features (such as debris slides and sedimentation), habitat fragmentation, predation, road kill, invasion by exotic species, dispersal of pathogens, degraded water quality and chemical contamination, degraded aquatic habitat, use conflicts, destructive human actions (for example, trash dumping, illegal hunting, fires), lost solitude, depressed local economies, loss of soil productivity, and decline in biodiversity. (Gucinski et al., 2001)

The FS neglects to fully analyze and disclose all the ongoing damage where project funding cannot address the full scope of insufficient maintenance issues. The EA violates NEPA.

The FS fails to recognize that "continual monitoring and maintenance" is necessary following project completion. It fails to properly analyze and disclose the impacts of its continuously failing, undermaintained road system.

We appreciate that road decommissioning is proposed, as described in the EA. This is a step towards a sustainable road system—if the FS actually carries it out, which is uncertain as the DN Appendix B states. Regardless, because of persisting ecologically adverse effects, the FS should fully obliterate and recontour each decommissioned segment. It is not clear the FS will do so. This concern also applies to the 13 miles of "temporary" roads.

The EA fails to disclose how many the miles of road decommissioning would be actively restored, and how much will merely be allowed to continue to recover naturally. That they're an issue to begin with means there is ongoing ecological damage. Yet the EA fails to analyze and disclose this damage, and we are particularly concerned with the areas to be passively restored.

It may be the case that the FS "restored" some of these roads previously, but since they're not on any inventory mentioned in the EA, how could the public know if the FS is trying to take credit for "restoring" them again? And the degree that the work on non-system roads is necessary reveals the FS has failed to account for these issues for a long time prior to this timber sale being proposed.

At what point does the FS believe the agency is obligated to either take responsibility for <u>all</u> non-system roads and put them on the system, or <u>fully decommission</u> them so they are no longer an entity called "non-system road"?

The TAR states at p. 15:

> As maintenance costs have increased, allocated maintenance funds have remained static or been significantly reduced. This causes a disproportionate shift of maintenance funds to the ML 3-5 roads. The increased use coupled with the decreased funds has resulted in degraded soil, water, vegetation, and wildlife habitat conditions. ...Funding for road maintenance is not adequate to maintain the existing system and perform needed monitoring.

Also, “With funds being far below what is necessary to keep the road system properly maintained, many roads do not get the maintenance treatments they need on schedule and are falling into a severe state of disrepair. ... For the Colville NF, it would take approximately $37 million to bring their entire road system back up to standard, and about $4.3 million per year to keep it that way.” (Id., Appendix F.)

The Boulder Park EA fails to disclose this fiscal reality for the CNF, and doesn’t fully analyze the resultant impacts of the undermaintained road system.

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

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

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 Boulder Park EA makes no commitments to bring all the roads up to BMP standards or otherwise fix the damage. The EA fails to consider the resulting impacts on water quality and fish habitat.

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

Ziemer and Lisle (1993) note a lack of reliable data showing that BMPs are cumulatively effective in protecting aquatic resources from damage. Espinosa et al., 1997 noted that the mere reliance on BMPs in lieu of limiting or avoiding activities that cause aquatic damages serves to

increase aquatic damage. Even activities implemented with somewhat effective BMPs still often contribute negative cumulative effects (Ziemer et al. 1991b, Rhodes et al. 1994, Espinosa et al. 1997, Beschta et al. 2004).

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

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

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.

The Boulder Park EA does not disclose the Project Area Road Management Objectives, which are to be developed consistent with the Travel Management Regulations.

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

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

If a travel management decision does not adequately reflect how the FS applied the minimization criteria in its motorized trail and area designations, the agency's decision is in violation of the Travel Management Rule and the ORV Executive Orders. The agency must demonstrate how the minimization criteria were implemented or applied in the route designation decision process, consistent with the objective of minimizing impacts. The Boulder Park EA and draft DN have failed to make such a demonstration for the specific increases in ORV access, and in terms of specific impacts along those ORV routes.

The Boulder Park EA falls short of the requirements for a proper NEPA analysis, and does not provide sufficient information to allow the FS to comply with its obligations under the Executive Orders to minimize impacts from off-road vehicle trails and areas.

In order to satisfy the Travel Management Rule, "the Forest Service must actually explain how it aimed to minimize environmental damage in designating routes." *Central Sierra Envtl. Resource Ctr. v. U.S. Forest Serv.*, 916 F. Supp. 2d 1978, 1095 (E.D. Cal. 2013); *WildEarth Guardians v. USFS,* 790 F.3d 920 (9th Cir. 2015).

Before designating any trails or areas for motorized use, the Boulder Park EA must show how it actually applied the minimization criteria to all trails, and areas designated for motorized uses. The FS has failed to do so. The draft DN would designate trails for motorized use that damage public resources, harass and disrupt wildlife and wildlife habitat, and perpetuate user conflicts. The FS fails to take a hard look at impacts from off-road vehicle trails and areas, and those impacts will significantly affect the quality of the human environment. The FS's failure to apply minimization criteria to the Boulder Park EA results in continuing harmful environmental, wildlife, recreation, and resource consequences.

NEPA regulations at 40 CFR § 1502.24 state, under **Methodology and scientific accuracy**: "Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." The Boulder Park EA violates NEPA in terms of methodology, scientific accuracy, and scientific integrity.

That is why there are so many roads which are ecologically adverse on the landscape, in most ways that roads are adverse. There is no forestwide inventory because they are not "system" or "national forest system" roads. The agency recognizes no requirement to maintain such an inventory.

The EA states, "Travel analysis of the project area to determine the sustainable road system needed for safe and efficient travel and administration, utilization, and protection of NFS lands follows 36 CFR 212 subpart B guidance." However, the Boulder Park EA does not demonstrate the FS is managing the project area or 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 sustainably. The EA lacks any indication that the FS has used travel analysis (FSH 7709.55, ch. 20) to meet the requirement for incorporating a genuine, science-based roads analysis at the appropriate scale to identify the minimum road system [36 CFR 212.5(b)(1)].

Likewise, The EA does not demonstrate that the FS is managing the project area or Forest consistent with 36 CFR 212 Subparts B and C. "Following project activities, winter recreation opportunities may actually improve as a result of increased spacing between overstory trees would lead to additional snowmobile play opportunities." How does this conform with the requirement to "minimize" motorized impacts as required by Executive Orders 11,644 and 11,989 and the Travel Management Regulations?

The EA doesn't explain why there is so much mileage of county roads on national forest land, with no apparent private land to access.

The Boulder Park EA does not analyze the impacts of roads not kept in conformance to BMPs or in compliance with standards because of funding shortfalls, nor does it analyze impacts of roads that go without maintenance because they are unauthorized or non-system. The EA rests on the assumption that this project will adequately mitigate the problems chronically posed by the road network using project road work/BMP implementation. USDA Forest Service, 2010t explains why this assumption is unfounded. Also in a non-NEPA context, a forest supervisor (Lolo National Forest, 1999) frankly admits that projects are a "chance to at least correct some (BMP) departures rather than wait until the funding stars align that would allow us to correct all the departures at once."

In response to this comment, DN Appendix B states, "See comment #152." However, that FS response has nothing to do with this comment.

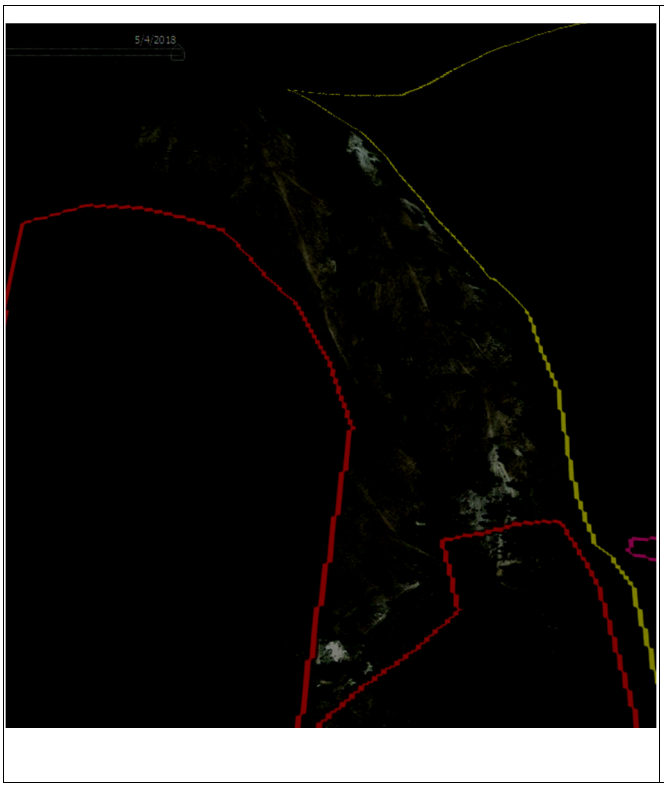
Yet the EA neglects to fully analyze and disclose all the ongoing damage where project funding cannot address the full scope of insufficient maintenance issues. E.g., "Lack of hydrologic stabilization on maintenance level 1 (closed) roads would continue to effect the watershed and potentially water quality long-term." The EA violates NEPA.

Please present a quantitative sediment and erosion analyses of the impacts of known problem areas associated with roads in the project area that will not be repaired or mitigated by project BMPs or other project actions.

The EA mentions a high level of motorized travel violations suggesting inadequate law enforcement resources, but doesn't really analyze and disclose the cumulative impacts of closure violations and indirect effects of inadequate law enforcement funding.

In response to our concern that the EA "doesn't really analyze and disclose the cumulative impacts of closure vio indirect effects of inadequate law enforcement funding" the FS states this "is an interpretation and opinion of the commenter" without disputing our "interpretation", and doesn't bother to cite where these impacts are analyzed.

All off road use by atv's should be identified and terminated. The commentor(s) have noted that the CNF has taken some steps to reduce the problem. Here is one example where ATV use persists.



This is located on the western edge of MA1 that is near Cusick Ck. (NF-436) there may be a locally unique area of gravelly soil that is severely impacted by atv's and dirt bikes. This use must be terminated.

Have all changes to project area Forest roads identified in the forestwide Travel Analysis Report been implemented? If not, please disclose what actions are yet to occur, and a timeline.

The Boulder Park EA does not disclose the Project Area Road Management Objectives, which were to be developed using the Travel Management Regulations.

The EA states, "vegetative re-growth and earthen berms have closed many of these roads to motorized access…" How many miles of the non-system roads would require no action except perhaps attention to closure methods/devices? If all that's required for decommissioning is to allow the road templates to recover (or to continue to recover) naturally, then taking credit for non-action as restoration or decommissioning is nonsense.

The EA claims to be "reducing road maintenance costs" but please disclose the quantitative financial analysis data to back up that statement.

Does the Action Alternative provide all sufficient funding to close 12 miles of existing road and decommission 25 miles of system roads (Table 3)?

Does the Action Alternative provide all sufficient funding to "Remove or replace" the 26 culverts (p. 9) the EA identifies? Same question for the other actions in Table 4.

How do the road surveys in the project area compare to Fly et al., 2011 (a comprehensive GRAIP inventory methodology of erosion and sediment sources for a project on the Boise National Forest) for thoroughness?

The does not present the proper economic or financial analysis to allow anyone to understand how well or how deficiently all the post-project system roads will be maintained, in light of the well-demonstrated inadequacy of annual appropriations or other funding sources. Therefore, it is impossible to discern the resultant ecological damage from maintaining watersheds in a "press" type condition which can never recover largely because of insufficient road maintenance.

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

The EA discloses that temporary road effects are long-term on the landscape; 20 to 100 years depending on site specific attributes. Since within a decade or two the effects of the Proposed Action would diminish such that potential fire severity class and forest density class would approach the values of the existing condition" it's clear the FS's management regime includes long-term—essentially permanent impacts on the landscape, not genuinely "temporary."

The Boulder Park EA does not disclose the Project Area Road Management Objectives, which were to be developed following the Travel Management Regulations.

Remedy: Choose the No Action Alternative. In any case, before preparing an EIS for Boulder Park project, finish the ongoing process of revising the Forest Plan that includes and incorporates a science-based forestwide Travel Analysis Process (TAP) so that it is fully consistent with the Travel Management Regulations Subpart A and related directives. Prepare an EIS that incorporates the revised forest-wide TAP and includes alternatives that implement the minimum road system.

Re-write the analyses under each resource, assuming the road decommissioning (and any other road work depending upon undetermined funding sources) will not be performed, as suggested in the DN.

Analyze and disclose the environmental impacts of roads (system or non-system) causing resource damage due to lack of current or foreseeable maintenance.

Analyze and disclose the amount of sediment to be caused by log hauling from project activities, and analyze and disclose the environmental impacts of this sediment on water quality and aquatic habitats.

Create a forestwide inventory of all existing and project-created "temporary" roads and all other non-system "templates" displayed as linear features on a GIS layer, with a corresponding

spreadsheet that contains data on each segment—including its length, date created (if known), project Decision authorizing its construction if applicable, date discovered, the project Decision commitment (date and/or contingency) for when it is to be obliterated, method of closure, closure effectiveness, signs of motorized and non-motorized use, number and location of culverts and other water crossings that are not hydrologically neutral, any other notable ecological problems such as slumps or other erosion sites, weeds, etc. and finally, dates of most recent FS survey of the segment.

WILDLIFE AND DIVERSITY

This issue was raised in UCRG/AWR EA comments at p. 29 (Sensitive species), p. 31 (viability), pp. 24-26, 32-33 (old growth as representing diversity). p. 24 (Habitat connectivity and fragmentation).

Scoping comments by Paul Sieracki included:

> **Unique Habitat Components**
> Please map and identify unique habitat components located in the analysis area and describe potential effects to the habits (open wetlands, rock outcrops, graminoid parks, subalpine meadows, forested slope wetlands, springs, bogs etc.)
>
> **Other Sensitive Species (R6 FS_Final-Sen&Str-List)**
> Please discuss each fungi, lichen and plant species that occurs in the area in detail and model their habitat in a spatially explicit way to effectively disclose effects.

Traill et al., 2010 state:

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

Assuring viability of most wildlife species is forestwide issue. The cumulative effects of carrying out multiple projects simultaneously across a national forest makes it imperative that population viability be assessed at least at the forestwide scale (Marcot and Murphy, 1992; also see Ruggiero et al., 1994a). Also, temporal considerations of the impacts on wildlife population viability from implementing something with such long duration as a Forest Plan must be

considered (id.) but this has never been done by the CNF. It is also of paramount importance to monitor population during the implementation of the Forest Plan in order to validate assumptions used about long-term species persistence i.e., population viability (Marcot and Murphy, 1992; Lacy and Clark, 1993).

The FS fails to consider and use the best available science and fails to insure population viability 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.

The U.S. Court of Appeals for the Ninth Circuit has repeatedly emphasized the importance of enforcing NFMA's consistency requirement with respect to Forest Plan standards for maintaining wildlife habitat, and with respect to procedural Forest Plan requirements. In *Neighbors of Cuddy Mountain v. USFS*, 137 F.3d 1372 (9th Cir. 1998), the Ninth Circuit enjoined the FS from proceeding with a timber sale when the FS could not demonstrate that the timber sale area would meet forest plan old growth habitat standards. The court first addressed NFMA's consistency requirement as follows:

> Pursuant to the NFMA, the Forest Service must demonstrate that a site-specific project would be consistent with the land resource management plan of the entire forest. 16 U.S.C. § 1604(i); 36 C.F.R. § 219.10(e).

137 F.3d at 1377 (quotation omitted). Following *Neighbors of Cuddy Mountain*, the Ninth Circuit again confirmed the importance of NFMA's "consistency" requirement, finding that the Tongass National Forest violated its own Forest Plan in failing to perform procedural steps required in the Tongass Land Management Plan prior to approving the a timber sale. *Friends of Southeast's Future v. Morrison*, 153 F.3d 1059, 1067-71 (9th Cir. 1998). The court there stated: "Under *Neighbors of Cuddy Mountain*, we must affirm the district court's decision to enjoin the Ushk Bay timber sale if that sale is inconsistent with the Tongass Land Management Plan." *Friends of Southeast*, 153 F.3d at 1068. Also, site-specific actions must be consistent with the Forest Plan, 16 U.S.C. §1604(i), such that the "Forest Service's failure to comply with the provisions of a Forest Plan is a violation of NFMA." *Native Ecosystems Council v. USFS*, 418 F.3d 953, 961 (9th Cir. 2005).

The Ninth Circuit Court of Appeals as also ruled that the Forest Service "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." (*Lands Council v. McNair*).

The fisher has likely been extirpated from the CNF, and the grizzly bear, caribou, lynx, and other species such as some of the Management Indicator Species and probably all those on the Sensitive species list have also been extirpated or exist on the CNF in numbers well below the historic range. The Boulder Park EA does not describe the quantity and quality of habitat that is necessary to sustain or restore the viability of these special status species nor explain the methodology for measuring their habitats.

The CNF Forest Plan Standards are not based upon scientific research regarding the forestwide amount and distribution of habitat needed to insure viability of old-growth associated wildlife or any other special-status wildlife. Within this Objection, we incorporate from our North Fork and

Middle-South Objections their discussions about wildlife ecology and management impacts on habitat, as supported by the scientific references cited therein.

The CNF has failed to monitor populations of old-growth associated wildlife, in favor of striving towards HRV of habitat (vegetation) in project planning. The Committee of Scientists, 1999 state:

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

Rather than performing the Forest Plan required monitoring of populations and habitat, the FS uses the DecAID results as a habitat proxy for viability for the various wildlife that depend upon snag and down wood features. From the CNF's "Orient Vegetation Management Project: Effects to Management Indicator Species and Landbirds" (Orient MIS Report):

> Forest Plan standards for maintaining dead wood habitat within timber harvest units were amended by the regional forester's Forest Plan Amendment #2 (Lowe 1995), also known as the Eastside Screens for Timber Sales. The Eastside Screens require sufficient snag habitat be retained within harvest units to support 100 percent of the potential population of primary cavity excavators throughout the timber stand rotation cycle. The effects of management activities on most woodpeckers are directly related to management-induced changes in the density and distribution of snags, and **we use snags as surrogates of woodpecker populations.** (Emphasis added.)

DSC is merely a proxy for soil productivity. The FS lacks science to validate the SQS methodology for use as a soil productivity proxy.

USDA Forest Service, 2008a states:

> Powers (1990) cites that the rationale bulk density is largely based on collective judgment. The FS estimates that a true productivity decline would need to be as great as 15% to detect change using current monitoring methods. Thus the soil-quality standards are set to detect a decline in potential productivity of at least 15%. This does not mean that the FS tolerates productivity declines of up to 15%, **but merely that it recognizes problems with detection limits.** (Emphasis added.)

It is important to point out, however, that Powers refers to separate and distinct thresholds when he talks about 15% <u>increases in bulk density</u>, which is a threshold of when soil compaction is considered to be detectable, and 15% <u>areal limit for detrimental disturbance</u>, which is the soil quality standard threshold for how much of an activity area can be detrimentally disturbed (including compaction from temporary roads and heavy equipment, erosion resulting from increased runoff, puddling, displacement from skid trails, rutting, etc.). With that caveat, what Powers has to say in relation to the soil quality standard is quite revealing (as quoted in Nesser, 2002):

> (T)he 15% standard for increases in bulk density originated as the point at which we could reliably measure significant changes, considering natural variability in bulk density… (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... (Emphases added.)

USDA Forest Service 2008b stated, "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" (emphasis added). So the SQS limits are based on feasibility of timber sale implementation rather than concerns over soil productivity; and additionally we have the bulk density increase limit is based upon the limitations of detection by FS bulk density measuring methods—again, not concerns over soil productivity.

The FS has no idea if conditions in the Boulder Park project area are adequate for supporting reproducing populations of snag and down log-dependent wildlife. The Wildlife Report states, "Densities of large diameter snags have declined from historic levels across the Forest." And for the Middle-South project, the FS reported the following DecAID results in that EA:

> Snag density is deficient in the 20-inch-and-over dbh size class, which is **a typical condition on the Forest.**
>
> Existing condition snag density within the 20 inches and over dbh size class is less than historic range of variability. This reduced density of large snags is a common occurrence across the Colville National Forest due to fires that occurred in the 1920s-1930s, as well as past logging practices that focused on removing the largest, highest value trees (USDA Forest Service 2014).
>
> Down wood cover in the 5 – 19.9 inch dbh class is similar to, or greater than, historic range of variability but i**s less than historic range of variability for the 20 inches and over dbh class. Similar to the snag data, the lack of large diameter down wood material is due to past fires, logging, and the lack of large snags that can be recruited as down logs. Wildlife habitat surveys likewise indicated common to abundant down wood within the smaller size class, but limited larger down wood.** (Emphases added.)

This means that deficiencies in large snag and down wood habitat occur across most of the CNF and thus habitat conditions are not sufficient to insure viability. And here in the project area the prescription is now more intensive management. The FS has no intention of managing in consistency with the Forest Plan and NFMA.

The proposed logging would remove trees less than 21 inches dbh that could eventually become snag habitat. In other words, those 20" dbh trees to be logged tomorrow won't be available as 21+" dbh trees in the years to come, nor will they ever be available as large snag and down log habitat features. As the Middle-South EA explained, "Long-term, recruitment of snags may decrease as treatments would remove trees that would otherwise die."

Although the EA states the project will retain the largest trees, it fails to disclose the FS's intent is to log many of those future large (21+" dbh) trees before they ever become large snags and large down wood. This is because the FS's "Preferred Alternative" for the revised forest plan

would drop the current Eastside Screens diameter limits in favor of management flexibility[4] that would result in logging the size of trees which are below HRV in the project area and forestwide landscapes.

The commentors recommend that snags deemed to be hazards to tree felling, be left and be buffered by leaving trees around the snag or be cut at at 10-12 feet preferentially to felling the entire dead tree.

Please retain all snags, if the choice is between felling a snag to safely log a green tree, skip logging that green tree. This will provide an existing snag and a replacement.

The Committee of Scientists (1999) report also stress the importance of monitoring as a necessary step for the Forest Service's overarching mission of sustainability: "Monitoring is the means to continue to update the baseline information and **to determine the degree of success in achieving ecological sustainability.**" (Emphasis added.) The Committee of Scientists (1999) further emphasize:

> The proposal is that the Forest Service monitor those species whose status allows inference to the status of other species, are indicative of the soundness of key ecological processes, or provide insights to the integrity of the overall ecosystem. This procedure is a necessary shortcut because monitoring and managing for all aspects of biodiversity is impossible.
>
> No single species is adequate to assess compliance to biological sustainability at the scale of the national forests. Thus, several species will need to be monitored. The goal is to select a small number of focal species whose individual status and trends will collectively allow an assessment of ecological integrity. That is, the individual species are chosen to provide complementary information and to be responsive to specific conservation issues. Thus, the Committee proposed for consideration a broad list of species categories reflecting the diversity of ecosystems and management issues within the NFS.

The EA and Draft DN do not address such scientific opinion that contradicts FS assumptions about MIS habitat management. This is a violation of NEPA. The FS has left assurance of the viability of MIS and TES species on the CNF in limbo.

The same situation exists for old growth in the project area and forestwide—the project area is below the HRV in amount and distribution, and old growth is also below the HRV forestwide.

One of the touted benefits of thinning the forest is to increase the growth rate of trees retained in logging units, as if having large trees on the landscape for ecological benefits is the FS's long term priority. Yet we find no plan that designates specific areas as recruitment old growth—for retention of any specified number of large trees across a wide landscape for an extended period of time into the future. Even the non-commercial treatments are largely tailored to maximize wood production.

[4] http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd490081.pdf

The CNF's Middle-South EA stated, "The Forest Plan (USDA 1988a) includes Forest wide Standards and Guidelines and Management Area (MA) Prescriptions as amended by: the *Continuation of Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales* (USDA 1995a, hereafter referred to as Eastside Screens)…" Here, the Boulder Park EA fails to provide an analysis demonstrating consistency with the Forest Plan/Eastside Screens.

The cumulative effects analysis area for MIS associated with old growth is the Colville National Forest. This would be consistent with how the Forest Plan and the 1982 Planning Rule and NFMA envisioned viability for native species would be insured. Yet the EA and supporting documents do not include a scientifically sound and valid forestwide viability determination.

The CNF's North Fork Mill Creek A to Z project EA stated "historic range of variability analyses conducted by Berube et al. (1993) and as revised by Berube and Kovalchik (1995) for the region …are the best available science characterizing historic range of variability for the project area." On the other hand, the Middle-South EA disagreed, saying that "Hessburg et al. (1999) provides finer resolution" but it fails to explain why Berube et al. is no longer "best available science." Since the FS seems no longer to be following Berube et al., the FS is obligated to explain how badly previous NEPA documents which relied upon Berube et al. have misled the public.

In 2001, the CNF stated:

> In order to comply with NFMA the Forest Plan established forest-wide management direction, goals, objectives, and guidelines for old-growth habitat and management indicator species (MIS). Guidelines for managing indicator species habitats are found on pages 4-38 to 4-42 of the Forest Plan. According to the Forest Plan, application of these required measures should ensure that each indicator species, and all other animals that use the same habitat, would persist over time. In other words, populations should remain **viable**.

(USDA Forest Service 2001e.) The above was several years after the Eastside Screens, but that timber sale EA did not say old growth had been replaced. This CNF game of Calvinball will eventually result in the complete diminishment of "the many significant values associated with old growth forests" expressed in the Forest Service Chief's 10/11/89 "Position Statement On National Forest Old Growth Values" found in Appendix C of the Green et al., 1992 document the CNF uses as its old-growth criteria.

The CNF's old growth direction is partly MA-1[5] - Old Growth Dependent Species Habitat. "The goal is to provide essential habitat for wildlife species that require old growth forest components, and contribute to the maintenance of a diversity of wildlife habitats and plant communities." (USDA Forest Service 2001e.) Also:

> In addition to the management prescription areas, the Forest Plan created a network of special management areas for certain old-growth dependent wildlife species. …Pine

[5] "(B)arred owls core areas." (USDA Forest Service 2001e)

> Marten Management Areas, and …Pileated Woodpecker Management Areas. (USDA Forest Service 2001e.)

The CNF's 1988 Forest Plan FEIS recognized that:

> Old growth forest is of concern for several reasons. It is usually found on productive forest land; it has unique aesthetic qualities, and it provides habitat components essential to many organisms, for which the relationships of only a few have just begun to be studied.

The 1988 Forest Plan stated a commitment and intent to "Inventory … old growth forests…" (Forest Plan at 2-21). The Forest Plan and FEIS asserted:

> The Forest is contracting a new vegetation inventory from which more precise information on old growth and other forest and vegetative characteristics can be interpreted. This inventory will be available for implementation and monitoring of the Forest Plan. (Forest Plan FEIS.)

However, the CNF maintains no forestwide old-growth inventory. The failure to inventory old growth is not a mere paperwork exercise. The barred owl, pileated woodpecker, and pine marten are CNF Management Indicator Species (MIS) associated with mature to old growth forest habitats. (USDA Forest Service 2001e.)

The DN Appendix B admits that there is very little old growth in the project area: "Currently there is approximately 130 acres of verified late closed stand structure that meets the definition of old-growth in the Tacoma Creek watershed." Therefore, the decision to allow further impacts to old-growth associated species and MIS worsens a situation where viability is already not assured, and is a violation of NFMA.

The Forest Plan FEIS disclosed that under forest plan implementation:

> The only old growth and large sawtimber will be in stands that are preserved or managed under longer rotations for recreation, wildlife habitat, or other specific purposes. Such management areas or prescriptions are necessary to maintain diversity across the Forest. …Under all alternatives, old growth forest and snags, especially in the larger size classes, will continue to decline throughout the portions of the Forest on which timber management is practiced. This will compound the direct and indirect effects previously discussed.

Also from the Forest Plan FEIS:

> The Management Prescriptions and Standards and Guidelines will result in a fragmented habitat pattern, with small islands of old-growth habitat scattered throughout the Forest, many of which are large enough to support only one breeding pair of the indicator species for which they were prescribed. The smaller species dependent on these habitats may be isolated into subpopulations, with no normal route for genetic exchange.
>
> …Old growth also occurs, and will continue to occur, in the unsuitable lands in Management Areas 5, 6, 7, and 8. These will provide some larger areas of old growth which might support greater population segments of small animals, and multiple pairs of larger ones, so that chances of viability will be enhanced.

> Never-the-less, there is information needed regarding old-growth habitat and ecosystem needs. Information Needs are listed in Chapter 2 of the Plan, to identify the areas in which sufficient information was lacking to confidently predict responses to the proposed actions. **Monitoring of management indicator species populations and their habitats will be necessary to assess whether they are responding as anticipated. This monitoring is in the Monitoring Plan in Chapter 5 of the Forest Plan.** (Emphasis added.)

Again we note that the CNF proposed using the "old growth inventory" as a way to meet Forest Plan wildlife monitoring requirements. (Forest Plan at 5-20.) But that isn't all—the other wildlife monitoring requirements for old-growth and cavity dependent species found in Chapter 5 of the Forest Plan have fallen by the wayside. Such monitoring requirements were mandated by NFMA regulations, in order to assure that populations weren't trending toward extirpation or extinction.

Along with population trend monitoring requirements, the Forest Plan and FEIS stated a need to perform actions to help insure viability of MIS wildlife species:

> Of the many ecosystems found in wildlands, several were identified as having particular current importance in forest planning. Old growth, riparian/aquatic, upper slope ecosystems, and human interactions within the Forest environment are examples where **more information would be desirable to test planning assumptions as future plans are developed.** (Forest Plan at 2-19.)

> Species that depend on snags or components of old growth forest for survival and/or reproduction are provided for in old growth Management Areas, and in the Forestwide Standards and Guidelines for marten, pileated woodpecker and northern three-toed woodpecker. Since most of these units are merely under extended rotations, they may not be the best quality for, or contain sufficient amounts of, all the components needed to support all of the species that they are expected to support. **Monitoring will be necessary** for distribution of habitat units maintained to meet needs of mature and old growth forest-dependent species, and to ensure that all needed habitat components are provided in sufficient supply within those units**. Snag distribution, characteristics, and use will need to be monitored** to maintain a data base of trends in snag habitat and dependent species. (Emphases added.)

Our incorporated North Fork Mill Creek Objection goes into more detail in terms of Forest Plan requirements for Management Indicator Species[6], ignored by the Boulder Park EA.

DN Appendix B states:

> In part, the Eastside Screens for Timber Sales (Lowe 1995) were intended to address the short-comings of a static reserve system for old growth associated species. Under the Eastside Screens (and the 2019 CNF Land Management Plan) we must manage the Forest

[6] These include pileated woodpecker, barred owl, Lewis' woodpecker, pine marten, northern three-toed woodpecker, primary cavity excavators, franklin's grouse, blue grouse, raptors, great blue heron, beaver, furbearers, waterfowl, and northern bog lemming. The FS does not disclose if the project area and Forest is being managed consistent with these standards, so there is no assurance of viability of the Management Indicator Species.

> to move watersheds closer to their historic range of variability (HRV) for stand structural stages. …**Most watersheds on the Forest are below HRV for late structure.** (Emphasis added).

The above demonstrates that the habitat proxy the FS relies upon is not assuring population viability of MIS or other old-growth associated species.

Along with population trend monitoring requirements, the Forest Plan and FEIS stated a need to perform actions to help insure viability of wildlife MIS:

> Of the many ecosystems found in wildlands, several were identified as having particular current importance in forest planning. Old growth, riparian/aquatic, upper slope ecosystems, and human interactions within the Forest environment are examples where **more information would be desirable to test planning assumptions as future plans are developed.** (Forest Plan at 2-19.)
>
> Species that depend on snags or components of old growth forest for survival and/or reproduction are provided for in old growth Management Areas, and in the Forestwide Standards and Guidelines for marten, pileated woodpecker and northern three-toed woodpecker. Since most of these units are merely under extended rotations, they may not be the best quality for, or contain sufficient amounts of, all the components needed to support all of the species that they are expected to support. **Monitoring will be necessary** for distribution of habitat units maintained to meet needs of mature and old growth forest-dependent species, and to ensure that all needed habitat components are provided in sufficient supply within those units**. Snag distribution, characteristics, and use will need to be monitored** to maintain a data base of trends in snag habitat and dependent species. (Emphases added.)

The Forest Plan includes Management Area 1 (MA 1), with a management goal to "Provide essential habitat for wildlife species that require old growth forest components, and contribute to the maintenance of diversity of wildlife habitats and plant communities." Of MA 1, the Forest Plan requires that:

> Old growth management areas will be at least 600 acres in size. They may be managed as a whole or separated into a "core area" and "foraging areas." Core areas are delineated on planning maps and allocated to Management Area 1. They will consist of old growth forest in a contiguous unit of 300 acres or more, the units being generally no more than twice as long as wide. General crown closure will be 60-100 percent (greater than 80 percent preferred) with relatively open understory.

The 1988 Forest Plan habitat management strategy for assuring viability of wildlife, especially mature/old-growth associated species and cavity habitat dependent species, is tenuous due to simple logistical problems of finding suitable habitat at pre-established grid locations due either to past management or natural conditions. This is demonstrated by pervasive geographic habitat relocations of MA 1 during the timber sale design process, throughout Forest Plan implementation. (Attachment 16 of our North Fork Objection, which is a "List of Amendments: Colville NF as of July 17, 2008" from the CNF website: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_034850.doc

Despite the fact—admitted by the FS in the Middle-South EA—that large snags are below the historic range on the Forest, the EA and CNF monitoring fail to disclose the population abundance or population trends of the MIS which depend upon such habitat components. So FS EA resorts to arriving at baseless conclusions of insignificance with the Boulder Park project, within the context of deficits of habitat components.

The 1988 Forest Plan included provisions that could have determined if viable populations of wildlife are persisting while intensive habitat modifications were implemented in the form of forest management—if the FS would have observed them. These provisions could have validated the utilization of MA 1 and MIS habitat blocks as forest plan habitat protection/viability assurance strategies. Those provisions were the Forest Plan requirements for inventorying and monitoring. But the FS has failed to follow them, resulting in a violation of the Forest Plan and NFMA. This was not disclosed in the Boulder Park EA.

MA1 – 30 years of false narrative. The New Forest Plan eliminated MA1 which was designed to maintain late seral species and their habitat, negating the claims by the USFS that population viability will be retained over time. This was the the purpose of these areas. These areas will be opened up for logging in future timber sales under the new Forest Plan, likely within a 10 year time frame.

> *1.3 Management Direction The Colville National Forest Land and Resource Management Plan (forest plan) as amended is the guiding management direction for the Boulder Park Ecological Restoration Project. This EA incorporates the forest plan by reference and is tiered to the forest plan's final environmental impact statement (USDA Forest Service 1988). (Boulder Park EA, p 4)*

The new Colville Forest Plan eliminates this designation. All past population viability analysis based on the old Forest Plan *including this EA* are invalidated because timber sales can now log in the old MA1 under the guise of "restoration" and impacting the MIS species they were designed to provide viable populations for.

The Boulder Park EA does not explain how the logging will retain snags and green tree replacements in compliance with Eastside Screens standards, given OSHA regulations for maintaining workers' safety, which result in unstable snags being felled. The CNF's Orient Project MIS Report stated that project area is only within the HRV for large snag and down wood habitat in some previously unlogged areas—not for the project area as a whole. And then of course, there's public firewood cutting, the effects of which aren't adequately quantified.

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).

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.

Pfister et al., 2000 state:

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

(Emphasis added). The CNF’s definition of old growth (Green et al., 1992) includes nine different North Idaho old growth types. Without any scientific support, the EA is essentially saying that its proposed logging facilitates the development of these types of old growth.

We cannot find any analysis that discloses the forestwide amount of old growth. This is because the CNF maintains no forestwide old-growth inventory. (*See* Old Growth FOIA response.)

Important details such as minimum stand size for designating old growth are ignored. In other documents (USDA Forest Service 1987a) the agency considers smaller patches of old growth to be of lesser value for old-growth associated wildlife:

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

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

USDA Forest Service, 1987a states:

> Richness in habitat translates into richness in wildlife. Roughly 58 wildlife species on the Kootenai (about 20 percent of the total) find optimum breeding or feeding conditions in the "old" successional stage, while other species select old growth stands to meet specific needs (e.g., thermal cover). Of this total, **five species are believed to have a strong preference for old growth and may even be dependent upon it for their long-term survival** (see Appendix I[7]). 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.**

[7] USDA Forest Service 1987b.

> Wildlife richness is only a part of the story. Floral species richness is also high, particularly for arboreal lichens, saprophytes, and various forms of fungus and rots**. Old growth stands are genetic reservoirs for some of these species, the value of which has probably yet to be determined.** (Bold emphases added.)

The FS acknowledges that wildlife habitat in the CNF has been heavily degraded by past FS management activities. However, how all those actions have cumulatively affected the wildlife habitat, populations, and distribution was not analyzed or disclosed in the EA or supporting documents.

Lehmkuhl, et al. (1991) state:

> Competition between interior and edge species may occur when edge species that colonize the early successional habitats and forest edges created by logging (Anderson 1979; Askins and others 1987; Lehmkuhl and others, this volume; Rosenberg and Raphael 1986) also use the interior of remaining forest (Kendeigh 1944, Reese and Ratti 1988, Wilcove and others 1986, Yahner 1989). Competition may ultimately reduce the viability of interior species' populations.
>
> Microclimatic changes along patch edges alter the conditions for interior plant and animal species and usually result in drier conditions with more available light (Bond 1957, Harris 1984, Ranney and others 1981).
>
> Fragmentation also breaks the population into small subunits, each with dynamics different from the original contiguous population and each with a greater chance than the whole of local extinction from stochastic factors. Such fragmented populations are metapopulations, in which the subunits are interconnected through patterns of gene flow, extinction, and recolonization (Gill 1978, Lande and Barrowclough 1987, Levins 1970).

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

> Forested connections between old growth patches …(widths) are important because effective corridors should be wide enough to "contain a band of habitat unscathed by edge effects" relevant to species that rarely venture out of their preferred habitats (Lidicker and Koenig 1996 and Exhibit Q-17).
>
> Timber harvest patterns across the Interior Columbia River basin of eastern Washington and Oregon, Idaho, and western Montana have caused an increase in fragmentation of forested lands and a loss of connectivity within and between blocks of habitat. This has isolated some wildlife habitats and reduced the ability of some wildlife populations to move across the landscape, resulting in long-term loss of genetic interchange (Lesica 1996, U.S. Forest Service and Bureau of Land Management 1996 and 1997).

> Harvest or burning in stands immediately adjacent to old growth mostly has negative effects on old growth, but may have some positive effects. Harvesting or burning adjacent to old growth can remove the edge buffer, reducing the effective size of old growth stands by altering interior habitats (Russell and Jones 2001). Weather-related effects have been found to penetrate over 165 feet into a stand; the invasion of exotic plants and penetration by predators and nest parasites may extend 1500 feet or more (Lidicker and Koenig 1996). On the other hand, adjacent management can accelerate regeneration and sometimes increase the diversity of future buffering canopy.
>
> The occurrence of roads can cause substantial edge effects on forested stands, sometimes more than the harvest areas they access (Reed, et al. 1996; Bate and Wisdom, in prep.). Open roads expose many important wildlife habitat features in old growth and other forested stands to losses through firewood gathering and increased fire risk.
>
> Effects of disturbance also vary at the landscape level. Conversion from one stand condition to another can be detrimental to some old growth associated species if amounts of their preferred habitat are at or near threshold levels or dominated by linear patch shapes and limited interconnectedness (Keller and Anderson 1992). Reducing the block sizes of many later-seral/structural stage patches can further fragment existing and future old growth habitat (Richards et al. 2002). Depending on landscape position and extent, harvest or fire can remove forested cover that provides habitat linkages that appear to be "key components in metapopulation functioning" for numerous species (Lidicker and Koenig 1996, Witmer et al. 1998). Harvest or underburning of some late and mid seral/structural stage stands could accelerate the eventual creation of old growth in some areas (Camp, et al. 1996). The benefit of this approach depends on the degree of risk from natural disturbances if left untreated.
>
> Effects on old growth habitat and old growth associated species relate directly to … "Landscape dynamics—Connectivity"; and … "Landscape dynamics—Seral/structural stage patch size and shapes."

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

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

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

> Linkages are mechanisms by which the principles of connectivity can be achieved. Although the definitions of linkages vary, all imply that there are connections or movement among habitat patches. Corridor is another term commonly used to refer to a tool for maintaining connectivity. …the successful functioning of a corridor or linkage should be

judged in terms of the connectivity among subpopulations and the maintenance of potential metapopulation processes. (Internal citations omitted.)

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

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

Harris, 1984 discusses habitat effectiveness of fragmented old growth:

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

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

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

The Boulder Park EA does not demonstrate consistency with the Eastside Screens Scenario A, requiring that projects maintain connectivity and reduce fragmentation of LOS stands by adhering to the following standards:

> a) Maintain or enhance the current level of connectivity between LOS stands and between all Forest Plan designated "old growth/MR" habitats by maintaining stands between them that serve the purpose of connection…
>
> b) To reduce fragmentation of LOS stands, or at least not increase it from current levels, stands that do not currently meet LOS that are located within, or surrounded by, blocks of LOS stands should not be considered for even-aged regeneration, or group selection…

The FS's Youkey, 2012 states:

> The assessment process used by the ICBEMP and forest plan revision is based on using the concept of Historic Range of Variability (HRV) to assess likelihood of maintaining viable populations of species. By managing habitat within HRV it is assumed that adequate habitat will be provided because species survived those levels of habitat in the past to be

present today. Thus, if we manage current habitats within the range of historic variability, we will likely do an adequate job of ensuring population viability for those species that remain (Landres et al. 1999).

That is the entire premise of FS wildlife management, which is based on a scientifically unproven assumption that managing "towards the HRV" magically results in abundant, well-distributed wildlife. It's not based upon peer reviewed science, especially in the context of so many other factors on the CNF being outside the HRV—which the FS conveniently wants to ignore. In response to this comment the FS states, "The commenters do not identify the "other factors on the CNF being outside HRV", so it is not possible to respond to this concern." Road densities. **ROAD DENSITIES**, FS wildlife and silviculture specialists. All the FS had to do was look at the next sentence in our comment, which stated, "For example, Youkey, 2012 ignores everything about what Wisdom et al., 2000 state about how critical it is to reduce road densities if wildlife populations are to recover." The 1998 Bull Trout Biological Opinion (BO) indicates that bull trout are absent when road densities exceed 1.71 mi./mi^2., depressed when the road density = 1.36 mi/mi^2 and strong when road density equals or is less than .45 mi/mi^2. (P. 67.) Could this explains why no bull trout have recently been found in the project area?

And to further respond to the FS nonresponse, here is a list of factors that have been heavily influenced by management, and their HRV:

FACTOR	HRV
Road density	zero
Noxious weed occurrence	zero
Miles of long-term stream channel degradation ("press" disturbance)	zero
Culverts	zero
Human-induced detrimental soil conditions	<1%
Maximum daily decibel level of motorized devices	zero
Acres of significantly below HRV snag levels for many decades	zero
Roadless extent	100%
Extent of veg. communities affected by exotic grazers (livestock)	zero
Extent of veg. communities affected by fire suppression	zero

Frissell and Bayles (1996) ask:

> Is the *range* of variability in ecosystems conditions really what we seek to emulate, or is it more important to maintain in a broader sense the full patter of states and successional trajectories (Frissell et al., in press)? Strictly speaking, the range of variability is defined by extreme states that have occurred due to climatic or geologic events over long time spans. Nothing says these extreme states were favorable for water quality or aquatic biodiversity, and in fact such natural-historical extremes were probably no more favorable for these values than present-day extremes. From the point of view of many aquatic species, the range of natural variability at any one site would doubtless include local extirpation. At the scale of a large river basin, management could remain well within such natural extremes and we would still face severe degradation of natural resource and possible extinction of species (Rhodes et al., 1994). The missing element in this concept is the landscape-scale *pattern* of occurrence of extreme conditions, and patterns over space and time of recovery

> from such stressed states. How long did ecosystems spend in extreme states vs. intermediate or mean states? Were extremes chronologically correlated among adjacent basins, or did asynchrony of landscape disturbances provide for large-scale refugia for persistence and recolonization of native species? These are critical questions that are not well addressed under the concept of range of natural variability as it has been framed to date by managers.
>
> …The concept of range of natural variability also suffers from its failure to provide defensible criteria about **which factors ranges should be measured**. Proponents of the concept assume that a finite set of variables can be used to define the range of ecosystem behaviors, when ecological science strongly indicates many diverse factors can control and limit biota and natural resource productivity, often in complex, interacting, surprising, and species-specific and time-variant ways. **Any simple index for measuring the range of variation will likely exclude some physical and biotic dimensions important for the maintenance of ecological integrity and native species diversity.** (Bold emphasis added.)

Despite all the management and other human activities in the project area, the Boulder Park EA presents no quantitative analysis of those cumulative effects on wildlife population abundance, trends, habitat features (adverse and beneficial). There are simply no comparisons to baseline (pre-development) conditions, except for the extremely narrow and inadequate HRV analyses.

For all wildlife and fish, the FS fails to set meaningful thresholds in an apparent assumption that habitat losses are insignificant. Schultz (2010) concludes "the lack of management thresholds allows small portions of habitat to be eliminated incrementally without any signal when the loss of habitat might constitute a significant cumulative impact." (See also Schultz 2012, who notes these problems of analyses for many wildlife species.) The geographic scope of wildlife viability analyses must be forestwide, or at least encompass the area of a truly viable population. Traill et al., 2010 and Reed et al., 2003 are published, peer-reviewed scientific articles addressing "minimum viable population" and how that number has been drastically underestimated in past. The FS has not identified the best available science for making minimum viable population determinations of wildlife species on the Forest.

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

The EA does not present an analysis of the quality of habitat in corridors, areas of assumed habitat connectivity, or linkage zones.

State-of-the-art conservation biology and the principles that underlie the agency's policy of "ecosystem management" dictate an increasing focus on the landscape-scale concept and design

of large biological reserves accompanied by buffer zones and habitat connectors as the most effective (and perhaps only) way to preserve wildlife diversity and viability (Noss, 1993).

The FS fails to assure viable populations of wildlife are being maintained following three decades of forest plan implementation. Forest Plan monitoring requirements include:

Barred owl and other old growth dependent species habitat diversity	Determine if old growth habitat is being managed to maintain viable populations of old growth dependent species and meet management objectives for barred owl. $15,000	(1) Areas of suitable old growth habitat. (2) Number of successful nests and owls.	Estimates of old growth acres in no less quantity or quality than predicted in the Plan. No more than 25% drop in nesting or 50% nesting failure.	(1) Old growth inventory, (2) Project reconnaissance (3) Timber stand exams (4) Calling counts	District Ranger and Wildlife Staff	10% of the MA-1 areas annually for population an nesting.
WILDLIFE Monitor levels of indicator species habitats and utilization including: marten, pileated woodpecker, northern three-toed woodpecker, grouse, beaver, raptors, herons, northern bog lemming, other sensitive or unique wildlife.	Determine if forest wildlife habitat for indicator species is being managed at acceptable levels.	Acres of suitable habitat in defined distribution; localized population or activity trends within specified areas.	Defined management objectives are being met.	Aerial photographs and field examination of habitat including transects and call and count routes. Department of Wildlife records.	District Rangers, Wildlife Staff, and Washingto n Dept. of Wildlife.	At least one presale and one postsale project/district per year, randomly selected. Unique and sensitive species habitats annually.

There can be no proper cumulative effects analysis if the FS has failed to properly conduct the monitoring assumed in the Forest Plan EIS.

Since the point of the Forest Plan's inclusion of management indicator species (MIS) for old growth is to maintain population viability, then logically the amount of old growth both within the project area and forestwide is highly relevant to the Boulder Park project.

The Forest Plan states:

> Old growth management areas will be at least 600 acres in size. They may be managed as a whole or separated into a "core area" and "foraging areas." Core areas are delineated on planning maps and allocated to Management Area 1. They will consist of old growth forest in a contiguous unit of 300 acres or more, the units being generally no more than twice as long as wide. General crown closure will be 60-100 percent (greater than 80 percent preferred) with relatively open understory.
>
> Foraging areas will be of sufficient acreage when added to the core area to make the total size of the management area 600 acres. The foraging areas will be stands of mature or old growth trees (dominated by other than lodgepole pine) of 30 to 300 acres or more, within 0.4 mile of the perimeter of the core area. General crown closure will be 60-100 percent (greater than 80 percent preferred) with relatively open understory.

> Snags and understory logs will be retained at their natural density within the core areas unless they become so dense that they degrade the habitat or become an unacceptable hazard. Within the foraging areas snags and understory logs will be maintained in, at least, sufficient numbers to provide habitat for 100 percent of the potential population of primary cavity excavators.

The FS has never insured that direction was being followed. In fact for the pine marten, Colville NF biologist M. Borysewicz describes the forestwide situation as: "many, if not most of our reserved core habitat areas for pine marten do not meet the desired stand characteristics…" (See Attachment 1). Truly, the Forest Plan scheme is a viability failure for old-growth associated wildlife. It might not have been, if the FS were to have observed Plan direction for old-growth associated species over the past 30 years.

Defining characteristics of old growth described by Green et al., 1992 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.

Lesica (1996) states, "Results of this study and numerous fire-history studies suggest that **old growth occupied 20-50% of many pre-settlement forest ecosystems in the Northern Rockies**." (Emphasis added.) Lesica, 1996 (also cited in Gautreaux, 1999) stated forest plan standards of maintaining approximately 10% of forests as old-growth **may extirpate some species**. This is based on his estimate that 20-50% of low and many mid-elevation forests were in old-growth condition prior to European settlement. This should be considered some of the best science on historic range of old growth necessary for insuring viability of old-growth associated species.

The Boulder Park 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 Colville NF.

The Colville NF 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. Biologically speaking, the FS refuses to check in with the real experts to see if logging and old-growth habitat are biologically compatible.

Surveys for wildlife have apparently not been conducted in all potential habitat.

The Boulder Park EA makes conclusory statements for wildlife species (e.g. "beneficial effects") which are not supported by science or analysis. The best available science clearly indicates project direct, indirect, and cumulative impact would not be "beneficial" so the EA should not be misleading the public.

The CNF has also failed in its obligations, set out in the Forest Plan, to monitor population trends of management indicator species in response to management activities.

The CNF Forest Plan Standards are not based upon updated scientific research regarding the forestwide amount and distribution of habitat needed to insure viability of special-status wildlife.

The FS Chief directed each national forest to complete an inventory of its old-growth forests, in recognition of the ecological, economic, and social values they hold for the American people and components of the ecosystems (quoted in Green et al., 1992). Nearly three decades following the Chief's directive, the Colville NF has yet to complete a forestwide inventory of our old-growth forests.

The FS fails to disclose if logging or burning is proposed in any stands meeting the Green et al., 1992 old-growth criteria. The Boulder Park EA provides no assurance the proposed management scheme ("thinning") will accelerate forest conditions toward old growth at some unspecified time in the future. There is no supporting science or monitoring. (Pfister et al., 2000.)

The EA states, "the proposed action would incorporate all of the conservation strategies identified in Youkey (2012) to improve viability outcomes for these species across the Forest." The FS has failed to evaluate major analysis documents and methodologies such as Youkey 2012 and DecAID using an independent peer review process. So while Youkey, 2012 states, "This assessment process is based on using the concept of Historic Range of Variability (HRV) to assess likelihood of maintaining viable populations of species" the scientific veracity of the methodology is not scientifically established. The entire premise of FS wildlife management is based upon a scientifically unproven assumption that managing "towards the HRV" magically results in abundant, well-distributed wildlife. It's not based upon peer reviewed science, especially in the context of so many other factors on the CNF being outside the HRV—which the FS conveniently wants to ignore. For example, Youkey, 2012 ignores everything about what Wisdom et al., 2000 (government scientists studies during the Interior Columbia Basin Ecosystem Management Project—"ICBEMP") state about how critical it is to reduce road densities if wildlife populations are to recover.

With the Eastside Screens Forest Plan Amendment and the specific MIS habitat provisions of the Forest Plan, the CNF has relied exclusively upon project-level habitat designations as its only viability strategy. This is contrary to the FS's own best available science. (Committee of Scientists (1999.) The Committee of Scientists (1999) state:

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

Please provide a list of best available scientific information the EA relies upon for analysis of impacts to each of the Table 14 Sensitive species.

Remedy: Choose the No Action Alternative. In any case, finish the ongoing process of revising the Forest Plan before preparing an EIS for this project, if the FS still wants to pursue it, which demonstrates consistency with all forest plan management requirements, complies with NEPA and NFMA, insures vertebrate viability, and uses the best available science. Complete formal consultation with the U.S. Fish and Wildlife Service, and incorporate the Biological Opinion into all alternatives of the EIS. Conduct a Science Consistency Review in an iterative process of evaluating alternatives and validating that they are designed consistent with available scientific information.

OLD GROWTH IS NOT IDENTIFIED AND MAPPED AND IS BEING LOGGED

The Old Growth Issue was raised in the Sieracki/AWR EA comments at pp. 1, 6 and 11.

Old Growth has not been mapped. District Ranger Gayne Sears agreed in a public meeting for the Boulder Park EA to have the HRV of old growth developed or provided, this information has not been made available as of yet for use in substantive commenting. Currently old growth is combined with open and closed mature categories making separation of this important ecosystem component impossible, and the exclusion of an old growth category in HRV estimations is unconscionable and unprofessional. The commentor has agreed to a field trip with USFS personnel to assist with old growth identification this upcoming summer (2018).

District Range Gayne Sears stated in a public meeting that HRV of old growth stands would be developed for this project, she later reneged on that promise.

Best available science regarding screening stands for potential old growth inventorying (Green et al., 1992) requires proper stand stratification, actual field examinations and professional review to determine if stands meet criteria for old-growth habitat. Why is the USFS ignoring this science? Additionally, unique old stands can exist outside Green et al's criteria and can be included as old growth. Please identify patches of old trees that may be suppressed, appear as krumholtz or other forms that exist outside of the old growth definition, identifying unique areas such as these is a requirement of the CNF Forest Plan.

Please estimate, using the best available science, the amount and type of old-growth in the analysis area historically, document the amount present currently and allocate additional stands

to meet historic levels (likely up to 30% based on the adjacent Selkirk Mountains). This is required for developing HRV under amendment 2 of the Region 6 Forest Plans.

HRV of old growth is not separated from mature stands.

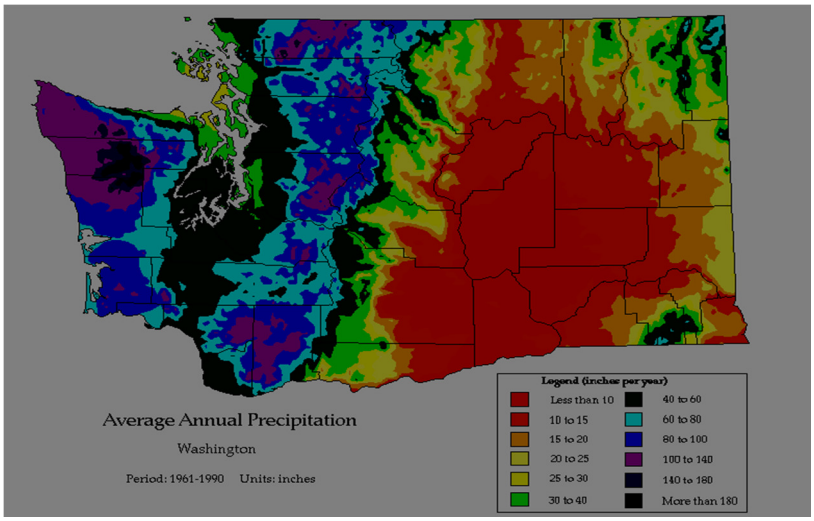
The following table shows the distribution of structure classes chosen by the CNF for the draft Forest Plan EIS from the Forest Vegetation Report for the FEIS Forest Plan Revision (J. Day, 2016):

"Table 2. Structure class definitions based on canopy cover and diameter

Structure	Definition
Early	Trees less than 10" dbh or canopy cover < 10%
Mid Open	Trees 10-20" dbh, canopy cover ≥ 10% and < 40%
Mid Closed	Trees 10-20" dbh, canopy cover ≥ 40%
Late Open	Trees ≥ 20" dbh, canopy cover ≥ 10% and < 40%
Late Closed	Trees ≥ 20" dbh, canopy cover ≥ 40%

Tree structure is classified into five general groups based on diameter and canopy cover as shown in table 2. Haugo et al. (2015) used a similar approach to defining structure classes, and the GNN data (2012) lends itself well to easily analyzing forest structure at multiple scales using these definitions. The diameter is based on the quadratic mean diameter in inches of trees whose heights are in the top 25% of all tree heights in the stand. This generally means that the diameters of the larger co-dominant trees in a stand are used to define the structure class."

Old growth is not separated from the existing mature HRV, obfuscating the amount and distribution of old growth by lumping it with mature size class trees. The entire HRV analysis is flawed by lumping HRV across the Forest, clearly HRV for the range of vegetation types that occur on the CNF would be different when separated by level 4 EPA ecoregions. The analysis area is in 15y, Selkirk Mountains with similarities to the Selkirks east of the Pend Oreille River and in adjacent Idaho, while the CNF also encompasses dryland habitats; Okanogan-Colville Xeric Valleys and Foothills, Okanagan Highland Dry Forests, Western Selkirk Maritime Forest and High Northern Rockies (illustration 2). These different ecoregions may have different HRV values for vegetation types including old growth. Lumping Level 4 ecoregion types all together for analysis at the Forest Level and then applying combined HRV values at the watershed level is questionable especially when noting that there is a west/east precipitation gradient, and the analysis area is located in the moister eastern area of the CNF. The image below shows the similarity of precipitation levels in the project area with the greater Selkirks to the east (http://4.bp.blogspot.com/-zVnhRx2nHBY/ToSk36KCE-I/AAAAAAAAAbY/9VeZKDp9vm8/s1600/precipitation_map.gif)



Old Growth as a biological legacy

The draft Plan has a list of biological legacies that are supposed to be represented at the landscape level.

> *"Large trees, snags, and down material are represented across the landscape and large tree habitat is maintained to support wildlife, aquatic and soil resources and support recovery processes in the post disturbance ecosystem. "*
>
> *"Table 7. Biological legacy categories, CNF Forest Plan.*
> *Legacy Category Examples Organisms Sexually mature and intact live trees Tree reproduction (seeding and sapling banks) Vegetatively reproducing parts (e.g., roots) Seed banks Shrub, herb, bryophyte species Mature and immature animals and microbes Organic matter Fine litter Particulate material Organically derived structures Downed trees and other coarse woody debris Root wads and pits from uprooted trees Hollow live trees Trees with mistletoe brooms or other features important for wildlife habitat Organically derived patterns Soil chemical, physical, microbial properties Forest understory composition and distribution."*

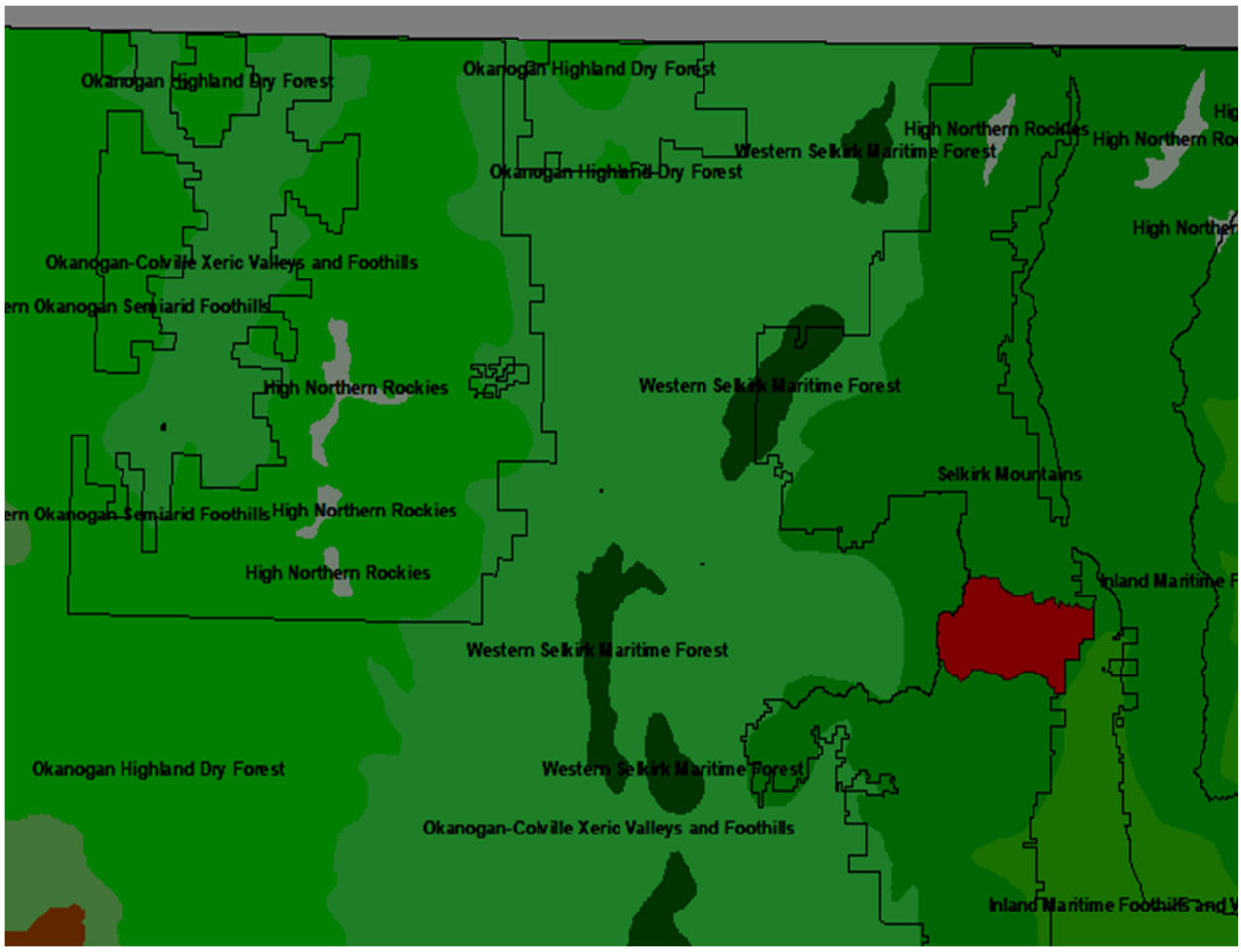


Illustration 2: The Project Area in red is located in the Selkrik Mountain Level 4 EPA Ecoregion. The CNF HRV analysis lumped variation in different ecoregions into one for the entire Forest, the HRV analysis does not separate out old growth.

Biological legacies at the landscape level should include unmanaged moist site old growth stands and dry site stands maintained by fire at historic levels for the Selkirk Mountains ecoregion. Also see the comments about lichen diversity and their distribution related to microclimates above.

NEPA requires the analysis of reasonably foreseeable actions. One of these actions would be approval of the CNF Forest Plan, modified alternative P, which would remove any old growth reserve and open up these areas for timber sales. The new Forest Plan that may be signed this year effectively negates old growth reserves.

> *"DECISIONS MADE IN THE PREVIOUS FOREST PLAN 438*
> *Decisions made in the previous Forest Plan, such as resource management standards, will no longer be binding unless they are explicitly carried forward by inclusion in this plan. Note that laws, regulations, and directives are not repeated or summarized in this plan (unlike the previous forest plan), but are still in force." DRAFT CNF Forest Plan, pg 17*

The CNF fails to realize that logging an entire landscape with a "design a stand" mentality would devastate old growth associated species because of the change from retaining natural old growth stands to artificialized stands and entire ecosystems. This is part of the reason that **logging is not restoration**.

The Boulder Park EA pg. 22 states:

> Stands that currently exhibit late structure or old-growth characteristics would not be treated, thus cumulatively adding to the overall late structure and old-growth stands in the future, as long as these stands do not decline because of health or disturbance.

And from the Boulder Park Wildlife Report pg. 8:

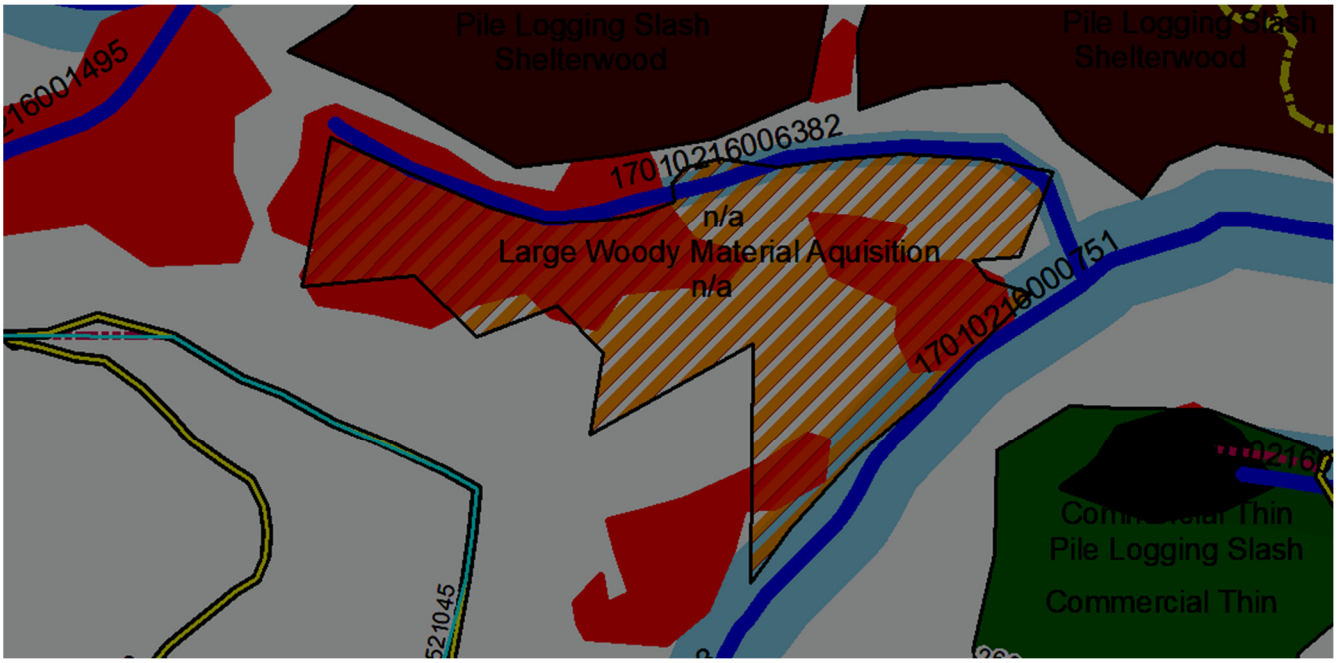
> Within the watersheds, there are approximately 130 acres of stands that meet the North Idaho Zone Old Growth definitions (Green et al. 1992). The silviculturist identified five distinct stands or stand patches ranging from 10-57 acres as old growth based on the tree species, size, and age of the trees.

Field reviews by Paul Sieracki, geospatial analyst/wildlife biologist have discovered areas that are old growth and are proposed to be logged and some areas that are only temporarily protected from logging due to the constraints in the EA.

The EA proposes to mine large diameter logs for placement as LWD in project area streams. One of these areas, Unit 95 (Large Woody Material Acquisition), includes a portion of a young cedar grove embedded in closed canopy mature moist site timber (see map below). Some of these trees may be over 3 average human lifespans old (see photographs below). By definition a cedar grove is 4-500 years or older, these are at least 150 years old. In addition, this area is a fire refugia located on a generally east facing drainage in Tacoma Creek, mid to upper elevation cedar/hemlock series, and between two streams with rocky outcrops above. These western redcedars have survived at least one ground fire with the smaller trees regenerating after the disturbance. To decimate an old growth and mature stand using heavy equipment to rip trees out of the ground for large root wads is unacceptable and contradicts this from the Wildlife Report p. 47: "Project activities would not occur within old growth forest stands".

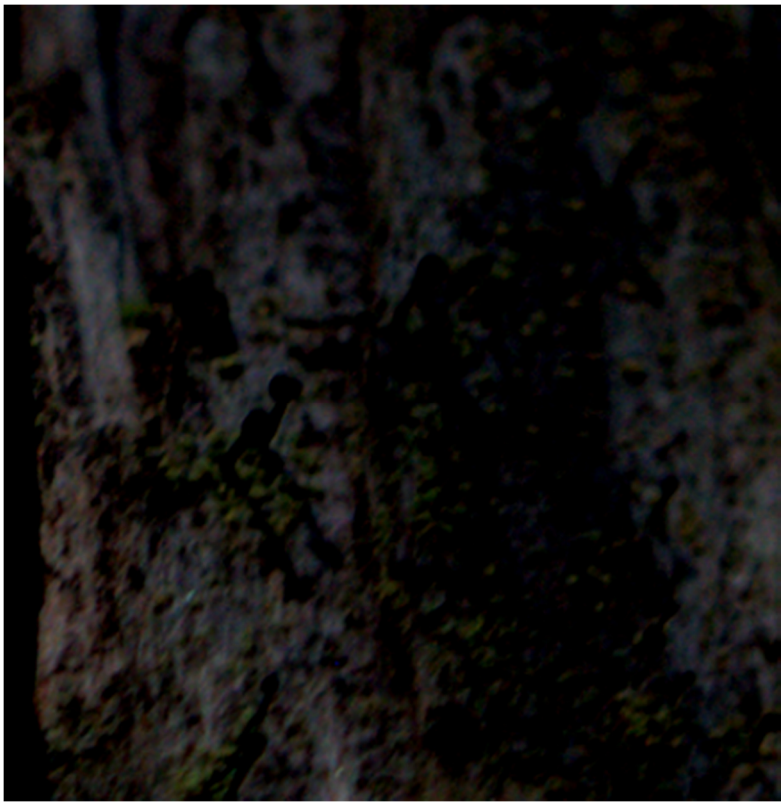
And it also contradicts the EA p 22: "Stands that currently exhibit late structure or old-growth characteristics would not be treated, thus cumulatively adding to the overall late structure and old-growth stands in the future..."

Other options are available for LWD replacement efforts including bundling several smaller diameter trees with metal bands to imitate the function of our irreplaceable old growth trees in stream ecosystems. Please eliminate this LWD source area.

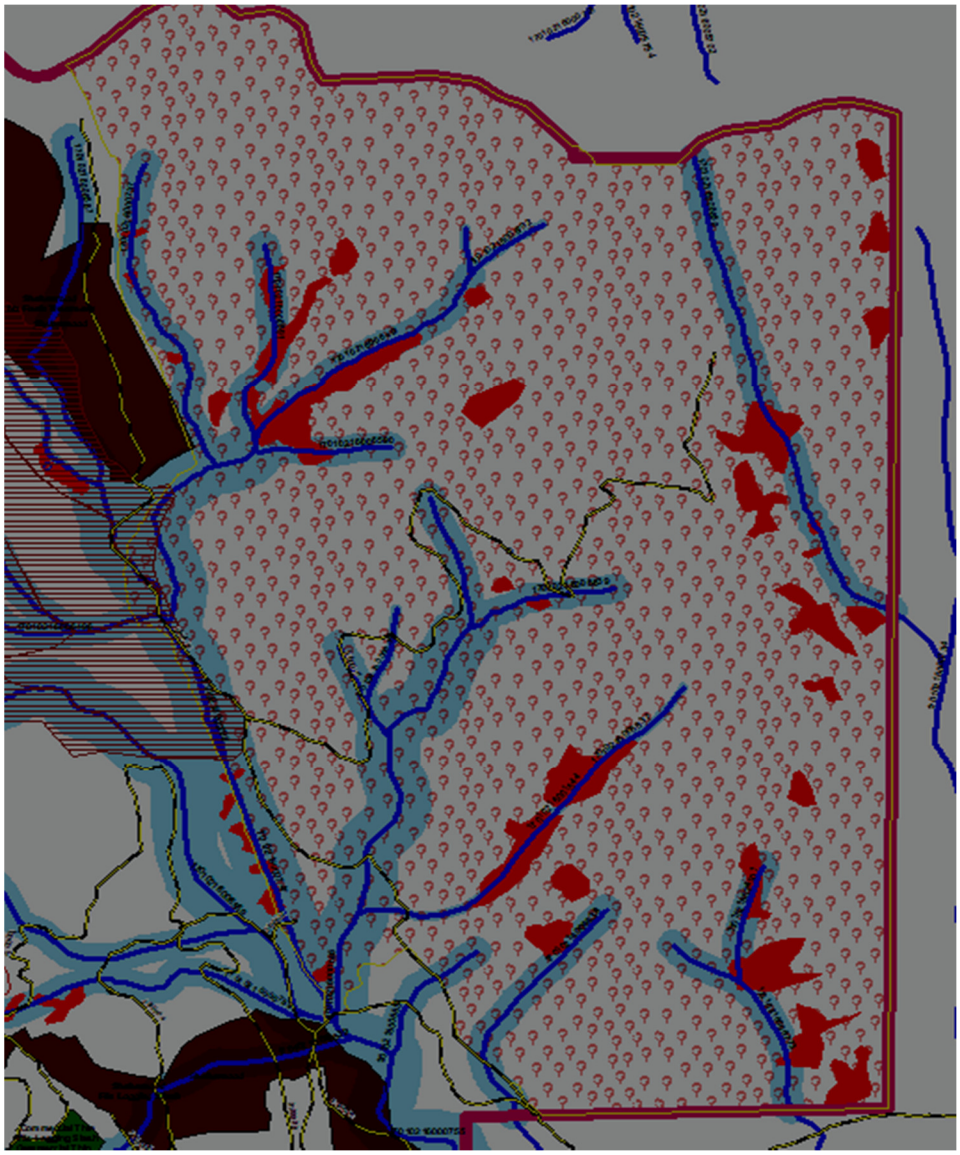


The map above shows Unit 96 with areas of trees greater than 100 feet tall in red. It is closed canopied and target fisher breeding habitat.

The area (Unit 95) is also target fisher breeding habitat and suitable pine marten habitat. The red areas indicate populations of trees greater than 100' tall and the yellow hatch is the area that is proposed to be decimated for LWD acquisition. There are also two springs in this area and one of the western redcedars has a population of calicoid or pin lichens, indicative of older trees.



The MA1 just east of Gardiner Creek is not providing habitat for old growth/late successional species as required by the Forest Plan. Only a small unmapped fraction of this MA1 is actually dry or moist site old growth as defined by the Green et al., 1992 definitions used by the CNF, leading to population viability questions for old growth species. The red polygons in the image below show areas of potential old growth in MA1. These areas have not been confirmed but it does illustrate how ineffective this MA is for providing habitat for both dry and moist site late successional species. The CNF proposed to burn this area, but does not have areas that should be underburned delineated from areas that are moist sites. No quantitative analysis is given as to how many acres, their location and what species would benefit from the underburning.



MA 1, east of Gardiner Creek, red patches indicate taller trees that might meet old growth species requirements. This also shows the limited extent of unverified mature to old growth stands.

Additionally MA1 areas would be eliminated in the revised Colville Forest Plan. Stating that this area is protected and providing habitat for late successional species viability is false, when the next entry could log it. The revised Colville Forest Plan dependence on a manufactured HRV to provide habitat for old growth associated species is pure speculation and not based in science.

Remedy: Choose the No Action Alternative. In any case, finish the ongoing process of revising the Forest Plan before preparing an EIS for this project, remedying the scientific and analytic deficiencies identified above.

BIG GAME SPECIES

This issue was raised in UCRG/AWR EA comments at pp. 31-32.

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

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

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

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

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

Thomas et al., 1988a also state:

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

The EA contains no analysis of how weed populations and trends are affecting and will affect the forage the FS claims will be improved by the project.

Winter Range

MA 6 & 8 emphasize winter range with uneven aged management in visually sensitive areas and 10 – 20 acres regeneration units in other areas. A GIS – based analysis reveals four major issues: The designation of winter range management areas is arbitrary and capricious. There are many acres of similar slope and aspect that are not included as winter range and likely serve that function to some unknown list of ungulates that winter range is supposed to be managed for (white-tailed deer, elk, moose, mule deer, bighorn sheep?). Unit size may exceed standards for winter range. Contiguous units may not be accounted for in the GIS analysis which increase the size of the logging units. Please discuss proposed activities in winter range in detail, at the stand and local landscape level, model all potential winter range where appropriate for each species utilizing that specific winter range area., including hiding cover, winter range and security currently available in the area as well as during and after the project. Examine alternative effects in relation to the Forest Plan Standards and to lower elevation forested ecosystems in relation to climate change and the potential uphill migration of potential natural communities.

Please analyze each ungulate species separately.

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

The EA says, "There is a need to move deer winter range closer to forest plan objectives for cover and forage habitat." Please explain why natural processes, which took care of those sort of things for a million generations of deer, can't continue to maintain cover and forage habitat for deer.

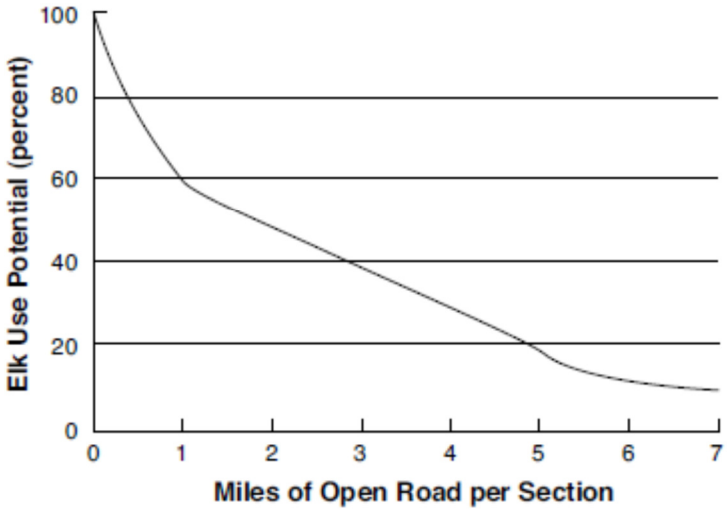
The EA does not present a quantitative or qualitative analysis of security and thermal cover. The effects of the proposed "treatments" is not adequately analyzed and disclosed.

The EA does not provide an analysis of the degree to which project activities will have the effect of displacing elk and other ungulates onto private land, and the indirect effects on values on those private lands.

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

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

5. Levels of habitat effectiveness:



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

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

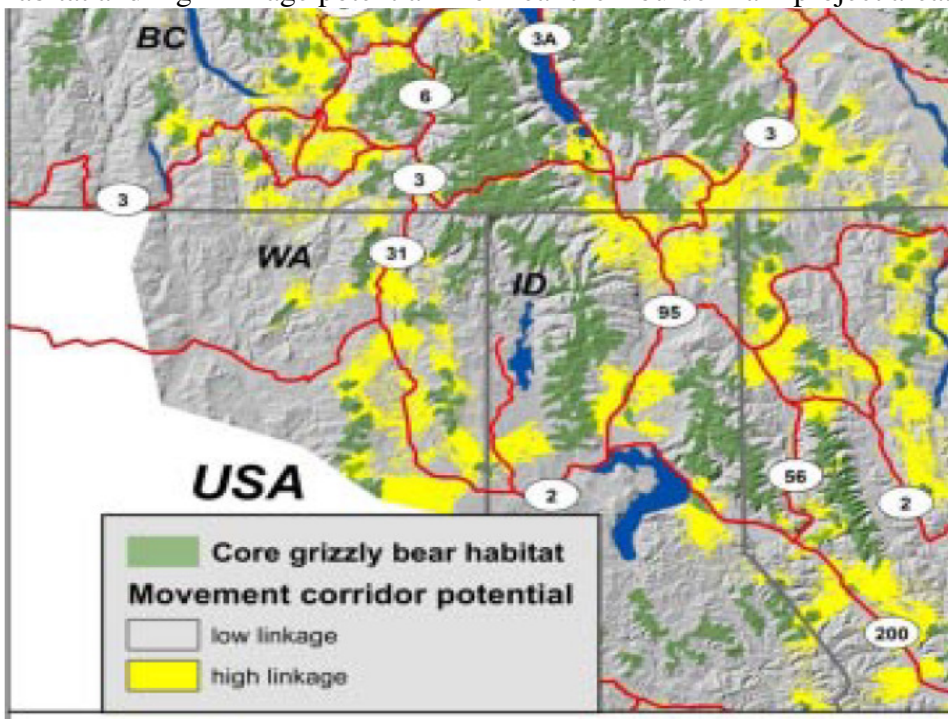
Also, Ranglack, et al. 2017 investigated habitat selection during archery and rifle hunting seasons.

Remedy: Choose the No Action Alternative. In any case, finish the ongoing process of revising the Forest Plan before preparing an EIS for this project.

GRIZZLY BEAR

This issue was raised in UCRG/AWR EA comments at pp. 27-28.

The area encompassing the project area is called the Selkirk South subpopulation area and is located in the Canada-US Trans-border region. (Proctor et al., 2012, Proctor et al., 2015) Proctor et al., 2015 conducted grizzly bear habitat connectivity mapping showing core grizzly bear habitat and high linkage potential in or near the Boulder Park project area:



The Boulder Park timber sale is likely to adversely affect the grizzly bear.

The effects to grizzly bears from the project include potential 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 may lead grizzly bears to avoid an otherwise suitable habitat.

The EA fails to adequately analyze and disclose cumulative impacts on land of other ownerships due to their unknown duration, location, and intensity.

"Our analysis shows that grizzly bears have little or no opportunity to select home ranges with lower road density or higher percentages of core… Because grizzly bears could not have selected home ranges having more core area and lower road densities, and there has been no growth in the population, there is no basis to conclude the proposed access standards are sufficient to insure the recovery of the Cabinet-Yaak and Selkirk grizzly bear populations" (Merrill 2003).

The effects to grizzly bears from the project include potential 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 may lead grizzly bears to avoid otherwise suitable habitat.

The Biological Evaluation (BE) laudably delineated core habitat. Please discuss if these areas will be free from disturbance for at least 10 years as required for core habitat in the GBMU's.

The BE again makes specious statements without quantitative analysis using scare tactics about fire impacting grizzly bear habitat, using unscientifc words like "likely" without a spatial probability assessment. The BE also alluded that wildfire would be detrimental to grizzly bears, this is untrue as they tend to utilize burns as they revegetate. Please map huckleberry fields, either forested or non forested and analyze the effects of management activities in a credible quantitative way. Recent research indicates female bears in the Selkirks and Cabinets tend to spend much time in areas with huckleberry concentrations. Mere statements about berries and forage are quite meaningless without being spatially explicit.

It would be wise to delineate this area as a BORZ. Please consult with the USFWS on this action.

Please discuss the following major points in relation to the grizzly bear.
- Effects of the proposed action including timing of logging in relation to season of use by grizzlies.
- Effects of vegetation management prescriptions in relationship to grizzly bear (Johnson, W., Gautreaux, R. 2008)
- Progress or status towards acquiring land encompassing the linkage zones.
- The commentors propose that this area be designated as a BORZ (Bears out of Recovery Zone) area with appropriate restrictions on road management and timing of activities.
- Please discuss acquiring DNR lands within and adjacent to the Abercrombie-Hooknose Roadless Area. This acquisition would be very valuable for wildlife.
- Please disclose the benefits to the grizzly bear and the environment for the re-introduction of anadromous salmon and trout.

Schwartz et al. (2010) noted that management for grizzly bears requires not only the provision of security area, but control of open road densities between security areas. Otherwise, grizzly bear mortality risks will be high as bears attempt to move across highly roaded landscapes to another security area.

The forest plan lacks direction regarding road densities located outside of and between security areas. There is no analysis in the EA regarding existing road densities located outside of and between BMUs, both at present and during project implementation.

The FS ought to be already aware of the best grizzly bear forest plan direction it has adopted to date, established in Flathead Forest Plan Amendment 19.[8] The Flathead NF established Open

[8] Although that Forest Plan has been revised and the Amendment 19 direction dropped and/or weakened, AWR has objected to the Flathead NF's revised forest plan and filed notice of intent to sue on this issue.

Motorized Route Density (OMRD)/Total Motorized Route Density (TMRD)/Security Core indices, 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. Also see McLellan, et al., 1988.

Grizzly bears are winter-sleepers rather than true hibernators. If high density motorized routes are known to disturb, displace, habituate, and raise mortalities among grizzlies in spring, summer, and fall, there's no logical, or scientific reason to believe they don't do the same to sleeping bears in winter. The Biological Opinion on the forest plan for the Kootenai National Forest states:

> In the CYE and NCDE, incidental take may occur where late season snowmobiling overlaps with grizzly bear post-denning habitat. The incidental take is expected to be in the form of harassment to individual female grizzly bears and/or cubs caused by premature den emergence or premature displacement from the den site area, resulting in reduced fitness of females and cubs. We expect the amount and extent of take would be very low.

That Biological Opinion also recognizes:

> The Revised Plan's desired condition for patches which includes a range of larger opening sizes may result in adverse effects if lack of cover leads to under use of foraging habitat or increased risk of human-grizzly bear conflicts causing mortality of a grizzly bear.

The FS's current management strategy allows "temporary" increases in road density as if the habitat would then get reprieve from such "temporary" adverse effects. However, the FS recognizes no genuine limitations on how much, how often and for how long these "temporary" adverse effects will occur or persist.

The EA does not include an analysis of season grizzly bear habitat components.

The EA also fails to take a hard look at cumulative effects on wildlife from activities in adjacent areas.

The Boulder Park EA fails to disclose the questionable effectiveness road closures for the purpose of eliminating human access behind closures. We incorporate the Amended Complaint for case CV-18-67-DWM for the purposes of explaining how roads affect wildlife and that ineffective closures on national forest land are all too common.

DN Appendix B states, "Note that the project would result in a net decrease of almost 15 miles of existing open roads." To the degree that the EA analysis relies upon that position, the EA violates NEPA because the FS also admits road decommissioning accomplishment is based upon uncertain funding.

The EA does not demonstrate that project implementation is consistent with the best available science, so EA and Draft DN violate the ESA, NFMA, and NEPA.

FISHER

Fisher were discussed in UCRG/AWR EA comments at pp. 29-30 and in the Sieracki/AWR EA comments at pp. 15, 34-36.

There is a documented sighting near Lake Leo, Pend Oreille County, May 02, 1998, located about 16 miles south of the analysis area (WDFW, PHP data query). The Boulder Park analysis area is located in or overlaps the Washington State designated Selkirk Recovery Area as shown below.

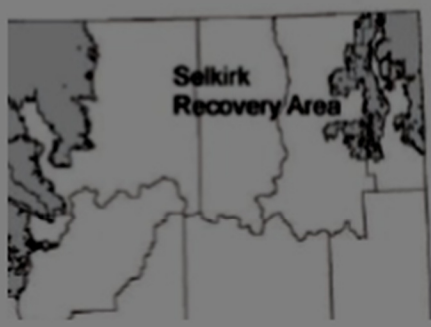


Image clipped from the Fisher Recovery Areas in Washington map (Hayes, G. E., and J. C. Lewis. 2006).

The Selkirk Recovery Area in the above image has been removed by WDFW, hoping that fishers would repopulate the Washington Selkirks from adjacent Idaho. Additionally BC has stopped supplying fihers to the coast range because of the increased amount of logging and wildfires, further putting the species at risk http://vancouversun.com/news/local-news/b-c-suspends-fisher-relocations-to-washington-state-amid-habitat-loss-to-logging-and-wildfires. However, the fisher is currently listed as a SSS species (Strategic Species) for the Colville NF, not sensitive. https://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/

> "Strategic species are species that have some sort of information gap and that gap either makes it difficult to manage the species or analyze in project effects analysis. For example, we may not have much information on species habitat, threats, distribution, or how to conserve the species."

It is listed as "D" - documented occurrence on the Colville National Forest. The fisher will be changing from strategic to sensitive on the CNF based on communications with personnel from the Interagency Special Satus / Sensitive Species Program (ISSSSP). The commentors suggest the CNF treat the fisher as a sensitive species for this project to avoid controversy, but mainly to prevent loss of potential and existing fisher habitat. The CNF's old growth associated areas, MA1's and travel corridors are clearly inadequate to provide enough habitat to assist in recovery/reintoroduction.

Fishers need larger patches of contiguous mature forest habitat than pine martens. The average home range size is approximately 12,200 acres and for a female fisher and approximately 24,300 acres for a male fisher in central Idaho (Sauder and Rachlow, 2014). Considering the entire

53,600 acre analysis area, this ideally amounts to habitat for 1 male and 2 female fishers. Due to these requirements, the connecting grid of MA1 and late successional patches that may or may not be functional is not adequate to provide for fisher.

> *"Fishers selected landscapes for home ranges with larger, more contiguous patches of mature forest and reduced amounts of open areas. Landscapes that had 50% mature forest arranged in connected, complex shapes with few isolated patches, and open areas comprising 65% of the landscape characterized a forest pattern selected by fishers in our study." (Sauder and Rachlow, 2014)*

The proposed alternative severely fragment fisher habitat and will preclude re-introduction or repopulation, violating NFMA direction to avoid causing populations of sensitive species from trending towards listing under the ESA (FSM 2670.22) which is a reasonably forseeable action. WDFW was not present or included in the 3 collaboration meetings 2017-18. The Washington State Recovery Plan for Fisher states that:

> *"Achieving this goal [self sustaining fisher populations] will require collaboration and partnerships among state, federal, and local agencies, tribal governments, and non-governmental organizations." (Hayes, G. E., and J. C. Lewis. 2006).*

The commentors request the following:

- Fisher habitat should be mapped in the analysis area.
- Bait stations and cameras should be used to continually attempt to discover presence of fisher.
- An area closure on trapping be implemented until fisher populations are documented, rebound or are reintroduced.
- Elimination of all poisoning of pocket gophers or other small mammals in plantations to prevent biological magnification and the loss of predatory species.
- WDFW be included in collaboration meetings in relation to reintroducing and recovering the pacific fisher population.

Unit 95 is proposed for mining Large Woody Debris and is also target fisher breeding habitat. Uprooting large trees will severely impact this stand for fishers by disturbance, removing large trees and incursion of skid trails. There is one record of fisher in the general vicinity. The CNF has removed fishers from their older sensitive species list, then considered them a strategic species, then they were eliminated from considerations because their past activities have removed the habitat they depend on causing extirpation. The project area has late successional habitat which is suitable for fisher.

The Colville NF forest plan revision Proposed Action states:

> The wolverine and fisher are listed as Region 6 sensitive species and a petition for listing under the federal Endangered Species Act is being pursued. An interagency team of biologists and scientists are developing conservation assessments and strategies for wolverine and fisher. The revised forest plan needs to incorporate the information developed in the conservation assessments.
>
> Wolverines have been discovered at several locations in the planning area; however, fishers have been extirpated. A regional assessment of landscape connectivity for the wolverine

was completed in 2001. This information needs to be integrated into land management planning.

Furthermore, the project documents fail to recognize that fisher ("extirpated"?) are native to this part of Washington. The FS is obligated to consult with the US Fish and Wildlife Service on behalf of this species, Proposed for listing under the ESA.

Now, the FS simply dismisses this species by saying, "The species presently has no status on the CNF." (DN Appendix B.)

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

The state of Washington Fisher Recovery Plan (Hayes and Lewis, 2006) includes this map, indicating Washington Fish and Wildlife believe fisher are native to the CNF:

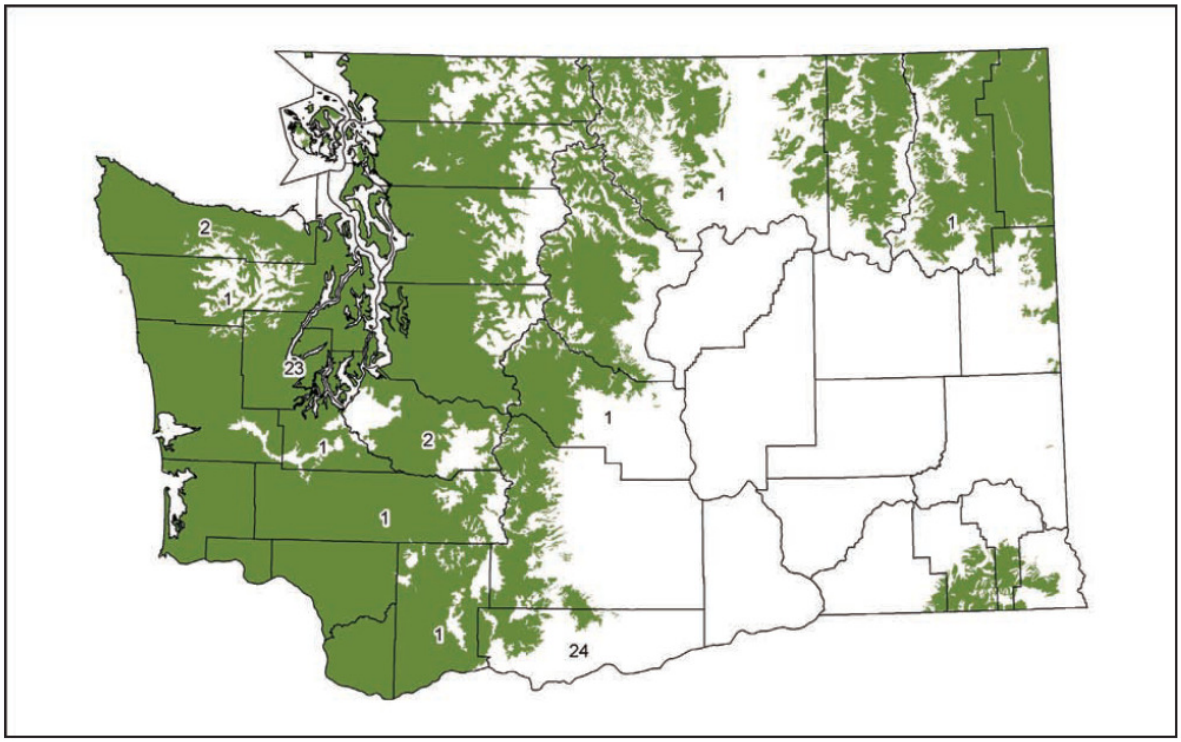


Figure 2. Probable historical distribution (circa 1800) of the fisher in Washington based on specimens (numbers indicated by county), trapping records, and forest zones associated with fisher records (Aubry and Houston 1992) (Forest zones [Cassidy 1997] shaded include: Western Hemlock types, Douglas-fir types, Grand Fir, Cowlitz River (zone), Willamette Valley (zone), Sitka Spruce, Interior Redcedar, Silver Fir, and Subalpine Fir).

Hayes and Lewis, 2006 state, "The two most significant causes of the fisher's decline were over-trapping by commercial trappers and loss and fragmentation of low to mid-elevation late-successional forests." Hayes and Lewis, 2006 also state:

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

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

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

Also Jones, (undated) recognizes:

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

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

Heinemeyer and Jones, 1994 state:

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

Jones and Garton, 1994 noted "Fishers seemed to prefer large-diameter Engelmann spruce trees and hollow grand fir logs as resting sites in north-central Idaho (Jones 1991)." Yet the FS with the Boulder Park proposal and others wants to substantially reduce grand fir incidence on the CNF. There is no analysis of such cumulative effects.

The Boulder Park EA fails to provide an explanation as to why wildlife species whose historic ranges include the Colville NF are rare or are not found in the project area or CNF.

Remedy: Select the No Action alternative. Alternatively, prepare an EIS that addresses the analytical and scientific issues identified above. Reinstate the fisher to the Sensitive species list.

PINE MARTEN

This issue was raised in UCRG/AWR EA comments at pp. 32-33 and in Sieracki/AWR comments at pp. 32-34.

For all mustelids, the commentors request that management direction should provide for thriving and resilient populations at the Forest level, not decrease populations to minimum viability as stated by the CNF Forest Plan. The 1988 Forest Plan Standards for Pine Marten include the designation of 160 acres of late successional habitat every 2.5 square miles. While the grid of "connected" stands for Pine Marten, Pileated Woodpecker and MA 1 (old growth) with connecting corridors has been established, the CNF could not supply field verification in the form of plot data to determine which designated areas are actually functioning as the required successional stage (old growth), nor could the CNF provide stand exam data showing the location of old growth stands. In other words there is no way to determine if this grid of late successional habitats will function as required by the CNF Forest Plan. Utilizing habitat that may or may not be functional cannot be used as a proxy for the presence / absence of the [animal itself] pine marten.

The existing grid of LOS stands does not provide adequate suitable habitat to ensure viability of the pine marten. Harvest unit adjacency to MA1 and Pine Marten Areas significantly reduces the ability of these reserves to provide functional habitat for the pine marten. The effects of habitat fragmentation are significant in relation to the probability of marten occupancy. Marten have home ranges that are larger than just the reserves set aside for the CNF Forest Plan. These areas are being rendered unsuitable by the proposed action. Wasserman et al, (2012) found that for the Selkirk Mountains of North Idaho, pine marten:

> *".....select habitat at multiple spatial scales, selecting home ranges within unfragmented landscapes with high canopy closure and low road density; and those marten select foraging habitat within late seral, mesic, middle-elevation forests." Wasserman et al, (2012)*

Several Pine Marten areas and the MA1 (old growth) patch are contiguous to proposed harvest units. Waserman et al exemplifies the negative effects of this fragmentation of pine marten home ranges:

"for example, a patch of late-seral forest in a highly fragmented landscape with low canopy closure is not likely to be utilized." Wasserman et al, (2012)

Marten occurrence is negatively related to total road density including open, closed and abandoned roads at a 1980m moving window scale:

"An increase in road density from 1.1 km per km2 (10th percentile) to 7.2 km per km2 (100th percentile) resulted in a decrease in probability of marten occurrence from 53% to 35%. Importantly, our analysis found that the density of all roads, including those closed and abandoned up to several decades in the past, was a higher predictor of marten occurrence than currently maintained roads. This emphasizes the import effects of these so-called "ghost" roads."Wasserman et al, (2012)

The current road density is 4.55 km/square km (moving window not used) for the analysis area using the total road distance from the proposed action assuming it includes ghost roads. This would decrease the probability of occurrence somewhere in the middle of the 53% to 35% probability of occurrence range. This means that most of the analysis area is unsuitable as pine marten habitat based on road densities alone.

Pine Marten in California:

"relied heavily on the cover of structurally complex forest stands to hunt for food, while avoiding predators such as hawks, owls and bobcats"

Moriarity in USDA (2016) also found that in California, during summer breeding and kit rearing season martens avoided openings and stands treated for fuels reduction.

"...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."

PNW Science Findings, Dec. 2016 Likewise, the CNF does not have stand exam data indicating that the hand drawn corridors will function as indicated.

Drawing arbitrary corridors between LOS reserves may be required by the CNF Forest Plan but is dated and is not utilizing the best available science.

The commentors request that an additional analysis should be completed showing connectivity. There are several credible programs that would allow the selection of the best connecting corridors (Corridor Designer and others), and of connectivity between late successional reserves (Circuitscape). That proposed units contiguous and adjacent to pine marten areas be removed or adjusted to optimize pine marten areas and that total road densities be reduced to levels allowing the occupancy of pine marten areas.

Please include Wasserman et al., 2012; Moriarity et al., 2016; Bull and Blumton, 1999; and Hargis et al., 1999 as best available science concerning pine marten biology and management impacts.

High road densities in combination with habitat fragmentation and forest simplification by logging in adjacent areas are rendering the MIS species reserves increasingly unsuitable for maintaining a viable marten population.

The commentors do not support the construction of any permanent or temporary roads for the project. We request that total road densities in the analysis area be reduced to 0.5 miles per square mile, that proposed units that are contiguous or near pine marten, barred owl and MA1's be removed or adjusted to optimize pine marten habitat patches. Utilizing commercial thins and regeneration logging adjacent to these areas will reduce structural complexity and result in marten avoidance of these units.

The Forest Plan recognizes that the pine marten is one of the species which "represent wildlife dependent on old growth."

The Boulder Park EA does not consider best available science for insuring viable populations of the pine marten, a species whose habitat is significantly altered by thinning and other active forest management. (See Moriarty et al., 2016; Bull and Blumton, 1999; Hargis et al., 1999 and Wasserman et al., 2012).

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

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

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

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

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

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

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

NORTHERN GOSHAWK

The northern goshawk was raised in UCRG/AWR EA comments at p. 26 and in Sieracki/AWR EA comments starting at p. 6.

NFMA requires the Forest Service to ensure that site-specific management projects are consistent with the applicable forest plan. 16 U.S.C. § 1604(i). The Agencies must ensure that all aspects of the proposed action comply with the Colville National Forest Land Management Plan. This EA was produced under the directions of the Colville 1988 Forest Plan and Eastside Screens. The USFS attempts to skate around the standards and guidelines of the old forest plan by proposing regeneration logging in goshawk post fledgling areas which is a violation of NFMA and NEPA.

Regeneration Logging is not allowed under the East Side Screens and is proposed in Goshawk Post Sledging Areas:

> *"A 30 acre, no-cut buffer of the most suitable habitat around the nest tree should be deferred from harvest . A 400 acre post-fledgling area (PFA) should be established around the nest stand. Harvest activities that enhance younger stands towards late and old condition are compatible with PFA management. If the particular biophysical environment is below the historic range of variability (HRV) for late and old structural stage stands (LOS), these stands should be deferred from harvest. If the biophysical environment is at or above HRV for LOS stands, then timber harvest "can occur within these stages as long as LOS conditions do not fall below HRV. Enhance LOS conditions and attributes as possible, consistent with other multiple use objectives." B-Park_proposed_goshawk_mgmt_9.24.2018*

The regeneration logging proposal for Unit 18 in the Gardiner Creek Goshawk Nest would remove cedar-hemlock and ponderosa pine old growth from and adjacent to the post fledgling area, violating directives of the East Side Screen since LOS is below HRV, violating the informal agreement to not log old growth, and removing target nesting stands from the PFA. The exhibit below shows the violation of the East Side screens, illustrating the overlap between unit 18, a proposed "opening" and the Gardiner Creek PFA boundaries in pink on the left side of the map below. Green dots show location of observation and photo points by the author. Please also note that the wildlife analysis document uses cutting unit maps with units that overlap RHCA's leading to questionable analysis due to maps that are not spatially correct.

Please discuss the selection of Gardnier Creek alt nest stand 1, which appears to consist of more areas without sufficient canopy cover than contiguous areas to the north and the old growth to the east.

On August 28, 2019, objector Paul Sieracki located a fledged northern goshawk near but outside of the Gardnier Creek Post Fledging Area (see image below) and reported this observation along with a possible alternate or new nest to the Colville NF wildlife biologist. During the first week of September, 2019, Mr. Sieracki reviewed the site with the CNF East Zone Wildlife Biologist

and Silviculturist. No goshawk were located and we decided that it was not a potential nest tree. The group then visited the original Gardiner Creek goshawk nest. It was abandoned. The CNF does not know where or if there are alternate nest sites in the area because they did not survey this territory this year (2019). The alternate nest, if the territory has not been abandoned should be located and if there are conflicts with logging units these must be resolved as part of the NEPA/public process.

The group walked through Gardiner alternate nest stand 1, a shelterwood unit. It does not meet goshawk nesting criteria and a new replacement should be designated. This image below shows the open characteristic of this old cutting unit.

This map shows the open canopy of the alternate goshawk nest stand, rendering it useless as nesting habitat for goshawks. The old growth/deer thermal cover is located just NE of the alternate nest stand using the acronym og.

The group visited the old growth stand Paul Sieracki located on the right of the above image. The Wildlife Biologist assigned the area as deer thermal cover with no entry at least for the time period of this EA.

The delineation of the PFA for Gardiner Creek is arbitrary and purposely allows regeneration logging of closed canopy moist site old growth in unit 18, and excluded an adjacent patch of dry ponderosa pine old growth (see photos). This old growth is target nesting habitat and serves as quality PFA habitat and a possible alternate nest stand.

The top photo is located in the PFA and illustrate the old growth characteristics of this area scheduled for logging. The lower, dry site photo of ponderosa pine old growth is located just to the east of the PFA. To get an idea of scale, there are 7" wide black binoculars at the bottom of the western redcedar in the left foreground of the upper photo (tiny black spot). Also see the photo on page 6 of the incorporated Scoping Notice comments.

The wildlife report makes specious statements verging on the absurd about the effects of commercial thinning on goshawks in an attempt to justify logging.

Please cite references and not anecdotal observations and absolutely ridiculous statements like they can fly easier through opened stands in the EA and Wildlife Reports. Thinning from below removes breeding habitat for ground and low canopy nesting birds (prey species), including varied-thrush, swainson's thrush, hermit thrush, american robin, pacific wren, orange crowned warbler among others and thus reduced prey availability as discussed above. A reduction in leaf area index and the surface area of the stems provides less substrate for insects that provide food for neotropical and resident songbirds.

> *'In commercial thinning units, the overhead tree canopy would be reduced, but not removed. Crown complexity and bulk density would be reduced. Concealing cover would be reduced in proportion to the amount of tree basal area removed. These effects could last from 15-20 years, until tree crowns begin to abrade.* ***["could or will, please provide data to support this]*** *Ambush hunters such as goshawks could experience reduced hunting effectiveness in the harvested stands.* ***[could or will?.. again]*** *Conversely, thinning harvests would provide some immediate benefits to large raptors. In the treated stands, these birds would have less "clutter" to negotiate when flying through the tree canopy.* ***[please cite credible research that this is really a benefit]*** *Many of the stands are presently so densely stocked with trees they may be avoided by goshawks.* ***[how many and where are they located?]*** *Thinning these stands could essentially increase the area that the birds can effectively access.* ***[could or will?.. again]*** *Equipment corridors in forest stands that have been thinned may serve as convenient "flyways" or hunting lanes for goshawks.* ***[may or will?.. again]*** *This is suggested by evidence of corridor use we have detected such as prey plucking sites, whitewash splashes, and direct observations of birds in flight."*

Please provide credible research that supports the statements in the paragraph above. The use of "could or may or suggested" shows much uncertainty in the statements and should be backed up by research.

In addition, please show a probability analysis that the claim that the PFA's will burn up without logging is an valid concern.

For the Little Tacoma Creek and Boulder Mountain Goshawk PFA's the proposal is to log a portion of both PFAs using thinning from below (removing cover for prey species) and creating a skip and gap scenario which is regeneration logging [even in alternate nest stands] and violates the East Side screens for goshawks.

The Proposed Action will not meet new forest plan standards.
FW-GDL-WL-19. Northern Goshawk Nesting Sites Goshawk territories should have the following components (new Forest Plan 2018):

1. A 30-acre nest site (active within the last five years) where no adverse management activities should occur as long as the nest site is active. Dominant trees should be larger than 15 inches dbh.
2. Post-fledgling area (420 acres total), including six nest areas, each 30 acres in size (six nest sites – three nests are suitable and three are replacements).
3. Foraging area surrounding the post-fledgling area, and Colville National Forest Land Management Plan Chapter 2 – Forestwide Direction 68
4. Total home range size = 6,000 acres. All active (within the last 5 years) or replacement nest sites for the northern goshawk should provide suitable nesting habitat with more than 50 percent canopy closure. Foraging area habitat can be a combination of late-and mid-seral stages.

None of the discovered territories provide 6 suitable and 6 replacement nest stands, nor is there any spatially explicit and quantitative analysis of the territory itself (see below). Guidelines of the new Forest Plan are also not followed.

Monitoring: the Wildlife Report, only quotes the portions of Moser and Garton (2009) that support the logging project.
The EA proposes scientifically indefensible monitoring for the three northern goshawk nest territories discovered due to the 3 year short term monitoring of the nests while Moser and Garton recommend long term monitoring:

> *"Because breeding goshawks may exhibit a delayed response to changes in prey densities (Tornberg et al. 2005), we recommend long-term monitoring of this species in areas of forest management. (in Moser and Garton 2009).*

in the EA and Wildlife report:

> *"Goshawk Nests - The three known goshawk nests in the project area would be monitored in an attempt to determine whether timber harvest in the post-fledgling areas (PFAs) affects nest stand re-occupancy" EA P 14.*

> *"Monitor Goshawk Nests*
> *Monitor the 3 known goshawk nests in the project area in an attempt to determine whether timber harvest in the post-fledgling areas (PFAs) affects nest stand re-occupancy. Use broadcasted taped calls and site-specific searches to determine nest stand occupancy in the year that adjacent harvest units are active, and for 3 years following harvest. Record any alternate nest locations in the PFAs. Use a sight-tube to record pre and post-harvest canopy closure in those units located within the PFAs. Complete a report on the findings of this monitoring." Wildlife Report p14.*

What is more concerning is that the continual logging of goshawk stands is taking place on the west side of the Colville National Forest as part of a "study" to see how much logging can

happen in PFA's without harming nesting site re-occupancy. The biologist already has stated that :

> *"A preliminary finding of this research is that re-occupancy of nest stands appears to be negatively affected when timber harvest occurs near these sites (pers. comm. with C. Loggers, 2018)." B-Park-proposed-goshawk-mgmt-9.24.18*

The proposed monitoring is only for 3 years after logging, and this pseudo study does not take into account long term monitoring recommended by Moser and Garton (2009) and amounts to an **observation and an irretrievable commitment if nesting goshawks are driven from their nest stands. Trees or goshawks cannot be replaced if logging causes nest or territory abandonment.** Proposing an unscientific observational study on a sensitive species is outrageous and amounts to fraud and is clearly written to favor logging over conservation of sensitive wildlife. This should only be undertaken after the species has been recovered and removed from the sensitive species list with the inclusion of a scientific committee and University.

Please discuss monitoring study design and what University will be involved with this proposed experiment on goshawk PFA areas.

Please disclose the nesting success/failure/abandonment rate of logging projects in goshawk territories that are being monitored on the west side of the Colville National Forest.

The USFS fails to assure viable populations of wildlife are being maintained following three decades of forest plan implementation by this proposed action. Again, there can be no proper cumulative effects analysis if the FS has failed to properly conduct the monitoring assumed in the Forest Plan EIS.

Analysis of PFA is different than Moser and Garton.
Moser and Garton (2009) use a circle around the nest site for habitat calculations. The USFS uses an arbitrary irregular shaped polygon. This invalidates the use of this study.

The EA/wildlife report failure to take a hard look at the Northern Goshawk home range.
There is no quantitative and spatial analysis of territory condition. The proposed alternative is devastating to closed canopy forest within northern goshawk home ranges.

The proposed action more closely resembles the landscape level logging that occurs in goshawk territories in the Crocker-Bedford study than in the PFA study of Moser and Garton.

> "Our findings contradicted those of Crocker-Bedford (1990) and Patla (2005), who found that goshawks in breeding areas subjected to some type of timber harvest exhibited lower re-occupancy and nest-success rates. However, Crocker-Bedford (1990) studied the effects of extensive timber harvest treatments (.1000 ha) on goshawk reproduction. Although our study involved more intensive timber harvest, it was in a much smaller area than reported by Crocker-Bedford (1990). The differences in timber harvest treatments between our study area and Crocker-Bedford's (1990) study area may also explain the differences in our results. For instance, the timber harvest treatments in CrockerBedford's (1990) study were conducted across large areas (1000 to 5000 ha),

which may be more likely to negatively affect goshawk reproduction by affecting the quality of foraging habitat. ***Subsequent unpublished analyses suggested timber harvest within goshawk foraging areas had adverse effects on goshawk reproduction (C. Crocker-Bedford pers. comm.).”*** [emphasis added] in Moser and Garton(2009).

And

> ***“The amount of area harvested within each breeding area was a relatively small proportion of the entire home range, which may explain why we found no significant differences in reproduction between harvested and unharvested goshawk breeding areas. “ Moser and Garton (2009).*** [emphasis added]

Please map foraging areas for the known goshawk territories and delineate late and mid seral foraging areas as required in the *new* Forest Plan.
“#4. Foraging area habitat can be a combination of late-and mid-seral stages.”

Nest Stand Size
Please conduct a literature review of northern goshawk research to explain why the Idaho Panhandle National Forests leave a 40 acre nest stand while the Colville National Forest only uses a 30 acre nest stand.

Short-term effects to goshawk foraging habitat will be severe.
Regeneration and commercial thin logging will greatly reduce prey species availability, there will be ongoing disturbances from logging activities, existing complex habitats will be simplified, logging and underburning or piling will result in a population crash of prey species such as red squirrel and snowshoe hare. Additionally, the new plantations will not emulate natural snag forests and the biodivese fauna they support which would provide prey. Precommercial thinning would remove snowshoe hare habitat. Dense young stands would propagate fire quickly through the area under extreme conditions.

The EA fails in habitat analysis for goshawks, is not quantitative and raise suspicions that foraging and PFA habitat analysis was not completed in a credible manner.
The EA states that current project proposal will commercial thin in goshawk PFA's and makes questionable assumptions about prey availability in reference to thinning. Thinning stands reduced red squirrel density, a primary prey species of the northern goshawk throughout the red squirrel's range.

> *“The impact of forest thinning from logging is known to be detrimental to goshawks, due to reductions of one of their most important prey species, the red squirrel. This species was identified as one of the most important goshawk prey species based on Montana research (Clough 2000 at 27, 33). Research has demonstrated that red squirrels decline with forest thinning (e.g., Herbers and Klenner 2007, Abstract, 2658-2661; Holloway and Malcolm 2006, Abstract, 1740-1744). The latter noted that preservation of viable populations of red squirrels will require the provision of large unharvested areas (Id. at 1744). Logging has been identified as a factor in the decline of goshawks in the Greater Yellowstone Ecosystem (Patla 2005), on the Black Hills of South Dakota (Faunal West Wildlife Consultants*

2003), and in the southwestern United States (Crocker-Bedford 1990)." Johnson and Garrity (2014).

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

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

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

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

Crocker-Bedford (1990) noted:

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

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

Remedy: Select the No Action alternative. Alternatively, prepare an EIS that addresses the analytical and scientific issues identified above. Moist and dry site old growth and recruitment stands need to be mapped and designated off limits to logging in the revised Forest Plan.

OTHER FOREST HAWKS

This was discussed in Sieracki/AWR comments at p. 14.

No surveys species specific for other forest hawks including coopers and sharp shinned have been conducted. A sharp-shinned hawk nest was found while surveying for northern goshawks. The USFS chooses to ignore this species because it is not protected under the 1988 Forest Plan, but is under the new Forest Plan.

> "FW-GDL-WL-18. Nest Sites For forest species listed in table 16, all known active nest sites should be protected from human disturbance caused by management activities during the following periods to reduce the risk of nest abandonment or decline in productivity."

If coordinates were assigned correctly this nest is located in a proposed precommercial thin, unit 204. Please state how sharp-shinned hawk nests will be protected from human disturbance, including logging, road building and human activity under the old and new Forest Plans. Please develop a management plan for this nest site.

FLAMMULATED OWL

This was discussed in Sieracki/AWR comments at p. 15.

The wildlife report erroneously states that Flammulated Owl habitat is not present. According to the report the Flammulated Owl is:

> *"Associated with ponderosa pine forests and mixed conifer stands with a mean 67percent canopy closure, open understory with dense patches of saplings or shrubs. Grassy openings for foraging" Wildlife Report P36*

The wildlife report also states that flammulated owls are not documented in the area. This might be because no owl surveys have been undertaken. A field review of MA1 near Gardiner Creek indicates that stands of larger ponderosa pine and douglas fir exist on southwestern aspects. Please correct this error and conduct surveys for all species of owls.

Wright, et al. (1997) point out that habitat restoration for the flammulated owl must be carefully targeted to the correct habitat types. The FS can't simply cut and/or burn forest land and expect flammulated owls to start or continue using it as habitat. Wright, et al. (1997) state:

> (W)e never detected Flammulated Owls in mesic old-growth ponderosa pine stands with a Vaccinium understory. Thus, within suitable landscapes, it may be most effective to conserve and restore stand structural characteristics within suitable habitat types (e.g., xeric ponderosa pine/ Douglas-fir stands in our study area), rather than within any stand containing ponderosa pine trees.

Hayward and Verner, 1994 provide a conservation assessment for flammulated owls, and make management recommendations.

Please disclose the FS's strategy and best available science for insuring viable populations of the great gray owl. Hayward and Verner, 1994 provide a conservation assessment for the great gray owl, and make management recommendations.

FRANKLIN'S GROUSE

This was discussed in Sieracki/AWR comments at p. 31.

The 1988 CNF Plan wildlife standards for Franklin's (spruce) grouse are as follows:

> *"Within Management Areas 5, 6, 7, and 8, in areas of extensive lodgepole pine, maintain a distribution of age classes so that within each area of 5,000 acres, at least 1,000 acres are less than 20 years of age. In addition, maintain at least 50 percent of the early age class lodgepole stands in an unthinned condition. Precommercial thinning may occur on these stands after the average tree age exceeds 20 years. Meet this standard within the intent of overall management area objectives."*
>
> *Optimum unit size is 20 acres or less, however, size may approach 40 acres. Density of open roads through these stands will not exceed one mile per square mile except during active projects (to protect lynx habitat)."*

Most of the proposed units are within management areas allocated for spruce grouse (management areas 5, 6, 7 and 8). There are many units which will exceed the 20 and 40 acre size limit recommended for the spruce grouse (See the discussion on unit size in the winter range section below).

Please map areas of lodgepole pine (and other species) suitable for spruce grouse, and model habitat distribution using a spatially explicit method for the existing condition and alternatives to discover the effects to spruce grouse. It is of importance that spruce grouse also utilize older lodgepole pine and stands of other tree species.

Please use a moving window or suitable analysis to show areas where open road density exceeds the 1 mile per square mile standard. The commentors recommend total road densities of 0.5 miles per square mile or less.

Disclose the results of Forest Plan monitoring spruce grouse populations.

DUSKY (BLUE) GROUSE

This was discussed in Sieracki/AWR comments at p. 31-32.

The 1988 CNF Plan wildlife standards for Dusky (Blue) grouse are as follows:

> *" Blue Grouse - In park-like or open timber on and near ridgetops, maintain mature limby Douglas-fir or subalpine fir at a rate of at least eight or more trees per acre, either individuals or in groups. Insure hiding cover around at least 50 percent of the perimeter of each spring or other water source, with no break in cover exceeding 600 lineal feet along the waters edge."*

Please spatially model potential and suitable dusky grouse habitat for existing condition and alternatives including projections into the future based on a range of climate models. Since dusky grouse migrate altitudinally, please note that low elevation ridgelines outside of the higher elevation roadless area may also be utilized in the winter and spring. In subalpine fir habitats dusky grouse are also utilize areas exclusive of douglas-fir in the Selkirk Mountains (of which the Boulder Park area is part of) and likely occur in those habitats in the analysis area.

Disclose the results of monitoring dusky grouse populations at the Forest Level.

LEWIS'S WOODPECKER (SENSITIVE / SUSPECTED [OCCURRENCE] FOR THE CNF).

This was discussed in Sieracki/AWR comments at p. 37.

Lewis Woodpeckers occur in riparian areas, ponderosa pine stands and burns. Please map and disclose the effects of the proposed alternative to these species.

This species relies on trees burned by fire (i.e., snags) for nesting cavities. For example, in the western U.S., Lewis's woodpeckers (Melanerpes lewis), a cavity-nester and an aerial insectivore common in riparian zones, have been called "burn specialists" because they tend to be abundant in both recent (2-4 years after fire) and older (10-25 years after fire) high-severity burns (Linder and Anderson, 1998).

Linder and Anderson, 1998 state:

> The microhabitat characteristics associated with nest sites in this study were the amount and size of dead and down material at a site, ground cover, and sky cover which would indirectly indicate perch sites. The openness of the canopy and the availability and dispersion of dead and down material seemed to be the fundamental habitat characteristics of Lewis' Woodpeckers in the Laramie Range of southeastern Wyoming.

USDA Forest Service, 2003c states: "Lewis' woodpecker is increasingly uncommon in the region (Dobkin 1992; pg. B-42). Habitat loss from logging and fire suppression in ponderosa pine forests impact this species. Reductions in the number of large diameter cottonwoods in riparian areas and snags, generally, also contribute to a decrease in preferred habitat both on private and NFS lands."

WHITE-HEADED WOODPECKER (SENSITIVE / DOCUMENTED LOCAL [OCCURRENCE])

This was discussed in Sieracki/AWR comments at p. 37.

This species has local records of occurrence just outside the analysis area (see location map below from ebird) up to 3100 feet elevation. This species has the potential to increase or reinhabit this area if suitable dry site stands are managed to become old growth, through an initial treatment and frequent fire. *Please identify potential habitat and steps to be taken to promote fire dependent old growth ponderosa pine and douglas-fir in a great enough extent to support multiple white-headed woodpecker territories.* Additionally, dry site potential natural communities are expected to increase with climate change. It would be very valuable to project location change utilizing climate change modeling under several scenarios in order to delineate potential future habitat. Please identify existing dry site stands and begin a restoration process by utilizing fire not logging as a restoration tool.

GREAT GRAY OWL (SENSITIVE / DOCUMENTED [OCCURRENCE] ON THE CNF)

This was discussed in Sieracki/AWR comments at p. 37.

Please survey for great gray owls and follow the snag management suggestions discussed above.

BEAVER

This was discussed in Sieracki/AWR comments at p. 40.

The beaver is a MIS for the CNF. Please take steps to map the existing distribution of beavers in the analysis area, increase the distribution of beaver colonies, including riparian rehabilitation and elimination of trapping by area closure.

BLACK-BACKED WOODPECKER AND NORTHERN THREE-TOED WOODPECKER

This issue was raised in UCRG/AWR EA comments at pp. 27, 42, and in Sieracki/AWR comments at p. 30.

The 1988 CNF Plan wildlife standards for the Northern Three-toed Woodpecker are as follows:

> *"Within subalpine fir working groups and lodgepole pine components of other timber working groups, maintain 75 acres of conifers in seral stages VI and/or V, distributed every two miles.*
>
> *Maintain a minimum average of two hard snags per acre more than ten inches DBH, within the 75 acre reproductive area. Forty-five of these 150 snags should be more than 12 inches DBH."*

The commentors request that three-toed woodpecker habitat be mapped and that spatially explicit habitat modeling be utilized to display the existing condition and disclose the effects of the alternatives. The mere totaling up of suitable acres and acres proposed to be logged is not spatially explicit.
Disclose the results of monitoring Three-toed Woodpecker populations at the Forest Level.

The Boise National Forest adopted the black-backed woodpecker species as an indicator species in its revised forest plan in 2010:

> The black-backed woodpecker depends on fire landscapes and other large- scale forest disturbances (Caton 1996; Goggans et al. 1988; Hoffman 1997; Hutto 1995; Marshall 1992; Saab and Dudley 1998). It is an irruptive species, opportunistically foraging on outbreaks of wood-boring beetles following drastic changes in forest structure and composition resulting from fires or uncharacteristically high density forests (Baldwin 1968; Blackford 1955; Dixon and Saab 2000; Goggans et al.1988; Lester 1980). Dense, unburned, old forest with high levels of snags and logs are also important habitat for this species, particularly for managing habitat over time in a well-distributed manner. These areas provide places for low levels of breeding birds but also provide opportunity for future disturbances, such as wildfire or insect and disease outbreaks (Dixon and Saab 2000; Hoyt and Hannon 2002; Hutto and Hanson 2009; Tremblay et al. 2009). Habitat that supports this species' persistence benefits other species dependent on forest systems that develop with fire and insect and disease disturbance processes. The black-backed woodpecker is a secondary consumer of terrestrial invertebrates and a primary cavity nester. Population levels of black-backed woodpeckers are often synchronous with insect outbreaks, and targeted feeding by this species can control or depress such outbreaks (O'Neil et al. 2001). The species physically fragments standing and logs by its foraging and nesting behavior (Marcot 1997; O'Neil et al. 2001). These KEFs influence habitat elements used by other species in the ecosystem. Important habitat elements (KECs) of this species are an association with medium size snags and live trees with heart rot. Fire can also benefit this

> species by stimulating outbreaks of bark beetle, an important food source. Black-backed woodpecker populations typically peak in the first 3–5 years after a fire. This species' restricted diet renders it vulnerable to the effects of fire suppression and to post-fire salvage logging in its habitat (Dixon and Saab 2000).
>
> … Black-backed woodpeckers are proposed as an MIS because of their association with high numbers of snags in disturbed forests, use of late-seral old forest conditions, and relationship with beetle outbreaks in the years immediately following fire or insect or disease outbreaks. Management activities, such as salvage logging, timber harvest, and firewood collection, can affect KEFs this species performs or KECs associated with this species, and therefore **its role as an MIS would allow the Forest to monitor and evaluate the effects of management activities on identified forest communities and wildlife species.** (Emphasis added.)

The EA's assumption of no impacts on the black-backed woodpecker makes no sense, logically or biologically. All the areas to be logged are potential habitat. All it takes is a fire, which could happen naturally or as a result of project activities. Those areas logged before a fire would have far less habitat value to this species.

The EA fails to disclose the FS's strategy and best available science for insuring viable populations of the black-backed woodpecker.

The "resilience" premises of the project, if carried out on the entire CNF, have serious implications for the black-backed woodpecker. Forestwide suppression of habitat conditions would eliminate population viability.

Hutto, 2006 addresses this subject; from the Abstract:

> The bird species in western North America that are most restricted to, and therefore most dependent on, severely burned conifer forests during the first years following a fire event depend heavily on the abundant standing snags for perch sites, nest sites, and food resources. Thus, it is critical to develop and apply appropriate snag-management guidelines to implement postfire timber harvest operations in the same locations. Unfortunately, existing guidelines designed for green-tree forests cannot be applied to postfire salvage sales because the snag needs of snag-dependent species in burned forests are not at all similar to the snag needs of snag-dependent species in green-tree forests. Birds in burned forests have very different snag-retention needs from those cavity-nesting bird species that have served as the focus for the development of existing snag-management guidelines. Specifically, many postfire specialists use standing dead trees not only for nesting purposes but for feeding purposes as well. Woodpeckers, in particular, specialize on wood-boring beetle larvae that are superabundant in fire-killed trees for several years following severe fire. Species such as the Black-backed Woodpecker (Picoides arcticus) are nearly restricted in their habitat distribution to severely burned forests. Moreover, existing postfire salvage-logging studies reveal that most postfire specialist species are completely absent from burned forests that have been (even partially) salvage logged. I call for the long-overdue development and use of more meaningful snag-retention guidelines for postfire specialists, and I note that the biology of the most fire-dependent bird species suggests that even a

> cursory attempt to meet their snag needs would preclude postfire salvage logging in those severely burned conifer forests wherein the maintenance of biological diversity is deemed important.

Hutto, 2008 cautions against the common practice of landscape scale thinning to "restore" forests to a condition thought to be more congruent with historical conditions:

> Black-backed Woodpeckers …require burned forests that are densely stocked and have an abundance of large, thick-barked trees favored by wood-boring beetles (Hutto 1995, Saab and Dudley 1998, Saab et al. 2002, Russell et al. 2007, Vierling et al. 2008). Indeed, data collected from within a wide variety of burned forest types show that **the probability of Black-backed Woodpecker occurrence decreases dramatically and incrementally as the intensity of traditional (pre-fire) harvest methods increases.** (Emphases added.)

The Hutto, 2008 Abstract states:

> I use data on the pattern of distribution of one bird species (Black-backed Woodpecker, *Picoides arcticus*) as derived from 16,465 sample locations to show that, in western Montana, this bird species is extremely specialized on severely burned forests. Such specialization has profound implications because it suggests that the severe fires we see burning in many forests in the Intermountain West are not entirely "unnatural" or "unhealthy." Instead, severely burned forest conditions have probably occurred naturally across a broad range of forest types for millennia. These findings highlight the fact that severe fire provides an important ecological backdrop for fire specialists like the Black-backed Woodpecker, and that the presence and importance of severe fire may be much broader than commonly appreciated.

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

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

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

> Contrary to what one might expect to find immediately after a major disturbance event, I

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

USDA Forest Service 2011c states:

> Hutto (2008), in a study of bird use of habitats burned in the 2003 fires in northwest Montana, found that within burned forests, there was one variable that exerts an influence that outstrips the influence of any other variable on the distribution of birds, and that is fire severity. Some species, including the black-backed woodpecker, were relatively abundant only in the high-severity patches. . **Hutto's preliminary results also suggested burned forests that were harvested fairly intensively (seed tree cuts, shelterwood cuts) within a decade or two prior to the fires of 2003 were much less suitable as post-fire forests to the black-backed woodpecker and other fire dependent bird species. Even forests that were harvested more selectively within a decade or two prior to fire were less likely to be occupied by black-backed woodpeckers.** (Emphasis added.)

Also see the agency's Fire Science Brief, 2009, which states, "Hutto found that Black-backed Woodpeckers fared best on sites unharvested before fire and poorest in the heavily harvested sites."

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

Cherry (1997) states:

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

The FS continues to manage against severely burned forests, as evident from the proposed Purpose and Need.

The northern three-toed and black-backed woodpeckers are primary cavity nesters, and indicators for species depending upon the process of wildland fire in the ecosystem. Cherry (1997) notes:

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

Cherry (1997) also notes:

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

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

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

> Black-backed woodpeckers occupy forested habitats that contain high densities of recently dead or dying trees that have been colonized by bark beetles and woodborer beetles (Buprestidae, Cerambycidae, and Scolytidae). These beetles and their larvae are most abundant within burned forests. In unburned forests, bark beetle and woodborer infested trees are found primarily in areas that have undergone natural disturbances, such as wind-

throw, and within structurally diverse old-growth forests (Steeger and Dulisse in press, Bull et al. 1986, Goggans et al. 1987, Villard 1994, Hoffman 1997, Weinhagen 1998).

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

> In California, the Black-backed Woodpecker's strong association with recently burned forest, a habitat that is ephemeral, spatially restricted, and often greatly modified by post-fire logging, as well as the species' relative rarity, may make the woodpecker vulnerable to declines in the state. Additionally, Black-backed Woodpeckers in California are affected by the management of unburned forests – both because pre-fire stand conditions affect the suitability of post-fire habitat for the species, and because a substantial proportion of California's Black-backed Woodpeckers nest and forage at a low population density in unburned forests. Conserving the Black-backed Woodpecker in California likely requires appropriate management and stewardship of the habitat where this species reaches its highest density – recently burned forest – as well as appropriate management of 'green' forests that have not burned recently.

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

PILEATED WOODPECKER

This issue was raised in UCRG/AWR EA comments at pp. 33-34 and in Sieracki/AWR EA comments.

The 1988 CNF Plan wildlife standards for the Pileated Woodpecker are as follows:

> *"Within Douglas-fir and cedar/hemlock working groups, within a 1,000 acre unit: maintain 300 acres of conifers in seral/stages VI and/or V, (Thomas, et. al, 1979) per pair for reproducing.*
>
> *Maintain a minimum average of two hard snags/per acre more than 12 inches DBH within the 300 acre reproductive area. Forty-five of these 600 snags should be more than 20 inches DBH.*
>
> *When possible maintain reproductive area in 300 contiguous acres. If not possible, habitat may be arranged in blocks no less than 50 acres and no more than 1/4 mile apart.*
>
> *Maintain a minimum average of two hard snags/per acre more than ten inches DBH on an additional 300 acres for feeding."*

The USFS claims that wildlife standards for the pileated woodpecker have been met through assignment of various habitat areas with connecting "corridors". The commentors request stand exam data showing which areas allocated for late successional species actually meet the criteria and are therefore functioning.

Please provide site specific data showing which allocated areas are being utilized by pileated woodpeckers for nesting, disclosing the effectiveness of the late successional area allocations.

Please disclose the Forest Plan Monitoring results for the Pileated Woodpecker.

Regeneration logging in MIS habitat reserves violates Forest Plan standards. This is proposed in Boulder Park. Any logging in these areas will fragment existing and potential habitat and tend to make them less suitable or even completely unsuitable in the case of clearcut logging (overstory trees are removed in shelterwood logging) for pileated woodpeckers through stand sanitation, removing dead and diseased trees that provide food sources to pileated woodpeckers.

The Boulder Park EA indicates the proposed logging would remove forest habitat components which provides habitat for species needing the kind of habitat features found in mature and old-growth forests, such as the pileated woodpecker.

The Committee of Scientists, 1999 defines Keystone species as a:

> …species whose effects on one or more critical ecological processes or on biological diversity are much greater than would be predicted from their abundance or biomass (e.g., the red-cockaded woodpecker creates cavities in living trees that provide shelter for 23 other species).

Consistent with the notion of the pileated woodpecker as a keystone species, USDA Forest Service 2011c states:

> Many types of disturbances, such as timber harvest, fuel reduction, road construction, blow-down, wildland fire, or insect or disease outbreaks, can affect old growth habitat and old growth associated species. This is well illustrated by **the pileated woodpecker, a "keystone" species**, which provides second-hand nesting structures for numerous old growth species such as boreal owls, kestrels, and flying squirrels (McClelland and McClelland 1999, Aubry and Raley 2002). A disturbance can reduce living tree canopy cover to levels below that needed by the pileated woodpecker's main food source, carpenter ants, forcing the pileated to forage and possibly nest elsewhere. Carpenter ants, which live mostly in standing and downed dead wood, can drastically reduce populations of species such as spruce budworm (Torgersen 1996), the most widely distributed and destructive defoliator of coniferous forests in Western North America. (Emphasis added.)

Please disclose the FS's strategy and best available science for insuring viable populations of the pileated woodpecker. Bull et al. 2007 represents over 30 years of investigation into the effects of logging on the pileated woodpecker and is the latest information on such effects.

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

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

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

This preferred diameter of nesting trees for the pileated woodpecker recognized by R-1 is notable. USDA Forest Service, 1990 uses an index of the "Number of potential nesting trees >30" dbh per acre" for the pileated woodpecker, and McClelland and McClelland (1999) found in their study in northwest Montana, with the average nest tree being 73 cm. (almost 29") dbh. The pileated woodpecker's strong preference for trees of rather large diameter is not adequately considered in the Forest Plan. Effectively, the CNF provides absolutely no commitments for leaving specific numbers and sizes of largest trees favored by so many wildlife species.

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

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

B.R. McClelland has extensively studied the pileated woodpecker habitat needs. McClelland, 1985 (a letter to the Flathead NF forest supervisor) states:

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

McClelland (1977), states:

> (The Pileated Woodpecker) is the most sensitive hole nester since it requires old growth larch, ponderosa pine, or black cottonwood for successful nesting. The Pileated can be considered as key to the welfare of most hole-nesting species. If suitable habitat for its perpetuation is provided, most other hole-nesting species will be accommodated.
>
> Pileated Woodpeckers use nest trees with the largest dbh: mean 32.5 inches;
>
> Pileated Woodpeckers use the tallest nest trees: mean 94.6 feet;

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

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

Other literature has also indicated the potential for reduced snag abundance due to human influence (Wisdom et al. 2000). And Bate and Wisdom, 2004 investigated management and other human influences on snag abundance. Some findings include:

> 1. Stands far from roads had almost three times the density of snags as stands adjacent to open or closed roads. No difference in snag density existed for stands adjacent to open versus closed roads. Rather, snag density declined with increasing proximity to nearest road. Consequently, the presence of any road near or adjacent to a stand is an important predictor of substantially reduced density of snags. Ease of access for firewood cutting and other forms of timber harvest is the most likely explanation for reduced snag density near roads.
>
> 2. Stands closer to the nearest town had a lower density of snags than those farther from nearest town. This finding implies that stands closer to town, and therefore more accessible to human activities, also are likely areas where firewood cutting is concentrated, resulting in reduced snag density.
>
> 3. Stands in the late-seral stage had three times the density of snags as stands in the mid-seral stage, and almost nine times that of stands in the early-seral stage. Stands in the late-

seral stage provide essential snag habitat for wildlife that does not appear to be consistently present in younger stands.

4. Stands with no history of timber harvest had three times the density of snags as stands that were selectively harvested, and 19 times the density as that in stands that had undergone a complete harvest. These results suggest that past timber harvest practices have substantially reduced the density of snags, and that snag losses have not been effectively mitigated under past management.

5. Stands adjacent to private land had a lower density of snags within mid- and late-seral stages, in contrast to a higher density in stands surrounded by Forest Service land. These results are likely explained by safety and fire management policies, which call for removal of snags along property boundaries, where such snags often are deemed to pose safety or fire hazards. In addition, increased human access likely contributes to lower snag densities in stands adjacent to private land.

The EA fails to quantify in the analysis the degree of snag loss expected because of safety concerns and also from the proposed methods of log removal.

The Wildlife Report states, "If necessary, create snags from live green trees within created openings (i.e., shelterwood harvest), in order to mimic habitat levels in un-managed stands, as determined by the biologist." However the DN makes no such commitment. Like road decommissioning, a false promise and one that renders EA effects analyses inaccurate and in violation of NEPA.

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

The EA doesn't disclose the FS's strategy and best available science for insuring viable populations of the pileated woodpecker. Bull et al. 2007 represents over 30 years of investigation into the effects of logging on the pileated woodpecker and is 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.

Primary Cavity Excavators

The commentors recommend that all standing dead and near dead, wolf or veteran trees be left standing, where there is a safety issue, precedence goes to leaving surrounding green trees to preserve the snag instead of cutting down the snag.

If a snag is inadvertently fallen, it is to be left intact on site.

If a unit is to be underburned, leave additional green trees to compensate for the trees lost from the underburn. These dying to dead trees will provide a substrate for bark beetles and provide an important missing component (food supply) for primary cavity excavators.

The commentors request that host – parasite relationships involving western larch and dwarf mistletoe be retained in all units and areas of dwarf mistletoe be mapped and retained. Dwarf mistletoe spread can be minimized in subsequent plantations by planting tree species that do not provide a substrate for dwarf mistletoe colonization in a buffer zone around the host tree. Maintaining these trees is very important to preserve biodiversity in a managed landscape because they provide nesting substrates for raptors such as the Northern Goshawk and Great Grey Owl, both sensitive species on the CNF. Trees with dwarf mistletoe are identified as biological legacies in the draft new Forest Plan.

Disclose the results of monitoring primary excavator habitat at the Forest Level and disclose the snag densities in the Project area, and the method used to determine those densities. Please include Bull et al., 1997 as best available science concerning snags and down wood.

Lorenz et al., 2015 state:

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

This means only the primary cavity excavators themselves have the ability to decide if a tree is suitable for excavating. The means managers know little about how many snags per acre are needed to sustain populations of cavity nesting species. This must be considered best available science to replace forest plan direction for snag retention.

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

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

Despite the fact that large snags are below the historic range on the Forest, the Boulder Park EA and Forest Plan monitoring fail to disclose the population abundance of such habitat components

or population trends of its MIS. So the FS resorts to arriving at baseless conclusions of insignificance, regardless of deficits of habitat components.

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

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

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

Cherry (1997) notes:

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

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

WOODLAND CARIBOU

This issue was raised in UCRG/AWR EA comments at p. 27.

Since caribou are ESA-listed species and native to the project area, it is inconsistent with NFMA and the ESA for the FS to exclude the species from habitat analysis and other considerations.

Remedy: Select the No Action alternative. Alternatively, prepare an EIS that considers the fact that the project area is historic range of the woodland caribou.

CANADA LYNX

This issue was raised in UCRG/AWR EA comments at pp. 28-29 and in Sieracki/AWR comments at pp. 36-37.

The Biological Evaluation prepared for the Orient project on the CNF states, "The Lynx Conservation Assessment and Strategy (LCAS) (Ruediger et al. 2000) was developed …to provide an approach for conservation of lynx on federal lands and to assist with Section 7 consultation. The LCAS was revised in August 2013 by the Interagency Lynx Biology Team, incorporating the best available science that had been published since the first document (Interagency Lynx Biology Team 2013)." We note that the LCAS nor changes to it have been subject to NEPA or independent scientific review.

The Orient Biological Evaluation also documents the incidence and decline of Canada lynx in and around that project area:

> The Kettle Range historically supported a lynx population and appears to have high quality lynx and snowshoe hare habitats. Based on Washington trapping records, the greatest numbers of lynx were trapped in the Kettle Range when lynx harvest peaked in the 1970s (Stinson 2001). The population of lynx in northeastern Washington declined dramatically from 1970 to the mid-1980s and the Kettle Range has not supported a population of reproducing lynx in the last 20 years. Anecdotal sightings of lynx occur about every other year, and in the past 3 years photographs of lynx have come from just west and north of the project area (thought to be the same animal) as well as south of Sherman Highway (D. Thornton pers. comm.). From 2009 to 2011, the CNF and WDFW conducted a lynx hair-snare survey on the Kettle Crest (Loggers and Dotts in prep.) using National Lynx Detection Survey Protocol (McKelvey et al. 1999, McDaniel et al. 2000) but no lynx were detected, thus confirming that a reproducing population of lynx does not occur in the Kettle Range.

"The Kettle Range in north-central Washington historically supported lynx populations." (Lynx Critical Habitat Final Rule Federal Register /Vol. 74, No. 36 / February 25, 2009 p. 8619.)

The importance of key winter lynx habitat was not clearly identified or assessed in the LCAS. And in addition, the impacts of habitat fragmentation, which have become clearer with more recent research (Squires et al. 2010), demonstrate the severe impacts that may result on lynx from forest thinning and regeneration.

Lynx winter habitat, provided only in older, multi-storied forests, is critical for lynx preservation. (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. (Squires et al. 2010.) Prey availability for lynx is highest in the summer. (Squires et al. 2013.)

The best available science indicates that lynx winter foraging habitat is critical to lynx persistence (Squires et al. 2010), and that this habitat should be "abundant and well-distributed across lynx habitat." (Squires et al. 2010; Squires 2009.) Existing 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 EA fails to analyze or disclose impacts on older, multi-storied forests that are so vital for lynx foraging.

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.)

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

For lynx to persist in metapopulations, individuals of the species must be able to migrate between core areas, surviving for periods of time in these connectivity/linkage zones. Squires et al. (2013) noted that long-term population recovery of lynx, as well as other species as the grizzly bear, require maintenance of short and long-distance connectivity. The LCAS and Boulder Park EA do not include scientifically-based direction that would protect connectivity between Lynx Analysis Units.

The EA also fails to adequately analyze and disclose recreational impacts on lynx.

Kosterman, 2014 finds that 50% of lynx habitat must be mature undisturbed forest for it to be optimal lynx habitat where lynx can have reproductive success and no more than 15% of lynx habitat should be young clearcuts, i.e. trees under 4 inched dbh. This renders inadequate the agency's assumption in the LCAS that 30% of lynx habitat can be clearcut, and that no specific amount of mature forest needs to be conserved.

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

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

(e.g., Fig. 3b). This scenario captures the importance of post-treatment recovery for Canada lynx when the landscape context is generally composed of lower quality habitat. Overall, these three items emphasize that both the spatial arrangement and composition as well as recovery time are central to balancing silvicultural actions and Canada lynx conservation.

Holbrook et al., 2018 fully contradict FS assumptions that clearcuts/regeneration can be considered useful lynx habitat as early as 5, 10, 15 or even 20 years post-logging.

The FS erroneously assume clearcutting/regeneration logging have basically the same temporal effects as stand-replacing fire as far as lynx re-occupancy.

Vanbianchi et al., 2017, found, "Lynx used burned areas as early as 1 year postfire, which is much earlier than the 2–4 decades postfire previously thought for this predator."

Kosterman, 2014, Vanbianchi et al., 2017 and Holbrook, et al., 2018 demonstrate that the LCAS 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. The importance of maintaining lynx linkage zones for landscape connectivity should be maintained to allow for movement and dispersal of lynx. Lynx avoid forest openings at small scales, however effects on connectivity from project-created or cumulative openings were not analyzed in terms of this smaller landscape scale. And connectivity between LAUs was not analyzed or disclosed.

In order to comply with the Endangered Species Act, the FS must undergo consultation with the U.S. Fish & Wildlife Service, in context of potential lynx occupancy of the project area and considering critical habitat.

On March 24, 2000, the U.S. Fish and Wildlife Service listed the lynx as threatened in 14 States (65 FR 16052). The analysis area is not delineated as critical habitat, however lesser standards apply to the Lynx Analysis Units that overlap the analysis area.

Kosterman, 2014 finds that 50% of lynx habitat must be mature undisturbed forest for it to be optimal lynx habitat where lynx can have reproductive success, and no more than 15% of lynx habitat should be young clearcuts, i.e. trees under 4 inches dbh. Kosterman, 2014 demonstrates that the LCAS is not adequate for lynx viability and recovery, as previously assumed by the Forest Service.

The USFS does not have stand exam or other vegetation plot data supporting the designation of denning, tree squirrel (a secondary prey species)and primary forage habitat in the analysis area. Selection of these stands seems cursory and cannot be defended or analyzed without vegetation plot data.

Most importantly, the CNF is managing for denning habitats with a low probability of use, by forest simplification, pre-commercial thinning which devastates the snowshoe hare population and removes horizontal cover, shelterwood logging which will remove potential recruitment old

growth stands which provide the best denning habitat. While lynx may use other habitats, Montana lynx vastly preferred to den in mature mesic forests (73%) and mature forests (80%). The CNF is not providing optimal habitat for lynx. "Lynx select for horizontal cover and older stands"

> *"The age of the forest stand does not seem as important for denning habitat as the amount of horizontal structure available, e.g. downed, woody debris (Mowat et al. 2000, pp.274-275; M. McCollough, pers. comm. 2007, as cited in USFWS 2007, p.19), which provides hiding cover and shelter for kittens. Den sites may be located within older regenerating stands (>20 years since disturbance) or in mature conifer or mixed conifer-deciduous (typically spruce/fir or spruce/birch) forests. In Montana, lynx selected den sites with higher horizontal cover than elsewhere in the animal's home range (Squires et al. 2006, p.24; Squires et al. 2008, p.1502). Seventy-three percent of lynx dens were found in mature, mesic forests. Dens were also located in regenerating mesic forests (18 percent) and boulder fields (7 percent). More recently, Squires et al. (2008, p.1502) found dens in Montana primarily within mature forest stands (80 percent), mid-seral regenerating forests (13 percent), young regenerating stands (5 percent) and thinned stands (2 percent). In Montana, dens were also found in topographically concave or drainage-like areas away from forest edges (Squires et al. 2008, p.1502). In Washington, lynx used Pinus contorta (lodgepole pine), Picea spp. (spruce), and Abies lasiocarpa (subalpine fir) forests older than 200 years with an abundance of downed woody debris for denning (Koehler 1990, p.847). A den site in Wyoming was located in a mature subalpine fir/ lodgepole pine forest with abundant downed logs and a high amount of horizontal cover (Squires and Laurion 2000, pp. 346-347). " Idaho Panhandle National Forests IPNF Forest Plan Revision Chapter III Canada Lynx*

The species is further threatened by climate change and actions on private lands in the Boulder Park Analysis Area. The best action is no action in the spruce fir zone due to increasing ecological stressors.

Logging to meet HRV and lynx habitat guidelines is not indicated because of the extreme pressure on spruce fir forest due to global heating. The best option is to not log, let existing stands naturally succeed toward old growth (which provided both denning and foraging habitat) and remove roads from the LAU. Logging in Lynx habitat is a violation of NEPA and the ESA.

Please discus in detail, citing peer reviewed literature and using quantitative spatial analysis how climate change will impact the subalpine habitats that lynx occupy and please discuss the importance of old growth spruce fir forests in providing prey in the form of snowshoe hares, denning sites and its value to other rare subalpine species. Please discuss how old growth provides more valuable habitat than tree plantations.

Please discuss the impacts of snowmobile use in Lynx habitat.

Please consult with the USFWS on the effects of logging and climate change to the Canada lynx.

The Boulder Park EA does not demonstrate project consistency with the Canada Lynx Conservation Agreement, U.S. Forest Service and U.S. Fish & Wildlife Service, 2005, nor is the

analysis consistent with best available science. For example, Kosterman, 2014 finds that 50% of lynx habitat must be mature undisturbed forest for it to be optimal lynx habitat where lynx can have reproductive success, and no more than 15% of lynx habitat should be young clearcuts, i.e. trees under 4 inched dbh. This scientific information is not recognized by the EA.

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

The Boulder Park EA fails to analyze and disclose how much lynx habitat is affected by snowmobiles and other recreational activities. As the Kootenai NF's Galton FEIS states, "The temporal occurrence of forest uses such … winter (skiing and snowmobiling) … may result in a temporary displacement of lynx use of that area…"

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

WOLVERINE

This issue was raised in UCRG/AWR EA comments at p.29 and in Sieracki/AWR comments at p. 36.

The analysis area may provide wolverine habitat. The commentors suggest that efforts be made to further reduce road densities, eliminate poisoning of rodents in plantations to maintain this area for wolverine dispersal and use.

The wolverine is proposed for listing as a threatened species under the ESA. The proposed rule was issued in 2013. 78 Fed. Reg. 7864 (February 4, 2013). FWS withdrew the rule on August 13, 2014, and the withdrawal of the rule was deemed unlawful and vacated in 2016. *Defenders of Wildlife v. Jewell*, 176 F.Supp.3d 975 (D. Mont. 2016). Thus, the wolverine is currently proposed for listing under the ESA.1 81 Fed. Reg. 71670 (October 18, 2016). The FS must undergo formal consultation with the U.S. Fish & Wildlife Service.

The Colville NF forest plan revision Proposed Action states:

> The wolverine and fisher are listed as Region 6 sensitive species and a petition for listing under the federal Endangered Species Act is being pursued. An interagency team of biologists and scientists are developing conservation assessments and strategies for wolverine and fisher. The revised forest plan needs to incorporate the information developed in the conservation assessments.
>
> Wolverines have been discovered at several locations in the planning area; however, fishers have been extirpated. A regional assessment of landscape connectivity for the wolverine was completed in 2001. This information needs to be integrated into land management planning.

The Boulder Park EA contains or incorporates insufficient updated scientific information to be able to make viability conclusions for wolverines.

Wolverines exist in the project area and are currently proposed for listing as threatened under the ESA. The species was originally proposed for listing in 2013 due to risk of eventual habitat and range loss due to climate warming, with secondary threats from trapping and wolverine harvest, human development, transportation corridors, and loss of genetic stochasticity due to isolation between snowy habitats caused by climate change. Activities in wolverine habitat may be detrimental to this animal. Please consult with the USFWS on this species.

The Boulder Park Biological Evaluation discloses wolverine have been recorded near the project area:

> A few documented sightings of wolverines exist from the Newport-Sullivan Lake Ranger Districts, mainly from high elevation areas like the Salmo-Priest Wilderness. …There is one visual record of a wolverine from the Boulder-Park Project Area, reported by a Forest Service wildlife biologist in 1971.

And as is the case with fisher, the FS has no scientifically defensible viability strategy for this species: "The Forest Plan provides no specific management direction for wolverines." Id.

Logging and road activities may affect wolverines; published, peer-reviewed research finds: "Roaded and recently logged areas were negatively associated with female wolverines in summer." Fisher et al., 2013. The "analysis suggests wolverines were negatively responding to human disturbance within occupied habitat. The population consequences of these functional habitat relationships will require additional focused research." Id.

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

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

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

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

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

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

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

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

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

Wisdom et al. (2000) state:

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

Carroll et al. (2001b) state:

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

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

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

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

The Forest Plan and Boulder Park wildlife reports have no description of the quantity and quality of habitat that is necessary to sustain the viability of the wolverine.

Results from Scrafford et al., 2018 "show that roads, regardless of traffic volume, reduce the quality of wolverine habitats and that higher-traffic roads might be most deleterious. We suggest that wildlife behavior near roads should be viewed as a continuum and that accurate modeling of behavior when near roads requires quantification of both movement and habitat selection. Mitigating the effects of roads on wolverines would require clustering roads, road closures, or access management."

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

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

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

The fact that project activities may affect the wolverine gives rise to the requirement to consult under Section 7 of the ESA.

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

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

Nowhere in the Forest Plan or Boulder Park EA can be found a description of the quantity and quality of habitat that is necessary to sustain the viability of the wolverine.

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

WATER QUALITY AND FISHERIES

This issue was raised in UCRG/AWR EA comments at pp. 34-39 and in Sieracki/AWR EA comments at pp. 17, 40-42.

The Boulder Park EA water quality and fish analysis:

- fails to accurately disclose sediment amounts and sediment impacts of management actions;
- fails to properly and accurately quantify road-related impacts to water quality and fish;
- fails to provide an analysis that discloses pertinent information as per NEPA requirements and for scientific integrity;
- fails to disclose the livestock grazing impacts to the affected streams in the Project Area.

Since the EA's second stated Purpose and Need was about restoring fish habitat[9], it makes no sense that, according to DN Appendix B, road decommissioning may never happen, that it "would be implemented as funding becomes available. Funding is often obtained through retained receipts." However it doesn't say that in the EA! This renders much of the EA's analyses claiming benefits of the project for watersheds to be speculative, e.g.: "The proposed stream enhancement and road activities would accelerate the attainment of INFISH RMOs by obliterating road sections of the RHCA." That statement is represented as fact instead of only a possibility, so is inaccurate and in violation of NEPA.

The EA does not 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 EA does not disclose populations and population trends of Sensitive fish species in all the project area streams, and compare those numbers to minimum viable populations.

The FS fails to acknowledge the known limitations of the Forest Plan/INFISH direction. INFISH deals primarily with riparian zone protection, and does not consider instream and stream bank erosion and sediment deposition during high water yield events, such as spring runoff and rain-on-snow (ROS) events. ROS events can be the most channel changing, sediment producing events and can have a significant adverse effect on fish and their habitat. Most segment altering and channel forming events occur during instantaneous peak flows.

[9] "There is a need to improve stream habitat connectivity and provide quality pool habitat for bull trout and westslope cutthroat trout. There is a need to remove or relocate road segments that are impacting riparian habitats and water quality."

The EA does not contain a monitoring and maintenance plan for culverts that will be left on closed roads. The USFWS Biological Opinion of the Effects to Bull Trout and Bull Trout Critical Habitat from Road Management Activities on National Forest System and Bureau of Land Management Lands in Western Montana (2015) states:

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

U. S. Fish and Wildlife Service, 2002a, concluded:

> Culverts left in place behind gated and bermed roads . . . pose a risk to bull trout . . . Whatever the design life, any crossing structure would have a 100% chance of failure over its installation life if it is not removed after the road is abandoned. …Regular monitoring and maintenance is necessary to keep stream crossings in good condition and to identify and correct problems. This preventative maintenance should be carried out at all culverts, not just culverts on actively used roads (Furniss et al. 1991). If these culverts are unmaintained the potential to fail and result in the addition of sediment to the stream channels is greatly increased.

The EA fails to include any analysis of the trends toward attainment of Riparian Management Objectives, especially of those not currently being met.

The Forest Plan/INFISH has no standards for cobble embeddedness or percent fines of sediment. Therefore, as the EA exemplifies, the FS feels free to ignore these habitat needs in its discussion of habitat quality.

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

The EA does not demonstrate that native fish populations in the CNF are viable. Forest Plan Monitoring as required by the forest plan has not been conducted. Viability of native fish is not assured, in violation of NFMA.

USDA Forest Service, 2017c explains that native westslope cutthroat trout have declined due to habitat degradation:

> 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).

The Kootenai NF's Flower Creek Forest Health project EA states:

Fine sediment can greatly reduce the capability of winter and summer rearing habitats and decrease survival to emergence when sediment levels reach 30% or greater (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 (Hillman et al. 1987). Fine sediment can also alter macroinvertebrate abundance and diversity.

US Fish and Wildlife Service (1998) recognizes, upland forest canopy removal raises stream temperatures. The FS must address best available science which indicates 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).

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 current conditions do not comply with the following Forest Plan Standards and Guidelines:

Protect fish habitat from degradation; rehabilitate habitats where degradation is unavoidable. Mitigate affected sites if possible.

Emphasis on native fish species habitat management. Non-Natives may be managed where they present no threat to native species or where their production or angler harvest is 15 percent or more above native production and/or harvest.

Minimize road crossings of Class I/II and fish-bearing Class III streams. Use existing crossings where possible. New crossings will be sited (i.e., least gradient) and constructed (i.e., bridges or bottomless arches) in such a manner as to minimize passage obstruction to native trout, particularly during their spawning period.

Maintain general character of aquatic and riparian habitat and natural sources of large wood debris for fish habitat.

In-stream fish passage obstructions will be removed except where they block undesirable fish or aquatic organisms or where removal would cause degradation.

Maintain water quality within good biological and State water quality standards:

Bank Stability: > 80 percent stable.
Low Bank Angle: > 75 percent of banks are <90° angle (i.e., undercut).
Wetted Width to depth Ratio: < 10.

Kappesser, 2002 discusses an assessment procedure used on the Idaho Panhandle NF:

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…it can be used as an indicator of stream reach and watershed condition and also of aquatic habitat quality.

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.

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

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 "threshold" 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.

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 "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."

USDA Forest Service 1994b states:

> 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.).

Harr, 1987 states:

> Perhaps the most basic of the erroneous beliefs is the idea that <u>simplicity can be willed on the forest hydrologic system</u>. 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.

Actions on private, state and NF lands are considered, the effects are not sufficiently analyzed to support a finding of no significant cumulative impact on fisheries and the other aquatic resources. The existing grazing alongside streams in the watershed is virtually unregulated and has the potential to contribute significant amounts of sediment to the affected streams, further damaging fish populations and habitat.

Aquatics

During the pre scoping meetings, the USFS could not provide data on streams where cutthroat trout exist free of brook trout that area above barriers. This information was requested by the Kalispel Tribe and myself.

Forest Plan Forestwide Standards and Guidelines for Fish Habitat:

The following are excerpts from the existing forest plan on fish habitat and water quality

"Protect fish habitat from degradation; rehabilitate habitats where degradation is unavoidable.

Maintain water quality within good biological and State water quality standards:

Streams
 Temperature: < 16°C
 Activity causing suspended and bedload sediments to accelerate channel changes and/or reduce bank stability will be considered excessive.

Riparian Management Objectives (RMO) require:
 Pool Frequency: > 96 pools per mile for streams < 10ft wide; > 56 pools per mile for streams < 20ft wide.
 No measurable increase in maximum water temperature.

Please disclose the Colville National Forest's record of compliance with state best management practices regarding stream sedimentation from ground-disturbing management activities. Minimum standards for fisheries and riparian management are included in the Forest Plan. Are you meeting all Forest Plan standards and guidelines? If not the project would violate NFMA, NEPA and the APA. Given the dynamic disturbance history of these watersheds, reference conditions are critically important to understand how the condition of stream habitats within the project area relates to conditions across the CNF as a whole. What streams are being used for reference conditions on the CNF?

Please take steps to bring the TMDL listed segment of Tacoma Creek up to standards and present a detailed analysis of the watershed conditions, including effects of the proposed action to all watersheds. Given the dynamic disturbance history of these watersheds, reference conditions are critically important to understand how the condition of stream habitats within the project area relates to conditions across the CNF as a whole.

Logging, post-harvest fuel treatments, road construction and increased traffic under the proposed action would lead to unavoidable increases in sediment delivery to streams. The USFS must demonstrate that these increases are consistent with all regulatory mechanisms, and not cumulatively significant.
Wildfire suppression, timber harvest, road construction, rural residential use, and livestock grazing are on-going and are anticipated to be ongoing and reasonably foreseeable future actions in the cumulative effects analysis area. Because of these impacts, we believe the USFS needs to prepare an EIS for this project.

Please solicit and disclose comments from the Washington Department of Ecology regarding the impact of the Project on water quality and Please disclose the Colville National Forest's record of compliance with the additional monitoring requirements set forth in previous DN/FONSIs and RODs which occurred in the Limestone/Silver project area for all issues.

Inland Columbia Basin Redband Trout and Westslope Cutthroat Trout (CNF Sensitive Species)
Please identify streams that area currently occupied, were they exist upstream of barriers, and streams that historically were occupied and take measures to enhance their habitat.

Bull Trout (Endangered)
The Pend Oreille River upstream of Boundary Dam is designated Bull Trout Critical Habitat as is Tacoma Creek. Please discuss how streams draining from the analysis area into the Pend Oreille River contribute to or can be rehabilitated to provide for bull trout spawning habitat. Failure to address water quality and TMDL standards for the streams draining into the Pend Oreille River may impact critical Bull Trout habitat and violate the ESA. The area is also impacted by a cattle allotment, and high road densities in and out of RHCA's. Please discuss effects in detail.

Impacts to RHCA's are extreme and will be exacerbated by the proposed action and the grazing allotment.
There are 37 (36.99) miles of roads within the 8.9 square miles of RHCA's in the project area, this is a road density of 4.16 miles of assumed open roads per square mile of RHCA (Map 1, Appendix B) This was derived from the CNF roads dataset, not the dataset where the CNF derived 370 miles of roads in the project area (This dataset is under FOIA). The district is taking little action to remove major roads from the RHCA of a stream listed as Bull Trout critical habitat. Please refer to comments for the grazing exclosure CE that are attached, the NEPA for that is still in progress.

Logging in RHCA's is proposed to increase tree growth and provide woody debris. Excluding on large riparian unit, the project proposes to log 1098 acres in RHCAs including clearcut (shelterwood) logging. It is likely that some of these areas were not excluded from the proposed logging map due to preliminary stand identification in a gis (see map below). It is not clear if the CNF plans to log in the headwater stream RHCA's based on the gis analysis of impacts to RHCA's. However, the Newport RD has repeatedly emphasized that it wants to log in RHCA's to the detriment of fish and wildlife to provide volume to timber industry (Areas are proposed in Limestone-Silver, Boulder Park and Sullivan Creek EA).

In addition to logging there is also a cattle allotment in the area please discuss the effects of cattle grazing and trampling on water quality and fish habitat.

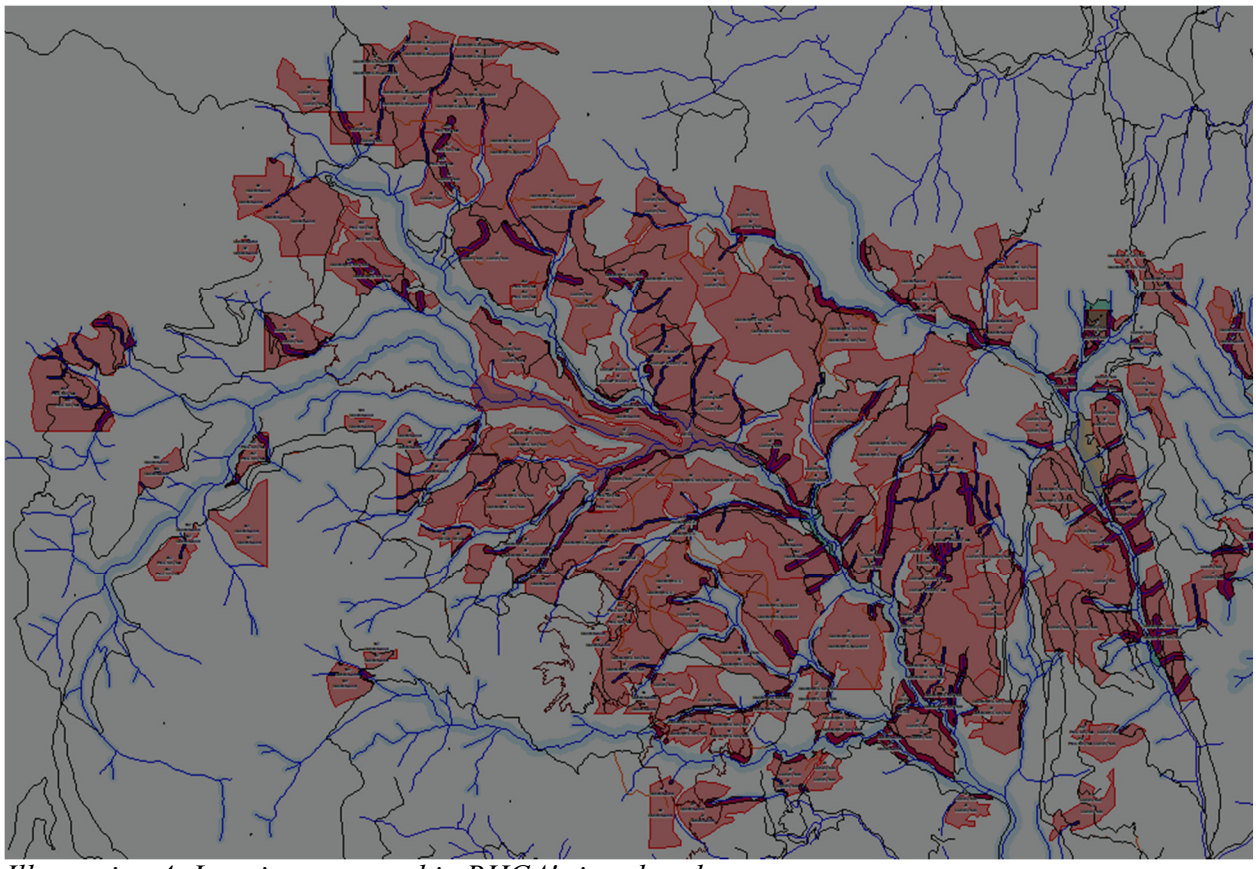


Illustration 4: Logging proposed in RHCA's is colored magenta.

The EA stumbles greatly in addressing cumulative impacts on fish habitat:

> Past, present, and reasonably foreseeable future actions (section 3.4) were reviewed for projects that may continue to have effects relevant to fish species populations. Past, present, and reasonably foreseeable future actions that could create cumulative effects on trout include timber harvest, road and trail maintenance, livestock grazing (in Cusick Creek catchment), harvest of game species, gold prospecting, aquatic organism passage and, rehabilitation of dispersed recreation sites are expected to continue on NFS lands and private land in the project area.

Then the EA resorts to a statement that pretends to show an understanding cumulative impacts but, in trying to say too much, flails in confusion: "Many of these impacts would affect fish species habitat elements which would have similar effects on fish species including timber harvest, road and trail maintenance, and livestock grazing."

There is in fact no coherent cumulative effects analyses for fish habitat in the EA.

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

indirectly by altering invertebrate species composition, thereby decreasing abundance of preferred prey.

The EA has no quantitative sediment analysis. It does not provide itemized numerical estimates of project-induced sediment increases, nor of decreases due to specific mitigation or restoration actions. The analysis is opaque and not credible without a breakdown of the numbers.

Although we would expect road decommissioning and stream crossing improvements may improve chronic sediment impacts in the long term, any claim of benefits is not backed up with reliable estimates nor numbers. The significance of the ongoing chronic impacts due to the remaining (post-project) road system is never examined. The EA lacks statistical rigor and scientific integrity.

Road and trail maintenance and use generates sediment by disturbing and loosening soil at stream crossings and other sites within sediment-contributing distance of streams, making any trails and roads within sediment-contributing distance sources of chronic fine sediment (Rhodes, 2002).

The massive amount of sediment flushed to streams as a result of the removal of 58.5 million board feet of timber caused by trucks hauling logs is not a subject of EA inquiry or disclosure.

Log hauling activities adds sediment to streams, especially along unpaved roads. USDA Forest Service, 2016b states, "Increased heavy-truck traffic related to log hauling can increase rutting and displacement of road-bed material, creating conditions conducive to higher sediment delivery rates (Reid and Dunne, 1984)." The abstract from Reid and Dunne, 1984 states:

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

From an investigation of the Bitterroot Burned Area Recovery Project, hydrologist Rhodes (2002) notes, "On all haul roads evaluated, haul traffic has created a copious amounts of mobile, non-cohesive sediment on the road surfaces that will elevate erosion and consequent sedimentation, during rain and snowmelt events." USDA Forest Service, 2001a also presents an analysis of increased sedimentation because of log hauling, reporting "Increased traffic over these roads would be expected to increase sediment delivery from a predicted 6.30 tons per year to 7.96 tons per year." Such impacts are not analyzed or disclosed in the EA.

The Boulder Park EA's water quality and fisheries analyses fail to utilize a legitimate site-specific baseline in the aquatics analysis or the cumulative effects analysis. The comparison of the conditions that existed at the time of a legitimate baseline, and the population number and

species that existed under those conditions, would provide a good basis for comparison to current existing conditions and fish species and populations. The EA contains no such analysis.

Has the analysis examined hydrologic recovery of the project watersheds, following past management actions?

The project area provides valuable habitat for the Sensitive species Westslope Cutthroat trout and Critical Habitat for bull trout. It doesn't indicate if the inland redband trout is native to the project area streams. The EA fails to provide an analysis that explains how viable populations of these species will be insured in project area streams.

The EA discloses, "Tacoma Creek has been designated as critical habitat for bull trout (*Oncorhynchus confluentus*), federally listed as threatened (USFWS 2010)" but it does not explain why "no bull trout have been documented in the project area."

Tacoma Creek is critical bull trout habitat. Please develop an alternative that fully restores hydrologic function using road removal and eliminating logging in RHCA's which is proposed by this EA. Please introduce bull trout to this stream since it is apparently unoccupied critical habitat. Please consult with the USFWS on this action.

Please develop a plan to eliminate brook trout above the fish barrier on Tacoma Creek and keep or reintroduce cutthroat trout. Please replace existing culverts with oversized ones with flow capacity to account for increased precipitation for the "business as usual" climate projection.

The Forest Plan/Eastside Screens Interim riparian standard states that timber sales will not be planned or located within riparian areas as described below:

> Ponds, lakes, reservoirs, seeps and springs, bogs and wetlands consist of the body of water or wetland and/or seeps/spring source and the area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site-potential tree, or **150 feet slope distance** from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake, **whichever is greatest**. (Emphasis added.)

Instead of being consistent with this standard, the EA proposes only reduced buffers (e.g., p. 13) which would violate NFMA.

The Boulder Park EA does not adequately disclose the existing conditions of site specific stream reaches and its effects on water quality, fish and other aquatic resources. The EA fails to disclose such critical information such as stream channel stability assessments on specific reaches, and information regarding the existence and effects of bedload and accumulated sediment. The Boulder Park EA does not disclose how much aggradation of fine and/or bedload sediment will increase and persist in the affected streams.

There is no analysis of scientifically valid, quantitative data gathered on the Forest to determine water flows and its 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. There is no documentation in the Boulder Park EA of the daily instantaneous flows during winter and/or spring ROS events for the project area streams.

The Boulder Park EA does not disclose whether the predictions made in previous NEPA documents for projects carried out in these watersheds were accurate, or if project fisheries and water quality objectives were met. Nor does it cite the results of monitoring required under those decisions. Systemic amnesia results in diminished expert credibility.

The EA states, "The proposed action is not expected to hinder or retard6 the attainment of Washington State water quality standards, INFISH RMOs for pool frequency, large woody material, water temperature, and wetted width to depth ratio" yet it fails to include any analysis of the trends toward attainment of Riparian Management Objectives.

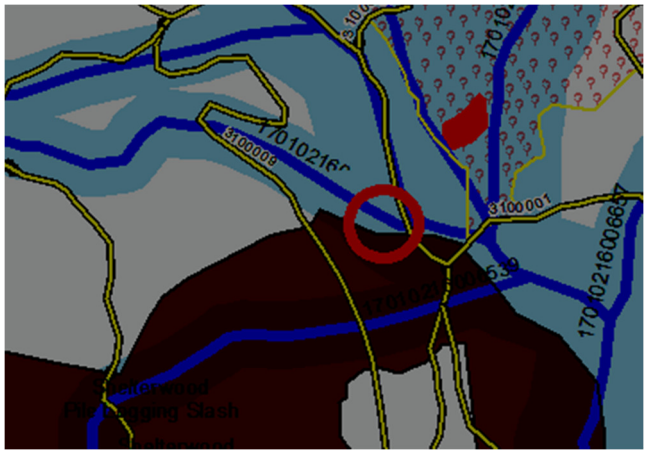
The EA discloses, "Water temperatures in Tacoma Creek and Cusick Creek are currently impaired, and are not meeting INFISH RMOs or state standards for Total Maximum Daily Load. They are both currently listed on the 305b list for temperature." The EA tries to tiptoe around this temperature issue but only ends up falling flat on its face, tripped up by its own internal inconsistencies and blatant misrepresentations of reality. So whereas shade in riparian areas is one thing the vegetation "restoration" cannot improve—only reduce—the EA resorts to obfuscating using words such as "minimal and unmeasurable." The plain fact is, the roads and logging in riparian areas will in fact "retard" attainment of the RMO for which Tacoma Creek and Cusick Creek are currently impaired—temperature. The FS seems clueless that cold, clean water is essential for native trout.

The EA does not disclose the location or acreage of "thinning units" in RHCAs (p. 9) nor does it justify the need to thin trees in riparian areas. The EA seems oblivious to Forest Plan direction.

"Treatments may remove some existing shade-providing trees in the short term. In the long term, removal of these conifers would allow for greater growth of the remaining stand and increased shade on these streams." So let's see—log it now, reduce the shade and raise water temperature even more in the short term, somehow that's a benefit to fish?

Why can't the FS restrain itself from logging and road building in riparian areas which—in the case of temperature-impaired Tacoma Creek and Cusick Creek—is required by the Forest Plan?

During a forest watch field recon trip in August, 2019, Paul Sieracki located a unit boundary that was within the RHCA of a perennial stream (Unit 6, a shelterwood, red circle in image below). During the field review with the biologist and silviculturist I showed the silviculturist the boundary and she agreed. The district silviculturist told me that she would let me know why this boundary was there. The district silviculturist did not respond why this boundary is located in the RHCA as of 9/18/2019. All RHCA boundaries must be verified as part of the NEPA/public process.



Map of Unit 6 with boundary in the RHCA shown as a red circle.


Photo of the boundary of Unit 6 in the RHCA, water can be seen behind the down tree in the lower right portion of the photograph.

"When harvest occurs within the RHCA, access for cattle may be increased to the riparian areas. Increased cattle access may increase cattle activity in the RHCA and affect water quality parameter of stream temperature from overgrazing of the riparian forage resulting in reduction in shade."

Yet this is "restoration"?

"Increased cattle access may increase cattle activity in the RHCA and affect water quality (i.e., increased bacteria levels)." Translated, more B.S. into streams—literally. Has the FS measured fecal contamination or "bacteria" in streams as a result of cattle grazing in the project area?

"(G)razing in the past caused bank destabilization…" That's not happening now? Apparently it is, because "Continued grazing is still causing bank destabilization and sediment input to streams at some locations in the Cusick Creek catchment."

"(T)he proposed action includes effective barriers to riparian areas along harvest unit edges adjacent to RHCA zones…" Please explain how that works.

"(E)ncouraging livestock to move out of riparian areas regularly would help stabilize stream banks and restore floodplain function…" How do you encourage cattle to stop grazing where they find water, and inside riparian areas where the vegetation is being improved for grazing by logging activities?

"Based on field observations within the RHCA on other areas of the district, appropriate implementation of BMP and INFISH recommendations have resulted in minimal to no effects from timber harvest and prescribed burning." Please list the project file documents you are citing from. If providing a list is of too much difficulty, just consider this a request under the Freedom of Information Act.

"Trails and stream crossings created from unauthorized OHV use in this subwatershed are considerable and not fully accounted for." How can the FS conclude these effects—to be exacerbated by the proposed project—are "insignificant"?

"These unauthorized trails would be restored to native terrain (decompacted and covered with slash) **when located in harvest units** or by the Forest Damage Response Team **to the extent funding and crew availability allows."** (Emphasis added as a comment.)

"In Tacoma Creek subwatershed and Cusick Creek catchment native vegetation is vigorous, healthy, and diverse in age, structure, cover, and composition on less than 25 percent of the riparian/wetland areas in the watershed." The EA fails to explain how this came to be.

"A large percent of native vegetation attributes along stream corridors, wetlands, and water bodies in the Tacoma Creek subwatershed and Cusick Creek catchment are considered functionally impaired." Please disclose the percent for each vegetation attribute you are referring to.

"Stream enhancement and fish passage activities that would occur under the proposed action include excavation and fill of sediment…" The EA doesn't explain what this "excavation" would entail, how much would occur, and why it's deemed necessary.

"The increased use of existing roads and construction of temporary roads during logging activities can also contribute to increased peak stream flows during and following timber harvest due to the increased delivery of water to the stream channel across compacted road surfaces."

When peak flows are elevated as compared to natural, doesn't this mean streambanks get destabilized and pools fill in with sediment?

"Personal observations of wildfire behavior during 2015 Kaniksu complex fires in late summer were consistent with the findings of Beche et al. (2005) in that when fire encountered riparian areas, there was very little fire impact (e.g. trees were generally not burned and duff layer was only surface burned rather than fully consumed)." And yet, "Reduction in the fuel loading in riparian areas would reduce the risk of stand-replacing fire along the stream channels and subsequent loss of stream shading." Really?

"Native riparian plant species within the project area generally need high levels of sunlight to flourish and do not typically exist under closed canopy conditions." Please cite scientific sources that support that statement.

If the FS has measured wetted width-to-depth ratio, large wood, and pool frequency (RMOs) in the project area, please disclose them.

Road densities in RHCAs would be reduced from 3.2 to 3.0 mi/mi^2 in Tacoma Creek and in the Cusick Creek catchment, a decrease in road density from 3.2 to 2.8 mi/mi^2. The amount of the chronic remaining sediment inputs into streams form the remaining 3.0 mi/mi^2 and 2.8 mi/mi^2 are not disclosed. How can you determine significance?

Given all the Boulder Park EA's deficiencies, it fails to support a Finding of No Significant Impact (FONSI), in violation of NEPA.

Remedy: Choose the No Action Alternative. Finish the ongoing process of revising the Forest Plan before preparing an EIS for the Boulder Park project. Complete consultation with the U.S. Fish & Wildlife Service concerning critical habitat and the revised forest plan.

FIRE SUPPRESSION, FIRE POLICY AND FIRE ECOLOGY

This issue was raised in UCRG/AWR EA comments at pp. 10-14.

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

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

DellaSala, et al. (1995) state:

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

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

Veblen (2003) states:

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

Riggers, et al. 2001 state:

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

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

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

> Large wild fires occurring in forests, grasslands and chaparral in the last few years have aroused much public concern. Many have described these events as "catastrophes" that must be prevented through aggressive increases in forest thinning. **Yet the real**

> **catastrophes are not the fires themselves but those land uses, in concert with fire suppression policies that have resulted in dramatic alterations to ecosystem structure and composition**. The first step in the restoration of biological diversity (forest health) of western landscapes must be to implement changes in those factors that have resulted in the current state of wildland ecosystems. Restoration entails much more than simple structural modifications achieved through mechanical means. **Restoration should be undertaken at landscape scales and must allow for the occurrence of dominant ecosystem processes, such as the natural fire regimes achieved through natural and/or prescribed fires at appropriate temporal and spatial scales.** (Emphases added.)

Noss et al. (2006) state:

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

The effects of fire suppression are not unique to this project area—similar language has been included in NEPA documents for all logging projects on this Forest for at least a decade. 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.

Even if there is scientific legitimacy to the claims that fuel reductions reduce ecological damage from subsequent fire—a claim that is scientifically controversial and unproven for the long term, and unquantified for any defined short term—the area affected by such projects in recent years is miniscule compared to the entire, 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 in the EA largely to justify logging as "restoration." However, playing the fire scare card is

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

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

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

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

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

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

Typically, attempts to control or resist the natural process of fire have been a contributor to deviations from Desired Conditions. The EA analyses skew toward considering fire as well as native insects and other natural pathogens as threats to the ecosystem rather than rejuvenating natural processes. It seems to need the obsolete viewpoint in order to justify and prioritize the

proposed vegetation manipulations, tacitly for replacing natural processes with "treatments" and "prescriptions." However the scientific support for assuming that ecosystems can be restored or continuously maintained by such manipulative actions is entirely lacking.

Biologist Roger Payne has the following to say about the same kind of hubris represented by the FS's view that it can manipulate and control its way to a restored forest by more intensive management:

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

(Payne 1995, emphasis added.) Karr (1991) cites a definition of ecological integrity as "the ability to support and maintain "a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitat of the region." Karr (1991) also cites a definition of ecological health: "a biological system ... can be considered healthy when its inherent potential is realized, its condition is stable, its capacity for self-repair when perturbed is preserved, and **minimal external support for management is needed**." (Emphasis added.) The EA definition of resilience misses that last aspect of ecological health—specifically that it doesn't need management meddling.

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

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

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

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

Churchill, 2011 points out:

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

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

The HRV does not separate out burns from regeneration logging areas. Burns, provide a structurally diverse early seral stage with high biodiversity. Clearcut logged areas (including seed trees and shelterwoods because the overstory is eventually removed) have greatly reduced structural and biological diversity. For some bird species like the olive-sided flycatcher, these areas may act as an ecological trap because they appear attractive to the birds but birds have reduced nesting success (Robertson, B. A. and R. L. Hutto. 2006. Is selectively harvested forest an ecological trap for olive-sided flycatchers?" The Condor 109(1):109-121. 2007 https://doi.org/10.1650/0010-5422(2007) 109[109:ISHFAE]2.0.CO;2). The olive-sided flycatcher is on the Audubon/American Bird Conservancy Watch List (yellow list).

The USFS HRV analysis does not even mention stand size which is critical for sensitive species, old growth and species that need more stable interior moist old growth habitats such as some lichen species. Microclimates are important!

> *"Climate patterns for the Colville are influenced by a transition between an intense rain shadow effect in the west formed by the Cascades, and the inland expression of maritime climate in the east caused by the convergence and uplifting of moist air masses over the Rockies. The result is a considerable west-east variation in precipitation across the forest. This variation can be seen expressed in vegetation from open, dry Douglas-fir types along the Okanogan-Ferry County line on the western boundary of the Forest, to more moist redcedar-hemlock vegetation types near the Idaho border on the eastern boundary of the Forest (Williams et al. 1995)." CNF-Forest Plan Revision Project. Forest Vegetation Report.*

Both the current and proposed Forest Plans are and will be reducing biodiversity. For example lichens need more than applying design-a-stand ideas that would gut moist site old growth forests. Old growth must be distributed over larger areas than currently allocated to provide the variatey of microclimates needed to maintain biodiversity. Aresenault, 2000 states that:

> *"Other important habitats for bryophytes and lichens include include large rotten logs, and large leaning trees and snags . At the stand level, the number of species of*

bryophytes and lichens is consistently higher in old-growth forests compared to young forests in both the Interior Cedar-Hemlock Zone and in the Coastal western Hemlock Zone. However, this relationship between species diversity and stand age is complex and will vary for certain groups of species across ecological gradients. For example old cedar-hemlock stands in the inland rainforests located on toe slope positions contain unique assemblages of epiphytic lichens, many of which are rare or infrequent, that are not found on adjacent old-growth forests located on mid-slope positions in the same biogeoclimatic variant. These findings clearly show that ecosystem representation at a finer scale than the biogeoclimatic variant is essential for the designation of old-growth management areas to minimize the loss of biological diversity in managed landscapes."

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

Despite the fact that the EA makes many statements to the effect that without the proposed treatments there is a high likelihood of highly adverse effects on various resources due to wildfire, the EA discloses nothing about such effects from recent fires in the general area. In response to our comments on this subject, DN Appendix B admits: "During the past 20 years this District has had only a couple of large Wildfires (300 acres or larger); Noisy Creek Fire 2017, Kaniksu Complex 2015, and Baldy Fire 2015, We haven't had the time or resources to conduct any quality assessments of those Fires." This is consistent with our belief that the FS's fear-invoking statements about the impacts of fire are speculative and not based upon data or any empirical evidence, in violation of NEPA.

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

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

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 EA does not disclose the limitations of this methodology. This 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. … 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 …are embodied in the Fire Regime Condition Class (FRCC) approach (Hann and Bunell, 2001), which is widely used to provide an index of the potential for uncharacteristically severe fire and fire regime alteration. The FRCC relies on of estimates of mean fire intervals, but does not require that they be estimated on the basis of site-specific historical data. It emphasizes fire scar data, but does not require its collection and analysis on a site-specific basis. The FRCC's analysis of departure from natural fire regimes also relies on estimates of how many estimated mean fire intervals may have been skipped. The method does not require identification and consideration of fire-free intervals in site-specific historic record. Notably, a recent study that examined the correlation of FRCC estimates of likely fire behavior with actual fire behavior in several large fires recently burning the Sierra Nevada in California concluded: "[Fire Regime] Condition Class was not able to predict patterns of high-severity fire. . . . Condition Class identified nearly all forests as being at high risk of burning with a dramatic increase in fire severity compared to past fires. Instead, we found that the forests under investigation were at low risk for burning at high-severity, especially when both spatial and temporal patterns of fire are considered." (Odion and Hanson, 2006.) These results corroborate that FRCC is biased toward overestimating the alteration of fire regimes and the likelihood of areas burning at uncharacteristically high severity if affected by fire. Therefore, in aggregate there is medium degree of certainty that the FRCC is biased toward overestimating departures from natural fire regimes and the propensity of forests to burn at higher severity when affected by fire.

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 Colville NF by now, and cited in the EA. We find no data or scientific analysis of those fires' effects validating the EA's predictions of uncharacteristically severe fire effects if the logging is not conducted.

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

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

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

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

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

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

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

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

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

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

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

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

Schoennagel et al., 2004 state:

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

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

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

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

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

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

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

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

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

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

We incorporate into these comments the John Muir Project's documents, "Forest Thinning to Prevent Wildland Fire …vigorously contradicted by current Science" and "Do beetle outbreaks in western forests increase fire severity?".

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

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

See Attachment 2, which is a collection of news media articles, quoting experts including those in the FS, who do understand the high value of severely burned forest for wildlife and other resources.

The EA fails to disclose or acknowledge the scientific information that indicates severe fires burning over large acreages are normal for these forests, and that fire intensity and severity are dependent much more upon weather than fuels. It's common knowledge by now. If the purpose for a project is built upon false information about ecological functioning, then the predicted

effects of the project are not credible. This EA does not comply with NEPA's requirements for scientific integrity.

Huff, et al, 1995 state:

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

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

As far as the "restoration" being alleged to address the impacts of long-term fire suppression, there is no coherent plan for integrating wildland fire back into this ecosystem. In fact in several places the EA indicates nothing is being changed to learn from the admitted suppression ecological damage. E.g., "These treated areas would provide defensible zones in which firefighters would have a higher likelihood of success in suppressing wildfires that may threaten the designated WUI areas and adjacent private lands" and "Fuels treatments also increase access through the creation of openings which can allow for use by aerial firefighters and helicopters." The war against wildland fire, i.e., nature, continues.

The Forest Plan and this EA 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 Colville Forest Plan was adopted. The "plan" is clearly to log now, suppress fires continuously, and log again in the future based on the very same "need" to address the ongoing results of fire suppression. Furthermore, the FS fails to cite any assessment of nearby/ recent fires which might support its assumptions about "uncharacteristic" fire effects.

The risks of fire are best dealt with in the immediate vicinity of homes, and by focusing on routes for egress during fire events—not by logging national forest lands well away from human

occupied neighborhoods. The EA fails to disclose that the only effective way to prevent structure damage is to manage the fuels in the immediate vicinity of those structures.

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

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

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

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

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

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

> Public land managers face significant challenges balancing the threats posed by severe fire with legal mandates to conserve wildlife habitat for plant and animal species that are positively associated with recently burned forests. Nevertheless, land managers who wish

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

Bradley et al., 2016 found that areas of more intensive management tend to burn more severely than unmanaged forests:

> There is a widespread view among land managers and others that the protected status of many forestlands in the western United States corresponds with higher fire severity levels due to historical restrictions on logging that contribute to greater amounts of biomass and fuel loading in less intensively managed areas, particularly after decades of fire suppression.
>
> … On the contrary, using over three decades of fire severity data from relatively frequent-fire pine and mixed-conifer forests throughout the western United States, we found support for the opposite conclusion—burn severity tended to be higher in areas with lower levels of protection status (more intense management)… Our results suggest a need to reconsider current overly simplistic assumptions about the relationship between forest protection and fire severity in fire management and policy.

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

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

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

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

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

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

> In order to be ultimately effective at helping to restore natural fire regimes, fuel treatments must be part of wider efforts to address the root causes of the alteration in fire behavior. At best, MFT can only address symptoms of fire regime alteration. Evidence indicates that primary causes of altered fire regimes in some forests include changes in fuel character caused by the ongoing effects and legacy of land management activities. These activities include logging, post-disturbance tree planting, livestock grazing, and fire suppression. Many of these activities remain in operation over large areas. Therefore, unless treatments are accompanied by the elimination of or sharp reduction in these activities and their impacts in forests where the fire regime has been altered, MFT alone will not restore fire regimes. (Internal citations omitted.)

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

> Realizing that wildland fires are inevitable should urge us to recognize that excluding wildfire does not eliminate fire, it unintentionally selects for only those occurrences that defy our suppression capability—the extreme wildfires that are continuous over extensive areas. If we wish to avoid these extensive wildfires and restore fire to a more normal

ecological condition, **our only choice is to allow fire occurrence under conditions other than extremes. Our choices become ones of compatibility with the inevitable fire occurrences rather than ones of attempted exclusion.** (Emphasis added.)

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

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

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

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

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

> Depending on intensity, thinning from below and possibly free thinning can most effectively alter fire behavior by reducing crown bulk density, increasing crown base height, and changing species composition to lighter crowned and fire-adapted species. Such intermediate treatments can reduce the severity and intensity of wildfires for a given set of

physical and weather variables. **But crown and selection thinnings would not reduce crown fire potential.** (Emphasis added.)

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

> For example, the 20-foot wind speed[10] 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 fails to recognize the implications of how the fire regime is changing due to climate change.

Also, 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 mortality of wildlife by entrapping them between two high-intensity flame fronts.
>
> ...Firelines, especially dozerlines, can become new "ghost" roads that enable unauthorized

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

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

We strongly support government actions which facilitate cultural change towards private landowners taking the primary responsibility for mitigating the safety and property risks from fire, by implementing firewise activities on their property. Indeed, the best available science supports such a prioritization. (Kulakowski, 2013; Cohen, 1999a) Also, see Firewise Landscaping[11] as recommended by Utah State University, and the Firewise USA website by the National Fire Protection Association[12] for examples of educational materials.

DN Appendix B states, "As a responsible land management agency, it is our duty to treat NFS lands adjacent to Private property in the WUI area to help create a 'buffer' between adjacent lands." The Forest Plan creates no such duty; this is FS using fire propaganda to prop up ecologically damaging logging under the guise of "fuel reduction" to protect landowners. And even if such logging could be demonstrated to protect homes, the owners of the CNF who don't live in the vicinity, the state of Washington, or the region (i.e., U.S. Taxpayers) have never been properly consulted about this subsidy.

DN Appendix B also indicates the FS believes it's the Washington Department of Natural Resources duty—not the FS's—to educate landowners as to why they cannot rely on "fuel treatments" to protect their homes.

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[11] https://extension.usu.edu/ueden/ou-files/Firewise-Landscaping-for-Utah.pdf
[12] http://www.nfpa.org/Public-Education/By-topic/Wildfire/Firewise-USA/The-ember-threat-and-the-home-ignition-zone

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

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

SCENERY

This issue was raised in UCRG/AWR EA comments at p. 4

SOIL PRODUCTIVITY

This issue was raised in UCRG/AWR EA comments at pp. 20-23.

The Boulder Park EA:

- fails to justify use of the FS's methodology limiting of detrimental disturbance as a proxy for complying with NFMA's requirements to protect soil productivity;
- fails to disclose that disclose that soil standards are based on the feasibility of limiting soil damage using typical log extraction methods rather than setting quantitative limits on losses of soil productivity based on ecological sustainability;
- fails to state the applicable Forest Plan requirements and demonstrate project compliance with them;
- fails to analyze and disclose the effects of noxious weeds on land and soil productivity;
- fails to disclose the reliability of FS survey data;
- fails to disclose the full extent of soil restoration needs in project area watersheds;
- fails to consider and disclose validity of FS analysis methodology;
- fails to include a cumulative effects analysis for soils that considers detrimental soil conditions outside of project activity areas;
- fails to include Design Elements/mitigation methods that are demonstrated to be effective in restoring soils to meet soil quality standards, or for preventing new detrimental soil damage.

Forest Plan Soil Standard 1.a. states:

> National Forest System lands will be managed under the principles of multiple use and sustained yield without permanent impairment of land productivity.
> The total acreage of all detrimental soil conditions should not exceed 20 percent of the total acreage within the activity area including landings and system roads. Consider restoration treatments if detrimental conditions are about 20 percent or more of the activity area. Detrimental soil conditions (see Glossary, FEIS) include compaction, puddling, displacement and severely burned soil.

The Region 6 soil quality standards are found in the Forest Service Manual at 2520, R6 Supplement 2500-98-1:

> Recognizing that many forest activities impact soil productivity (e.g., road construction, landings, rock pits, etc.), the Forest Service policy is to limit the extent of these

detrimental impacts. The Pacific Northwest Regional policy emphasizes protection over restoration (Forest Service Manual 2500— Watershed and Air Management, R6 Supplement 2500 – 98 – 1). When initiating new activities:

4. Design new activities that do not exceed detrimental soil conditions on more than 20% of an activity area. (This includes landings and the permanent transportation system.)
5. In areas where less than 20% detrimental soil conditions exist from prior activities, the cumulative detrimental effect of the current activity following project implementation and restoration must not exceed 20%.
6. In areas where more than 20% detrimental soil conditions exist from prior activities, the cumulative detrimental effects from project implementation and restoration must, at a minimum, not exceed the conditions prior to the planned activity and should move toward an improvement in soil quality.

The FS therefore has adopted a proxy—detrimental soil conditions (DSC)—for determining management compliance with NFMA requirements that **soil productivity** not be permanently impaired.

The Region 6 soil quality standards are full of loopholes. They basically boil down to a mitigation of soil productivity losses with an entirely uncertain outcome, as we explain below. Soil damage can be unlimited as long as the FS makes any effort, no matter how ineffective, at "moving toward" a net improvement. It doesn't mean soil quality improvements must be measurable, and it doesn't mean actual productivity must be restored.

One set of cumulative soil impacts ignored by the Region 6 soil quality standards is associated with permanent, or "system" roads. Although every square foot of road is, of course compacted, this compaction is in no way limited by the application of the Region 6 soil quality standards. The same goes for existing or ongoing erosion—no amount of soil erosion on these road templates would violate the Region 6 soil quality standards. Also, the "displacement" DSC (organic matter layer(s) displaced due to management actions)—practically 100% on permanent/system roads—is not limited in any way by the Region 6 soil quality standards.

Another cumulative impact the Region 6 soil quality standards ignores is existing or prior management-induced DSC on old log landings left after logging projects for future logging use. They are typically flattened areas which had been compacted or had organic layers displaced to use as temporary log storage and/or log truck loading, and were not recontoured to original slope or decompacted following use. Unless they are being used by the current project (and thus within an "activity area"), they are not limited in number or extent by the Region 6 soil quality standards. Much like system roads, there are no limits to total DSC from landings set by the Region 6 soil quality standards, and there is even no requirement their existence a project area be disclosed. Roads and log landings might be limited by other resource considerations such as road densities in sensitive wildlife habitat, but they are not limited by the Region 6 soil quality standards.

The Boulder Park EA also does not quantify DSC within any dispersed campsites located in the project area as required by the Region 6 soil quality standards.

Still more cumulative soil damage the Region 6 soil quality standards ignores involve existing DSC on areas the Forest Service maintains as part of the "suitable" or productive land base such as timber stands, grazing allotments and riparian zones that are not within the boundaries of any current project activity areas. The Region 6 soil quality standards do not limit or require disclosure of the existing/prior DSC in such areas, caused by past management activities such as log skidding, partially reclaimed log landings and temporary roads, firelines, burning of slash piles or other prescribed burns, compaction due to the hooves of livestock in springs, wetlands, or other riparian areas or simply in upland pasture areas. Furthermore, Region 6 soil quality standards do not compel the FS to take action to restore the soil productivity in such areas because their existing DSC does not matter for determining consistency with the Region 6 soil quality standards —until the day arrives when another project is proposed and the damaged site in question is included within an "activity area" because it is proposed for yet another round of logging and soil damage.

The CNF's Middle-South EA states, "Cumulative effects on soil productivity …occur through wildfire suppression, livestock grazing, and dispersed recreation." Also, previous logging has damaged soil productivity in the Boulder Park project area. Yet the FS makes no attempt to quantify these cumulative impacts on soil productivity—ignoring management's long-term effects on the productivity of the land.

Appendix A of the Soil Report discloses FS estimate of DSC for proposed units. However, there is no estimation of cumulative activity area DSC as a result of project activities. This violates NFMA and NEPA.

Please disclose that your Soil Quality Standards (SQS) are merely a mitigation of unavoidable soil damage, and have little basis in sustained yield or sustaining soil and land productivity. Detrimental soil disturbance (DSD) is merely a proxy for soil productivity. There is no science to validate the SQS methodology for use as a soil productivity proxy. The SQS definition of DSD considers only alterations to physical properties, but not chemical or biological properties, which is inconsistent with best available science.

The EA states, "Detrimental soil conditions would increase to thresholds that are below regional and forest plan soil quality standards." The regional standards include "Design new activities that do not exceed detrimental soil conditions on more than 20 percent of an activity area." How did the FS define an "activity area" for the purposes of this project? Is the whole project area the sole "activity area"?

USDA Forest Service, 2016a admits that there's no strong empirical connection between what FS Soil Quality Standards (SQS) focus on as a proxy (detrimental soil disturbance) for what NFMA requires (maintaining productivity). USDA Forest Service, 2016a also acknowledges therefore the FS can't really address its commitments for "sustained yield." It also admits that ripping for soil compaction mitigation isn't necessarily best available science: "A compacted soil will not be 100% mitigated immediately after shallow ripping. It takes time for soil processes to become re-established and native vegetation to reclaim a site. Indirect effects noted above of accelerated soil erosion or noxious weed infestations have the potential to derail the entire land restoration process."

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 "…coordinated management of resources without impairment of the productivity of the land" and in the Forest and Rangeland Renewable Resources Act "…substantial and permanent impairment of productivity must be avoided".
>
> 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 "quality of the soil" 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.**
>
> 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 – 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 "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" (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.

A FS report by Grier et al., 1989 adopted as a measure of soil productivity: "the total amount of plant material produced by a forest per unit area per year." They cite a study finding "a 43-percent reduction in seedling height growth in the Pacific Northwest on primary skid trails relative to uncompacted areas" for example. And in another FS report, Adams and Froehlich (1981) state:

> 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.

Detrimental soil compaction cannot be determined by mere visual observations. Kuennen, et al., 1979 discovered that although "the most significant increase in compaction occurred at a depth of 4 inches… some sites showed that maximum compaction occurred at a depth of 8 inches… Furthermore, ... subsurface compaction occurred in glacial deposits to a depth of at least 16 inches."

Cullen et al. (1991) concluded: (M)ost compaction occurs during the first and second passage of equipment." Page-Dumroese (1993), investigating logging impacts on volcanic ash-influenced soil in the IPNF, stated: "Moderate compaction was achieved by driving a Grappler log carrier over the plots twice." Page-Dumroese (1993) also cited other studies that indicated "Large increases in bulk density have been reported to a depth of about 5 cm with the first vehicle pass over the soil." Williamson and Neilsen (2000) assessed change in soil bulk density with number of passes and found 62% of the compaction to the surface 10cm came 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. Adams and Froehlich (1981) state, "(L)ittle research has yet been done to compare the compaction and related impacts caused by low-pressure and by conventional logging vehicles."

Soil productivity can only be protected if it turns out that the soil standards work. To determine if they work, the FS would have to undertake objective, scientifically sound measurements of what the soil produces (grows) following management activities. But the FS has never done this on the CNF.

The Forest Plan includes the following monitoring requirement designed to determine if logging meets Forest Plan standards:

MONITORING ITEM	ACTIONS/EFFECT	UNITS	VARIABILITY THRESHOLD	SUGGESTED METHODS	WHO WILL MONITOR	FREQUENCY
SOIL Changes in soil productivity.	To determine if soil management and conservation practices are being implemented and to assess their effectiveness.	Percentage of detrimental soil disturbance and/or vegetative recovery or growth loss. Amount of organic matter retained in harvest units.	Minimum of 80% of an activity area will be left in a non-detrimental impacted state following a soil disturbing activity.	Field reviews, transects, soil sampling, photopoints.	Watershed Staff	Annual review of one project per district, quantitative sampling of at least one project every two years.

Since the CNF gave up the practice of following through on required Forest Plan monitoring commitments almost as soon as the ink was dry on its Forest Plan, the FS has nothing to support the Boulder Park EA's assumption that the Forest Plan or R-6 standards would be met following project activities.

Note that the Forest Plan monitoring requirement for Soil is to assess "Changes in soil productivity." DN Appendix B admits, "There is no study that quantifies soil production changes within the boundary of the Colville National Forest."

NEPA requires the FS to specify the effectiveness of its mitigations. (40 C.F.R. 1502.16.) The Boulder Park EA fails to specify the effectiveness of its soil damage mitigations. There is no

quantitative monitoring data that demonstrates DSC remediation actions have taken CNF activity areas with DSC amounts violating the standard to a level that complies with the standard.

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, "It is acknowledged that the effectiveness of soil restoration treatments may be low, often less than 50 percent." (P.3.5-20.)

USDA Forest Service, 2005b states, "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." (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 Boulder Park EA 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.)

Then there is the issue of the reliability and validity of the soil survey methods used by the FS in this instance. 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.
>
> …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[13]) 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.)

The EA doesn't provide enough detail to indicate the thoroughness of the surveys, including whether all sources of DSD were inventoried. The and EA do not disclose the accuracy of the utilized proxy substituting for soil bulk density measures required under the Region 6 soil quality standards:

> **Detrimental Compaction** – An increase in soil bulk density of 20 percent or more over an undisturbed level in volcanic ash soils or an increase in soil bulk density of 15 percent or more over an undisturbed level in other soil textures.

DN Appendix B states "Bulk density sampling is not required by Forest Plan or Regional Soil Quality Standards," which entirely ignores the requirements we state immediately above. In fact the project Soils Report states: "The desired condition is …Soils should have bulk densities within 20% of natural occurring densities for proper hydrologic function and soil productivity (tree root function). …These conditions should be maintained across a landscape to maintain and support ecological and watershed function."

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).

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. Merely used a spade for 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.

Craigg and Howes (in Page-Dumroese, et al. 2007) state:

[13] Detrimental Soil Disturbance (DSD) is equivalent to Detrimental Soil Conditions (DSC).

> 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).

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

Amaranthus, Trappe, and Molina (in Perry, et al., 1989a) recognize "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."

The rationale for which acres covered by roads to be included as DSC within activity areas appears to be applied arbitrarily. It's not clear that the amount of DSC attributable to livestock grazing, temporary roads, unauthorized roads, and landings was included in activity area calculations as required.

Finally, the soil survey methods are not fully described. There is no analysis of soil bulk density—the index necessary to determine detrimental soil compaction as per the R-6 standards. Detrimental soil compaction cannot be determined by mere visual observations. Kuennen, et al., 1979 discovered that although "the most significant increase in compaction occurred at a depth of 4 inches… some sites showed that maximum compaction occurred at a depth of 8 inches… Furthermore, ... subsurface compaction occurred in glacial deposits to a depth of at least 16 inches."

The EA also fails to disclose the areal extent of DSC in any area **outside of** project activity areas. The EA therefore fails to adequately address these cumulative effects.

Management requirements in the Forest Service Manual at 2520, R6 Supplement 2500-98-1, (which the FS mostly fails to cite and demonstrate compliance with) include:

> Use soil quality standards to guide the selection and design of management practices and prescriptions on a watershed scale. **Evaluate existing soil conditions on all ownerships within the watershed** and **consider cumulative effects** with the addition of proposed actions **on** ecosystem sustainability and **hydrologic function**. On a planned activity area, evaluate existing soil conditions and design activities to meet soil quality standards. Document adjustments to management practices, soil conservation practices or restoration techniques necessary to **meet threshold values for the affected soil properties and watershed conditions.** (Emphasis added.)

But no matter how compacted the soils are outside the proposed activity areas, the fact that reduced water infiltration in those other locations is contributing to increased water yield and erosion during storm events—so what? And if the previous logging in those other locations resulted in a scarcity of legacy wood that, if present, would be incorporated into the soil and hold water and transmit nutrients for the next generation's timber stand—so what?

And if those previously disturbed areas outside the proposed activity areas have become prime growing sites for noxious weeds—many species of which are adapted well to damaged, disturbed sites and some of which actively inhibit native vegetation from recovering and therefore the sites exhibit reduced productivity—so what?

Elsewhere the FS recognizes that amounts of soil compaction and other measures of DSD across a watershed accumulates over space and time to harm watersheds. From USDA Forest Service, 2008f:

> Many indirect effects are possible if soils are detrimentally-disturbed… 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.

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.

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 FS (USDA Forest Service, 2007c) acknowledges 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.)

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.

…**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.)

Please provide an analysis of the hydrological implications of the cumulative soil damage caused by past management added to timber sale-induced damage in project area watersheds. Kootenai NF hydrologist Johnson, 1995 noted this effect from reading the scientific literature: "Studies by Dennis Harr have consistently pointed out the effects compacted surfaces (roads, skid trails, landings, and firelines) on peak flows." Elevated peak flows harm streams and rivers by increasing both bedload and suspended sediment are effects to be analyzed in a watershed analysis.

Harr, 1987 rejects absolute thresholds for making determinations of significant vs nonsignificant levels of soil compaction in watersheds, but nevertheless he does refer to his experience as noted above by Johnson, 1995. Harr, 1987 states:

…a curvilinear relation between amount of compaction and increased flow is shown.

Numerous plans, guidelines, and environmental impact statements have related the predicted amount of soil compaction to a defined threshold of compaction totalling 12 percent of watershed area. …The 12 percent figure is arbitrary. Flow changes at lesser amounts of compaction may also cause adverse impacts. …Without reference to the stream channels in question, we cannot arbitrarily say nothing will happen until the mythical 12 percent figure is surpassed.

In some watersheds, compaction was determined from postlogging surveys, but in others, compaction was taken as the area in roads (including cut and fill surfaces), landings, and skid trails.

The FS has at times even quantified past DSD across watersheds of various sizes. USDA Forest Service 2005d states:

> **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. … 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.
>
> …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. (Emphasis added.)

We object to the FS's failure to incorporate the best available science and to have the full extent of soil restoration needs in project area watersheds made known. USDA Forest Service, 2009c states, in regards to project area sites where DSC soils were not to be restored by active management: "For the …severely disturbed sites,… "no action" …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." (Emphasis added.)

USDA Forest Service 2014a states:

> Management activities can result in both direct and indirect effects on soil resources. Direct and indirect effects may include alterations to **physical, chemical, and/or biological properties.** Physical properties of concern include structure, density, porosity, infiltration, permeability, water holding capacity, depth to water table, surface horizon thickness, and organic matter size, quantity, and distribution. Chemical properties include changes in nutrient cycling and availability. Biological concerns commonly include abundance, distribution, and productivity of the many plants, animals, microorganisms that live in and on the soil and organic detritus.

The soil standards employed by the FS focus only on physical properties, having no nondiscretionary mandates to quantify chemical or biological properties. 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.)

Castello et al. (1995) state:

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

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

The scientists involved in research on ectomycorrhizal networks have discovered connectedness, communication, and cooperation between what we traditionally consider to be separate organisms. Such a phenomenon is usually studied within single organisms, such as the interconnections in humans among neurons, sense organs, glands, muscles, other organs, etc. so necessary for individual survival. The EA does not consider the ecosystem impacts from industrial management activities on this mycorrhizal network—or even acknowledge they exist. The industrial forestry management paradigm is unfortunately destroying what it fails to recognize.

The Ninth Circuit, in *Lands Council v. Powell*, is a case where the FS proposed more logging in a watershed that was no longer properly functioning because of the effects of past logging. As the Court noted in that case, "(c)umulative effects analysis requires the (EIS) to analyze the impact of a proposed project in light of that project's interaction with the effects of past, current, and reasonably foreseeable projects… (Here) there is no discussion of the connection between individual harvests and the prior environmental harms from those harvests that the Forest Service now acknowledges." (Id., at 1027.) The same failure of analysis for soil productivity is evident with the Boulder Park EA.

Further compromising soil productivity in the CNF is the failure to adequately address the spread of noxious weeds, which have the potential effect of reducing site productivity by replacing natural vegetation and competing with same for soil nutrients, moisture, etc. The impacts of invasive plants and/or noxious weeds represent another potential cumulative impact on the productivity of a site that is not accounted for by the Soil Standards. From an ecological standpoint, this is nonsensical, since soil disturbance often provides the opportunity invasive plant species take advantage of to first become established on a site, with the effect of displacing native plant species important to the ecology of the area. These unwelcome plants divert the productive potential of the soil at a given site to the production of vegetative biomass that native wildlife may not be able to utilize.

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

USDA Forest Service, 2015a indicates:

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

The FS has no idea how the productivity of the land been affected in the Project area and forestwide due to noxious weed infestations, nor how that situation is expected to change. In response to comments DN Appendix B states, "This kind of data is not collected, we operate on a 'desirable accomplishment of acres treated for a season…" In other words, it doesn't matter if the weed treatments are really effective, or how much taxpayer money is wasted—all that matter is that FS decisionmakers are not accountable.

USDA Forest Service, 2005c states:

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

In focusing only on its DSC proxy, the FS avoids quantifying logging-induced losses in **soil productivity**, potentially leading to serious long-term reduction in tree growth.

The very concept of "sustained yield" is based on the ability of the land to sustain tree growth in perpetuity. Since the FS has failed to quantify permanent impairment of the soil forestwide as well as within the project area, any assumption of "sustained yield" is unfounded, the project is inconsistent with the Forest Plan Soil Standard 1(a) requirement that "National Forest System lands will be managed under the principles of multiple use and sustained yield without permanent impairment of land productivity." In sum, the FS's regulatory mechanism for complying with NFMA is a failure.

Has the FS conducted measures of soil bulk density in the project area?

The SQS definition of detrimental soil disturbance considers only alterations to physical properties, but not chemical or biological properties. This is inconsistent with best available science.

One of these biological properties is represented by naturally occurring organic debris from dead trees. The SQS recognize the importance of limiting the ecological damage that logging causes due to retaining inadequate amounts of large woody debris, but set no quantitative limits on such losses caused by logging and slash burning. And the EA doesn't disclose or analyze the levels of large woody debris anywhere in the project area following past management activities, consistent with its refusal to examine any effects.

USDA Forest Service, 2007 states:

> Sustained yield was defined in the Kootenai Forest Plan …as "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." Sustained yield is based on the capacity of the lands ability to produce resources.

That statement is on point: Since the FS has no idea how much soil has been permanently impaired either within the project area or forestwide, "sustained yield" is an empty promise. There continues to be a lack of adequate regulatory mechanisms for protecting soil productivity on the Colville NF, as advocated for by Lacy (2001). The FS has no idea how much soil has been permanently impaired either within the Boulder Park project area or forestwide. The FS lacks adequate regulatory mechanisms for protecting soil productivity on the Forest.

Continual and repeated application of projects, hardly limited by the Region 6 standards, will result in soils maintained at a damaged condition essentially forever. The FS has no quantitative data or inventory of the continuous deficit of soil or land productivity. To the U.S. Department of Agriculture, apparently soil productivity of national forests hardly matters.

The FS's soil proxy—its assertion that up to 20% of an activity area having long-term damage is consistent with NMFA and regulations—is arbitrary. The Boulder Park EA does not cite the scientific basis for adopting its percent numerical limits.

The FS has no idea how the productivity of the land been affected in the Boulder Park project area and forestwide due to noxious weed infestations, nor how that situation is expected to change.

The Boulder Park EA fails to consider the hydrological implications of the cumulative soil damage caused by past management added to the proposed timber sale-induced damage in project area watersheds.

If there exists some study that quantifies Colville NF changes in soil productivity due to past management activities, please cite it in response to these comments.

The Boulder Park EA also fails to consider and use the best available science, in violation of NFMA and additionally, NEPA's requirements that NEPA documents demonstrate scientific integrity. *See* 36 C.F.R. 219.3; 40 C.F.R. 1502.24.

Remedy: Choose the No Action Alternative. In any case, before preparing an EIS for the Boulder Park project, finish the ongoing process of revising the Forest Plan to create soil standards based on the best available science that set measurable, quantitative limits on changes to physical, chemical and biological properties of soils, and also set measurable, quantitative limits on reductions of soil productivity.

- Explain how the soil survey data translate to determinations of the amount of DSC in each activity area.
- Disclose the amount of statistical error that exists for each type of DSC measurement and each type of DSC estimation, providing a statistically sound explanation how accurate those values are, and disclosing the percentage error expected of the existing and estimated values for DSC, and disclosing the odds of each activity area meeting the 20% DSC standard based on the particulars of each unit and logging plan.
- Disclose the cumulative level of DSC over all acres of the project area caused by past management. Disclose these numbers for each subwatershed.
- Disclose the link between current and cumulative soil DSC in project area watersheds to the current and cumulative impacts on water quantity and quality, incorporating the best available science.
- Disclose the full extent of soil restoration needs in these watersheds made known.

NOXIOUS WEEDS

This issue was raised in UCRG/AWR EA comments at pp. 5, 21-23.

Project activities will worsen the noxious weed spread in the project area, and even if post-disturbance treatments are implemented, their uncertain efficacy means that the project will significantly increase noxious weed occurrence.

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

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

The FS fails to present any numerical estimate of noxious weed infestations in the project area. There appears to be no on-the-ground survey data.

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

The EA has no accurate numerical estimate of noxious weed infestations in the project area. Is there recent on-the-ground survey data? What is the forestwide trend in noxious weed infestation, in acres or any meaningful metric?

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

Remedy: Select the No Action Alternative. Otherwise, prepare an EIS that addresses the analytical and scientific issues identified in EA comments and in above discussions.

CUMULATIVE EFFECTS

This issue was raised in UCRG/AWR EA comments at pp. 20, also throughout our comment letters.

The Boulder Park EA states, "This EA incorporates the forest plan by reference and is tiered to the forest plan's final environmental impact statement (USDA Forest Service 1988)." However 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.

In response to our comments pointing out the FS's failure to monitor (and therefore be informed by the impacts of past management), the DN Appendix B brushes off the comment stating, "Forest-wide monitoring of MIS is beyond the scope of the Boulder Park analysis."

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

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

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

Those items are a critical part of the NEPA analysis. Without this critical link the validity of many FS assumptions are baseless. Without analyzing the accuracy and validity of the assumptions used in previous NEPA processes one has no way to judge the accuracy and validity of the current proposal. The predictions made in previous NEPA processes also need to be disclosed and analyzed because if these were inaccurate, and the agency is making similar decisions, then the process will lead to failure. For instance, if for previous projects the FS said they were going to do a certain monitoring plan or implement a certain type of management and these were never effectively implemented or monitored, it is important for the public and the

decision maker to know. If there have been problems with FS implementation or monitoring in the past, it is not logical to assume that implementation will now all of a sudden be appropriate. If prior logging, prescribed fire and other "forest health" or "fuel" treatments have not been monitored appropriately, then there is no valid justification for this project.

In 2016, the FS required AWR to file a Freedom of Information Act (FOIA) request in order to receive the Forest Plan-required annual monitoring reports. The FS then added the reports to the CNF website in response, revealing a complete absence of reporting from 2003 – 2011.

In response to public comments on the North Fork Mill Creek A to Z project regarding the absence of any reference to forest plan monitoring and evaluation reports as part of the NEPA process, the FS tacitly admitted they have dropped the ball in that regard: "Although no previous Monitoring & Evaluation Reports were identified for previous Forest Service timber sales in the Project area, the analysis is based on the existing condition; anything done previously would be part of the existing condition." Given the unsatisfactory ecological conditions of forests, streams, and soils in the A to Z project area, and in light of that FS statement, it can be presumed that continuing implementation of the Forest Plan (that is, "anything done previously") is cumulatively having unanticipated, significant adverse environmental impacts on forest resources.

The near total absence of required Forest Plan implementation monitoring, together with the failure to undertake the kind of hard look under NEPA at the project level that can only be accomplished with an EIS, makes it impossible for the public to gauge the cumulative impacts of this latest timber sale in our Colville National Forest.

The EA also fails to take a hard look at cumulative effects on wildlife from activities in adjacent areas.

The analysis area is incorrectly delineated

The analysis area is purposely truncated to cover only USFS lands in the Tacoma and Cusick Ck. Watersheds. The USFS first proposed to use HRV that was developed for the area only on USFS lands. They then added private timber lands in the analysis area when goaded by publics in one of their information meetings. The analysis area is not ecosystem based, neither is it watershed based, excluding the lower reaches of Tacoma and Cusick Creeks and smaller watersheds that drain into the Pend Oreille River. Not including the deforested portions of the watersheds allows the USFS to cut more timber on our public property based on proportions. The image (Illustration 1) below shows watersheds that should be used in the cumulative effects analysis, both for hydrology, fisheries, wildlife and other resources. The extensive amount of deforestation on private timber lands in the original analysis area is also evident.

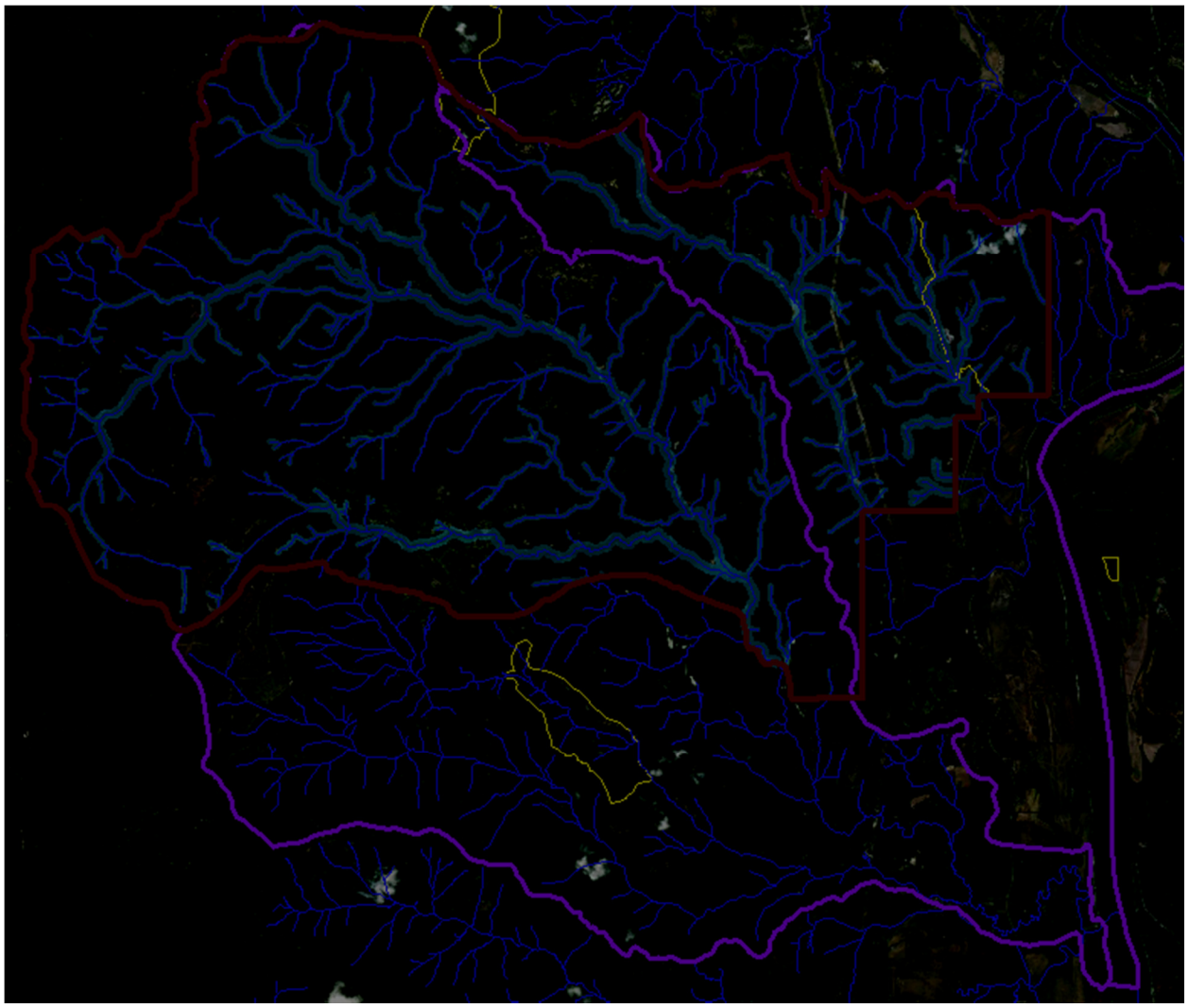

Illustration 1: Watershed based analysis, the red outline is the proposed analysis area, the purple outline includes most of the Tacoma and Cusick Ck. watersheds and illustrates the deforested private lands near the Pend Oreille River.

SCIENTIFIC INTEGRITY; ALSO DEFICIENCIES OF DATA AND MODELS USED FOR EA ANALYSES

This issue was raised in UCRG/AWR EA comments at pp. 39. Within this section of the Objection, we incorporate the corresponding sections (with the identical heading) of our April 4, 2016 Objection of the North Fork Mill Creek A to Z project draft Decision Notice and our May 1, 2017 Objection of the Middle and South Fork Mill Creek A to Z Project draft Decision Notice.

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.

Because Boulder Park EA analyses rely upon data, the reliability of that data is of utmost importance. When the data is inaccurate or otherwise unreliable, then the analyses based upon that data are likewise inaccurate and unreliable. Furthermore, when inaccurate or unreliable data is used as input through a model, then it wouldn't matter if it was the best model in the world—the output would not be valid, and bad or uninformed decisions are a likely result.

In sum, the Boulder Park EA fails to demonstrate the reliability of the data used for its analyses; fails to demonstrate the validity of its models, fails to apply any established scientific standard for determining best available science, and fails to disclose the limitations of its models and other analysis methodology.

The FS has not undertaken the task of determine the reliability of all the data used as input for the models used in the Boulder Park analyses. Since "an instrument's data must be reliable if they are valid" (Huck, 2000) this means data input to models must accurately measure that aspect of the world it is claimed to measure, or else the data is invalid for use by that model. Huck, 2000 states:

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

Beck and Suring, 2011 "remind practitioners that if available data are poor quality or fail to adequately describe variables critical to the habitat requirements of a species, then only poor quality outputs will result. Thus, obtaining quality input data is paramount in modeling activities."

Data sources must be of high reliability. The document, "USDA-Objectivity of Statistical and Financial Information" is instructional on this topic.

Larson et al. 2011 state:

> Although the presence of sampling error in habitat attribute data gathered in the field is well known, the measurement error associated with remotely sensed data and other GIS databases may not be as widely appreciated.

During litigation of a timber sale on the Kootenai NF, the FS criticized a report provided by Plaintiffs, stating "(Its) purported 'statistical analysis' reports no confidence intervals, standard deviations or standard errors in association with its conclusions."

As Huck (2000) states, the issue of "standard deviations or standard errors" that the FS raised in the context of 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 observations of the same thing must result in numbers that are very similar to result in small "standard deviations or standard errors" and thus high reliability coefficients, which in turn provide the public and decisionmakers with an idea of how confident they can be in the conclusions drawn from the data.

The next level of scientific integrity is the notion of "validity." As Huck, (2000) explains, the degree of "content validity," or accuracy of the model or methodology is established by utilizing other experts. This, in turn, demonstrates the necessity for utilizing the peer review process. The validity of the various models utilized in the Boulder Park 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.

So even if FS data input to a model is reliable, that still leaves open the question of model validity. In other words, are the models scientifically appropriate for the uses for which the Forest Service is utilizing them? The Nez Perce-Clearwater NF's 2015 Clear Creek FEIS defines "Model" as "A theoretical projection in detail of a possible system of natural resource relationships. A simulation based on an empirical calculation to set potential or outputs of a proposed action or actions." (G-14.)

From www.thefreedictionary.com :

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

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

However, there is no evidence that the FS has performed validation of the models for the way they were used to support the Boulder Park EA analyses. There is no documentation of someone using observation or experiment to support the models' inherent hypotheses. Ziemer and Lisle, 1993 state: "For any model or evaluation procedure, independent verification is essential. First, individual modules must be tested by comparing predicted and measured values under a variety of field conditions at differing sites. Then, functioning of the entire model must be evaluated under a wide array of field conditions. Finding an adequate model verification program is rare; however, finding unverified model predictions for important management and policy decisions is common."

The validity of habitat and other modeling utilized in land management plan development and the quality of scientific research are important topics. The documents, "USDA-Objectivity of Regulatory Information" and USDA-Objectivity of Scientific Research Information are instructional on this topic.

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

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).

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

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

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

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

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

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

Beck and Suring, 2011 state:

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

Larson et al. 2011 state:

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

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

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

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

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

> The Forest Service is comprised of three major branches: the National Forest System (managers and policy makers for National Forests and National Grasslands), Research and Development (scientists chartered to address issues in natural resource management for

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

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

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

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

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

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

Sullivan et al. 2006 contrast peer-reviewed literature with gray literature which:

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

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

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

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

> Often, scientific and political communities differ in their definition of best available science and opposing factions misrepresent the concept to support particular ideological positions. Ideally, each policy decision would include all the relevant facts and all parties would be fully aware of the consequences of a decision. But economic, social, and scientific limitations often force decisions to be based on limited scientific information, leaving policymaking open to uncertainty.
>
> The American Fisheries Society and the Estuarine Research Federation established this committee to consider what determines the best available science and how it might be used to formulate natural resource policies and shape management actions. The report examines how scientists and nonscientists perceive science, what factors affect the quality and use of science, and how changing technology influences the availability of science. Because the issues surrounding the definition of best available science surface when managers and policymakers interpret and use science, this report also will consider the interface between science and policy and explore what scientists, policymakers, and managers should consider when implementing science through decision making.
>
> As part of their implicit contract with society, environmental scientists are obliged to communicate their knowledge widely to facilitate informed decision making (Lubchenco 1998). For nonscientists to use that knowledge effectively and fairly, they must also understand the multifaceted scientific process that produces it.
>
> Science is a dynamic process that adapts to the evolving philosophies of its practitioners and to the shifting demands of the society it serves. Unfortunately, these dynamics are

> often controversial for both the scientific community and the public. To see how such controversies affect science, note that over the last decade nonscientists have exerted increasing influence on how science is conducted and how it is applied to environmental policy. Many observers find this trend alarming, as evidenced by several expositions titled "science under siege" (e.g., Wilkinson 1998; Trachtman and Perrucci 2000).
>
> To achieve high-quality science, scientists conduct their studies using what is known as the scientific process, which typically includes the following elements:
>
> 4. A clear statement of objectives;
> 5. A conceptual model, which is a framework for characterizing systems, stating assumptions, making predictions, and testing hypotheses;
> 6. A good experimental design and a standardized method for collecting data;
> 7. Statistical rigor and sound logic for analysis and interpretation;
> 8. Clear documentation of methods, results, and conclusions; and
> 9. Peer review.

The Committee of Scientists (1999) state:

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

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

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

The Boulder Park EA and supporting reports do not conform to NEPA because the FS has not insured the reliability of data relied upon by the models, and the FS has not validated the models for the way the FS utilizes them. The Ninth Circuit Court of Appeals has declared that the FS must disclose the limitations of its models in order to comply with NEPA. However, the FS has failed to disclose these limitations.

The FS has not undertaken the process of a Science Consistency Review for the Forest Plan or for the DEIS's conclusions (Guldin et al., 2003, 2003b.) Guldin et al., 2003 state:

> ...outlines a process called the science consistency review, which can be used to evaluate the use of scientific information in land management decisions. Developed with specific reference to land management decisions in the U.S. Department of Agriculture Forest Service, the process involves assembling a team of reviewers under a review administrator

> to constructively criticize draft analysis and decision documents. Reviews are then forwarded to the responsible official, whose team of technical experts may revise the draft documents in response to reviewer concerns. The process is designed to proceed iteratively until reviewers are satisfied that key elements are **consistent with available scientific information.**

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

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

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

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

NEPA regulations at 40 CFR § 1502.24 state, under **Methodology and scientific accuracy**: "Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." The Boulder Park EA violates NEPA in terms of methodology, scientific accuracy, and scientific integrity.

Remedy: Choose the No Action Alternative. Finish the ongoing process of revising the Forest Plan before preparing an EIS for the Boulder Park project which properly establishes the reliability of data relied upon by the EIS, and only uses model methodology that have been validated by independent peer review for the way the EIS's analyses utilize them.

SENSITIVE PLANTS

This issue was raised in UCRG/AWR EA comments at p. 19.

"Of the five occurrences of sensitive species documented from the project area, two are located within proposed treatment units and one is directly adjacent to a unit." The Boulder Park EA does not explain how implementation of the intensive industrial management actions can be carried out without extirpating Sensitive plant species. Surveys have apparently not been conducted in all potential habitat.

"Proposed activities could add cumulative impacts to the current populations of (Sensitive plants)…" (EA at 36.) What about direct and indirect impacts (NEPA)?

The EA mentions "approximately five acres of precommercial thinning which is intended to benefit whitebark pine." The EA does not cite any science to support the proposed management actions regarding Whitebark Pine.

Remedy: Choose the No Action Alternative.

CUMULATIVE EFFECTS OF LIVESTOCK GRAZING

This issue was raised in UCRG/AWR EA comments at pp. 9-10.

USDA Forest Service, 2012c (CNF's Power Lake Vegetation Management Project Environmental Assessment) points out that "Cattle grazing has the potential to impact newly established regeneration from cattle trampling the seedlings or pulling them out of the ground with their teeth." USDA Forest Service 2012c also 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 does not properly analyze and disclose the impacts of livestock grazing in the project area and fails to disclose scientifically valid quantitative data of the monitoring of its livestock grazing program to validate analyses for affected resources within project area and cumulative effects analysis area.

The EA states, "Continued cattle grazing…(is) anticipated to be ongoing and reasonably foreseeable future activities." The EA states without real analysis, "the effects are small and localized effects to forest structure, stand density, and mortality trends." Yet how livestock grazing on 7,740 acres of the active allotments (and unknown acres of the inactive allotment) in the project area interacts with proposed management actions is barely touched upon in the EA. It indicates the logging will make more favorable vegetation for cattle, but says nothing about how subsequent grazing affects "desired" tree composition, density, structure, etc.

We recognize the risk and likelihood of environmental damage from past and ongoing livestock grazing in the project area, and also note the EA's failure to adequately analyze and disclose the cumulative effects of this grazing. With this failure, the FS reveals its bias for accommodating livestock interests above the needs of the general public, who deserve to have explained how the Boulder Park project activities interact synergistically and integrate with livestock grazing activities and impacts.

Beschta et al 2012 review some of the science on livestock exacerbation of climate change:

> Livestock production impacts energy and carbon cycles and globally contributes an estimated 18% to the total anthropogenic greenhouse gas (GHG) emissions (Steinfeld and others 2006). How public-land livestock contribute to these effects has received little study. Nevertheless, livestock grazing and trampling can reduce the capacity of rangeland

> vegetation and soils to sequester carbon and contribute to the loss of above- and below-ground carbon pools (e.g., Lal 2001b; Bowker and others 2012). Lal (2001a) indicated that heavy grazing over the long-term may have adverse impacts on soil organic carbon content, especially for soils of low inherent fertility. Although Gill (2007) found that grazing over 100 years or longer in subalpine areas on the Wasatch Plateau in central Utah had no significant impacts on total soil carbon, results of the study suggest that ''if temperatures warm and summer precipitation increases as is anticipated, [soils in grazed areas] may become net sources of CO2 to the atmosphere'' (Gill 2007, p. 88). Furthermore, limited soil aeration in soils compacted by livestock can stimulate production of methane, and emissions of nitrous oxide under shrub canopies may be twice the levels in nearby grasslands (Asner and others 2004). Both of these are potent GHGs.

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

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

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

Remedy: Choose the No Action Alternative.

ECONOMICS

This issue was raised in UCRG/AWR EA comments at pp. 23-24.

The Boulder Park EA claims to be a "Net Present Value" of $ 10,342,512. Yet because costs are not itemized, this difficult to believe. What is the FS committed to do with the ten million bucks it says it will earn for taxpayers on this massive timber sale?

Please identify the funding sources for all proposed non-commercial activities.

Please disclose the itemized costs for each of the following: new system roads, new temporary roads (including machine trails and excavated skid trails), project-related road maintenance, road decommissioning, all other road-related work, NEPA and associated pre-decisional costs, sale preparation and administration, project-related weed treatment, prescribed fire application, other project mitigation, post-project monitoring, environmental analyses and reports, public meetings

and field trips, publicity, consultation with other government agencies, responding to comments and objections, collaborative meetings.

The EA fails to account for fire suppression for which taxpayers are expected to foot the bill, without having any say in the matter.

Remedy: Choose the No Action Alternative.

INVENTORIED ROADLESS AREAS AND OTHER UNROADED AREAS

This issue was raised in UCRG/AWR EA comments at pp. 5, 13, 39, 77.

The Boulder Park EA fails to provide an analysis considering uninventoried roadless areas.

The Forest Plan lacks direction to update roadless area boundaries utilizing a transparent public procedures in order to evaluate unroaded areas contiguous with IRAs and Wilderness.

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

The Kootenai National Forest's Lower Yaak, O'Brien, Sheep Draft Environmental Impact Statement explains the concept of Roadless Expanse:

> Northern Region (Region 1) Direction for Roadless Area Analysis Region 1 provides additional guidance for roadless area analysis in a draft document titled "Our Approach to Roadless Area Analysis of Unroaded Lands Contiguous to Roadless Areas" (12/2/10). In summary this paper is based on court history regarding the Roadless Area Conservation Rule. The "Our Approach" document states that "projects on lands contiguous to roadless areas must analyze the environmental consequences, including irreversible and irretrievable commitment of resources on roadless area attributes, and the effects for potential designation as wilderness under the Wilderness Act of 1964. **This analysis must consider the effects to the entire roadless expanse; that is both the roadless area and the unroaded lands contiguous to the roadless area**.

(Emphasis added.) The FS must analyze and disclose impacts on the Roadless Characteristics and Wilderness Attributes of the Roadless Expanse. The public must be able to understand if the project would cause irreversible and irretrievable impacts on the suitability of any portion of Roadless Expanse for future consideration for Recommended Wilderness or for Wilderness designation under forest planning.

The FS must acknowledge the best scientific information that recognizes the high ecological integrity and functioning of roadless and unmanaged areas. Management activities have damaged the streams and other natural features found in the project area watersheds. The FS has yet to demonstrate it can extract resources in a sustainable manner in roaded areas.

Unroaded areas greater than about 1,000 acres, whether they have been inventoried or not, provide valuable natural resource attributes that are better left protected from logging and other

management activities. Scientific research on roadless area size and relative importance is ongoing. Such research acknowledges variables based upon localized ecosystem types, naturally occurring geographical and watershed boundaries, and the overall conditions within surrounding ecosystems. In areas where considerable past logging and management alterations have occurred, protecting relatively ecologically intact roadless areas even as small as 500 - 1,000 acres has been shown to be of significant ecological importance. These valuable and increasingly rare roadless area attributes include: water quality; healthy soils; fish and wildlife refugia; centers for dispersal, recolonization, and restoration of adjacent disturbed sites; reference sites for research; non-motorized, low-impact recreation; carbon sequestration; refugia that are relatively less at-risk from noxious weeds and other invasive non-native species, and many other significant values. (See Forest Service Roadless Area Conservation FEIS, November 2000.)

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

Conclusion

In closing, we incorporate AWR's May 14, 2018 comments on the Boulder Park Proposed Action and the May 2018 comments by Paul Sieracki and AWR within these comments, because most of our input was not considered in the EA. We also incorporate our Objections to the Colville NF's Middle and South Fork Mill Creek A to Z Project and North Fork Mill Creek A to Z Project for the purposes of identifying best available scientific information the FS must consider for the Boulder Park project, and for commenting on Colville NF analysis methodology for implementing its Forest Plan. For the purposes of providing the interdisciplinary team with the best available scientific information and analysis rationale, we also incorporate our written participation in the forest plan revision process, including our July 5, 2016 comments on the Draft Forest Plan, the September 14, 2011 comments on the revision Proposed Action by Jeff Juel, and our November 6, 2018 Objection.

Thank you for the opportunity to provide input. Please re-initiate the comment period on the EA for the reasons we discuss above. Better yet, proceed instead to the preparation of an EIS once the Forest Plan revision results in a decision.

It is our intention that you review the literature and other documents cited and include it in the project file. Please contact AWR if you can't find a copy of any of the references or documents. Please keep both groups as listed below on the mailing list to receive all future communications about the Boulder Park proposal.

Along with a data disk containing this Objection, we are including another disk that is a duplicate of the data disk submitted to the FS with our Objection to the revised forest plan.

Sincerely,

/s/

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