

September 14, 2018

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

Subject: OBJECTION to Orient Watershed Project

Sent via email to: objections-pnw-colville@fs.fed.us

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 2018 Orient Watershed Project Environmental Assessment (Orient EA) on the Three Rivers Ranger District, Colville National Forest (CNF). The Responsible Official is District Ranger Joshua White. This objection is filed on behalf of Objectors Upper Columbia River Group - Sierra Club and Alliance for the Wild Rockies (AWR).

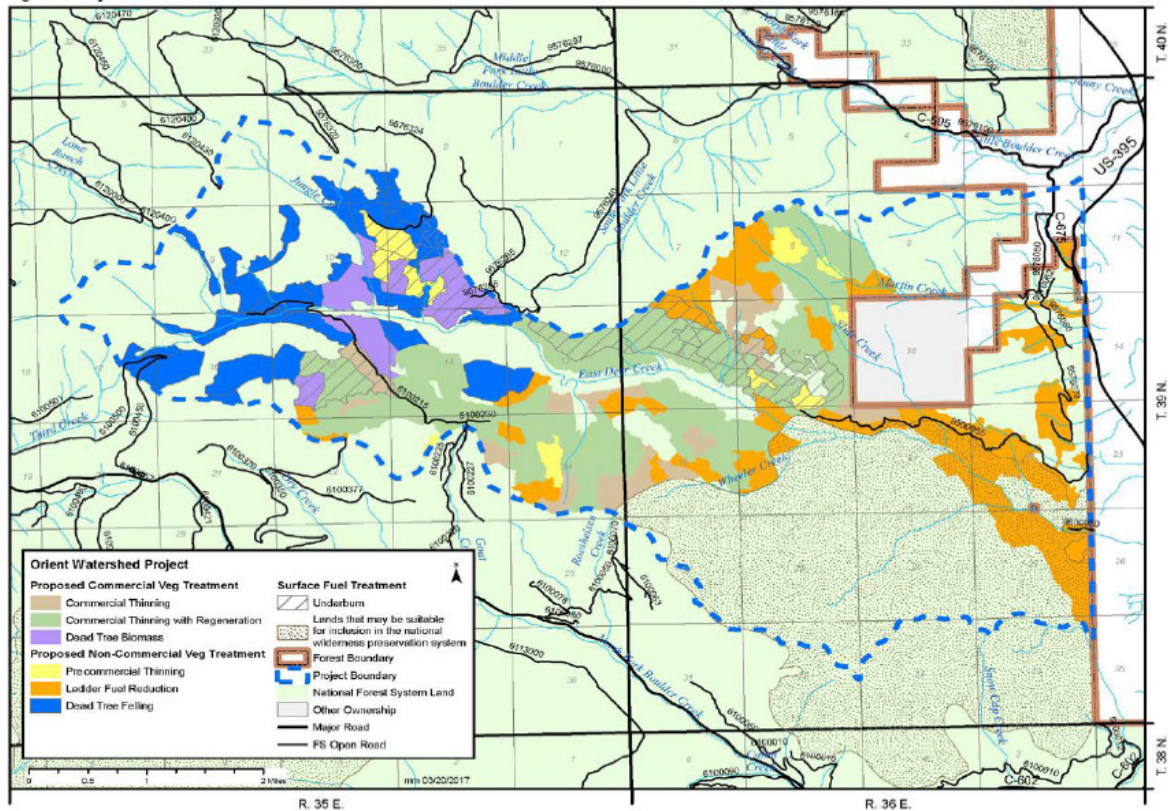
The EA states, "Table 1 lists the proposed action treatments and Figure 2 displays a map of the treatments."

Table 1. Acres of Treatments

Treatment	Proposed Action
Commercial Treatments (in acres)	
Commercial thinning	2,000
Regeneration openings	960
Dead tree biomass	440
<i>Total commercial treatment</i>	<i>3,400 acres</i>
Non-Commercial Treatments (in acres)	
Pre-commercial thinning	290
Ladder fuel reduction	4,510
Dead tree felling	1,560
<i>Total non-commercial treatments</i>	<i>6,360 acres</i>
Surface Fuel Treatments (in acres)	
Underburning	1,250
Mechanical piling and pile burning	2,920
Hand piling and pile burning	340
Lop and scatter	2,060
<i>Total surface fuel treatments</i>	<i>6,570 acres</i>

System Roads (in miles)	
Road maintenance	37.0
Road decommissioning	6.1
Road converted to trail (open to all vehicles)	1.6
Temporary Roads (in miles)	
New construction	1.0
Reconstruction on existing non-system templates	1.7
Restoration of existing non-system templates	31.1

Figure 2. Proposed Treatments



Objectors submitted a scoping comment letter dated December 23, 2016 and submitted a comment letter on the Orient EA, dated May 16, 2018. This objection incorporates those comment letters by reference. In turn, our May 16, 2018 EA comment letter incorporated by reference “Our Objections to the CNF’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 Orient Watershed project, and for commenting on CNF analysis methodology for implementing its failed Forest Plan. Also we incorporate our written

participation in the forest plan revision process, including our July 5, 2016 comments on the Draft Forest Plan and the September 14, 2011 comments on the revision Proposed Action by Jeff Juel.” And the incorporated comments on the EA for the Middle and South Fork Mill Creek A to Z Project incorporated by reference AWR’s Complaint filed in Case No. 2:16-CV-294-RMP.

Since the North Fork Mill Creek A to Z Objection and Middle and South Fork Mill Creek A to Z Objection (plus the comment letters those objections incorporated and are thus incorporated herein) were incorporated within our comments on the Orient EA, the issues under most of the headings of the Objection (below) were clearly raised in the incorporated objections, under those same identical headings.

I. ENVIRONMENTAL ASSESSMENT VIOLATES NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

We raised this issue on pp. 1 of our comments on the EA.

The Environmental Assessment (EA) does not comply with requirements of NEPA regulations for several reasons. For one, it contains no analysis or comparison of the Selected alternative with the No Action alternative. 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 EA does not conform to the regulations, nor to USDA regulations at 36 CFR § 220.

The Forest Service (FS) claims the specialist reports contain the analyses and so that’s good enough. Yet all of the specialist reports are stamped “DRAFT” in large letters on the front, for the duration of the objection period. Apparently the FS believes it is appropriate to make substantial changes after the public process is finished.

The EA includes a map of the Project Area, but doesn’t even state how large of an area it is, in acres.

An EA must include sufficient information to determine what the impacts will be. The fact that the NEPA document for this action is an EA instead of a full EIS does not excuse the FS from disclosing the environmental impacts. Because it leads to a "Finding of No Significant Impact," an EA must include sufficient information to determine what the impacts of the project will be. *Southern Oregon Citizens Against Toxic Sprays v. Clark (SOCATS)*, 720 F.2d 1475, 1480 (9th

Cir. 1983). In *SOCATS*, the government argued that section 1502 of the CEQ regulations applies only to preparation of an EIS. 720 F.2d at 1480. The court rejected that view.

In an EA an agency must "[b]riefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact," as well as "brief discussions of the need for the proposal, of alternatives as required by sec. 102(2)(E), [and] of the environmental impacts of the proposed action and alternatives." 40 C.F.R. ' 1508.9; see also 40 C.F.R. ' 1502.9(c)(1)(ii).

An EA "must support the reasonableness of the agency's decision not to prepare [an] EIS." *SOCATS*, 720 F.2d at 1480. "Were an EA simply a statement that an agency can take an action without filing an EIS, EA's would not fulfill the mandate of NEPA nor provide the decisionmaker or the public with information about the choice." *Sierra Club v. Watkins*, 808 F. Supp. 852, 871 (D.D.C. 1991). In an EA the agency must take a "hard look" at the project and its impacts, "as opposed to bald conclusions, unaided by preliminary investigation," and must "identify the relevant areas of environmental concern." *Maryland-National Capital Park and Planning Commission v. U. S. Postal Service*, 487 F.2d 1029, 1040 (D.C. Cir. 1973). The Ninth Circuit held in *Foundation for North American Wild Sheep v. U. S. Dept. of Agriculture* that the government, in an EA, "failed to take the requisite 'hard look' at the environmental consequences of its action," noting that the EA "failed to address certain crucial factors, consideration of which was essential to a truly informed decision whether or not to prepare an EIS." 681 F.2d 1172, 1178, 1179 (9th Cir. 1982). The omitted factors in *Wild Sheep* included increased traffic and impacts on bighorn sheep, and "significant questions raised by respondents to the initial draft of the EA were similarly ignored or, at best, shunted aside with mere conclusory statements." *Id.* at 1179-80. Because of these omissions, the Ninth Circuit rejected the EA. See also *Save the Yaak Committee v. Block*, 840 F.2d 714, 719 (9th Cir. 1988) (holding EA inadequate for lack of wildlife discussion).

In *SOCATS* the Ninth Circuit held:

Together, the EA and the programmatic EIS must "provide the information 'necessary reasonably to enable the decision-maker to consider the environmental factors and to make a reasoned decision.'"

720 F.2d at 1480. In *Marble Mountain*, the court again rejected this tactic of excluding discussion of environmental impacts in an EA tiered to a forest planning document, and held that such exclusion of environmental impacts violates NEPA unless the site-specific impacts were actually addressed in the broader planning documents. 914 F.2d at 182. Here, the site-specific environmental impacts were not adequately discussed in either document.

Remedy: Choose the No Action Alternative. Alternatively, prepare an EIS which conforms with NEPA.

II. CUMULATIVE EFFECTS WITH OTHER MANAGEMENT ACTIVITIES ARE NOT PROPERLY ANALYZED AND DISCLOSED.

We raised the issue of inadequate analyses of cumulative effects in our EA comments (pp. 9, 10, 13, 14, 17, 18). Within this section of the Objection, we incorporate the corresponding sections (with the identical headings) 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. Herein we also incorporate the section of this Objection entitled “FOREST PLAN IMPLEMENTATION MONITORING.”

NEPA regulations at 40 CFR § 1508.25 state:

To determine the scope of environmental impact statements, agencies shall consider

- (a) Actions (other than unconnected single actions) which may be:
 - (2) Cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement.
 - (3) Similar actions, which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography. An agency may wish to analyze these actions in the same impact statement. It should do so when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact statement.
- (c) Impacts, which may be: (1) Direct; (2) indirect; (3) cumulative.

NEPA regulations at 40 CFR § 1508.7 define “Cumulative impact as:

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

The Orient EA and specialists reports do not adequately analyze or disclose the impacts of reasonably foreseeable activities in the project area, only listing them in the EA.

The Orient EA and specialists reports do not consider how the context of the surrounding forest conditions are relevant to the project’s purpose and need.

NEPA regulations at 40 CFR § 1508.7 define “Cumulative impact as:

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

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 Orient EA violates NEPA in terms of methodology, scientific accuracy, scientific integrity, and failure to properly analyze and disclose cumulative effects.

Remedy: Choose the No Action Alternative. Alternatively, prepare an EIS which fully analyzes and discloses cumulative impacts as required by NEPA.

III. ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANCE (FONSI) ARE INAPPROPRIATE.

Within this section of the Objection, we incorporate the corresponding sections (with the identical headings) 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. Herein we also incorporate the section of this Objection entitled “FOREST PLAN IMPLEMENTATION MONITORING.”

As we point out in Section I of this objection, the EA fails to include sufficient analysis to support a FONSI.

The FS gave up the practice of following through on required CNF Forest Plan monitoring commitments shortly after adopting the Forest Plan. The purpose of monitoring implementation of the Forest Plan is to understand cumulative impacts of management activities. The lack of Forest Plan monitoring means the FS must compensate in project analyses, but reviewing the Orient EA reveals this hasn’t happened.

The Orient EA violates NEPA in terms of methodology, scientific accuracy, scientific integrity, and failure to properly analyze and disclose cumulative effects.

Remedy: Choose the No Action Alternative. Alternatively, finish the ongoing process of revising the Forest Plan before preparing an EIS for the Orient project that properly analyzes and discloses the direct, indirect, and cumulative impacts occurring within the appropriate cumulative effects analysis areas.

IV. CUMULATIVE EFFECTS OF LIVESTOCK GRAZING WERE NOT ADEQUATELY ANALYZED

We raised this issue on pp. 7, 12, and 17 of our EA comments. Within this section of the Objection, we incorporate the corresponding sections (with the identical headings) 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. Herein we also incorporate the section of this Objection entitled “FOREST PLAN IMPLEMENTATION MONITORING.” We also incorporate the Declaration of Katie Fite in Case No. 2:16-CV-294-RMP.

The Orient EA does not properly analyze and disclose the impacts of livestock grazing in the project area and fails to disclose scientifically valid quantitative monitoring data to validate analyses for affected resources within project area and cumulative effects analysis area. The Orient EA violates the NEPA and the National Forest Management Act (NFMA).

The Range Report states, “Unfortunately, since many of the harvested units included riparian and wet areas, livestock access and use has resulted in areas where resource impacts such as streambank trampling have occurred.” However that is about as detailed as it gets. Most of the Range Report is concerning how Orient project activities impact grazing operations—not how grazing operations create cumulative effects on the environment.

The Range Report describes “Required Monitoring” including: “Compliance inspections to insure livestock management is occurring in accordance with the Term Grazing Permits and the official direction for grazing rotations allocated by the line officer to ensure livestock drift is not occurring, pasture rotations are obtainable and livestock management is consistent with historic use as a result of the Orient Watershed Project implementation.” However nothing in the Range Report or EA actually report on the results of such ongoing monitoring. Cumulative effects cannot be determined if monitoring isn’t conducted, or if it is being conducted, the information isn’t included in a genuine analysis.

The Range Report indicates there are 7,349 livestock allotment acres in the project area. The Soil Report states, “Livestock trails were observed throughout the planning area and within some proposed treatment units. Monitoring indicates that grazing allotments add 1 to 2 percent detrimental soil conditions typically concentrated in livestock trailing and meadows/wetlands.”

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.)

Our North Fork A to Z and our Middle-South A to Z comments and Objections cite scientific studies documenting significant cumulative effects of livestock grazing on forest conditions,

science the FS fails to consider in the Orient EA. (Also see the incorporated Katie Fite Declaration.)

The Orient EA and specialist reports do not disclose the monitoring results of the grazing operations as prescribed in national forest allotment decisions and NEPA documents.

The Orient EA and specialist reports do not adequately disclose the amount of direct, indirect or cumulative effects regarding site-specific damage caused by cattle grazing within the cumulative effects area on state, private and national forest ground, as NEPA requires.

No site specific description of the impairment of the affected streams and riparian area are disclosed in the Orient EA and specialist reports.

Much proposed logging is in close proximity to streams. The existing and the proposed new roads that will access these units will also facilitate cattle access to the headwaters of these streams. Access by cattle and the damage they cause to these headwater streams could result in adding significant amounts of sediment resulting in unfavorable width depth ratios that could lead to warming of the affected headwater streams. This potential adverse effect to the streams and fisheries is not considered in the Orient EA and specialist reports.

The following are Forest Plan monitoring requirements that the CNF has routinely ignored forestwide:

1. Annual Report on compliance with AUM restrictions
2. Annual Review of compliance with range-improvement schedule
3. Annual Report on utilization of forage
4. Monitor Conditions of Riparian and Range resources on 10% of allotments every year.
5. Results of monitoring will be incorporated in annual operating plans and Allotment Management Plans

NEPA regulations at 40 CFR § 1508.7 define “Cumulative impact as:

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

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 Middle-South EA violates NEPA in terms of methodology, scientific accuracy, scientific integrity, and failure to properly analyze and disclose cumulative effects.

Remedy: Choose the No Action Alternative. In any case, finish the ongoing process of revising the Forest Plan before preparing an EIS for the Orient project which properly analyzes and discloses the direct, indirect, and cumulative impacts from livestock grazing.

V. EA'S WILDLIFE AND DIVERSITY PROTECTIONS ARE NONFUNCTIONAL AND INCONSISTENT WITH LAW, REGULATIONS, FOREST PLAN, AND BEST AVAILABLE SCIENCE.

We raised this issue on pp. 13- 17 of our EA comments. Within this section of the Objection, we incorporate the corresponding sections (with the identical headings) 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. We also incorporate AWR's Complaint in Case No. 2:16-CV-294-RMP. Herein we also incorporate the section of this Objection entitled "FOREST PLAN IMPLEMENTATION MONITORING." We also incorporate the Declaration of Dr. Sara Jane Johnson in Case No. 2:16-CV-294-RMP.

Wildlife viability

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

Traill et al., 2010 and Reed et al., 2003 are published, peer-reviewed scientific articles addressing how "minimum viable populations" can be estimated, and how they have been drastically underestimated in past. The FS has not identified the best available science to make quantitative minimum viable population determinations for wildlife species on the Colville NF.

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).

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 Orient 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 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 cited scientific references.

With the Eastside Screens Forest Plan Amendment and the specific Management Indicator Species (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.)

As discussed above, 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 "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.)

The Orient MIS Report also states:

DecAID provides forest inventory data for dead wood habitats on the national forests of Oregon and Washington. It is a tool that synthesizes published literature, research data, wildlife databases, and expert judgment and experience. We model existing conditions based on areas that have and have not been harvested in the past, time since harvest, harvest prescription and method, and recent history of mortality in the project area.

The Orient MIS Report continues:

Existing Snag Levels – Snags in the project area reflect the disturbance history, and more snags on average appear available in the Orient project area than in most large project areas analyzed in the recent past. Most of the old forest, multi-stage stands are within their historic ranges of variability and have not been harvested in the past, so large tree snag levels for these stands are expected to be high.

It's important to note that the FS is not saying they surveyed the project area to determine snag levels and therefore suitability of habitat for wildlife. All they've done is come up with "expected" snag levels based on modeling, and so without survey sampling in the project area to verify modeling, the validity of the modeling has been not established. The Orient MIS Report continues:

...Snags are often removed along open roads and the road along East Deer Creek due to legal and illegal firewood harvest. Another about 1410 acres (9% of the project area) have been harvested since the 1980s and have lower snag levels than the surrounding unharvested areas. All but about 60 acres of riparian area on the non-NFS land (about 1070 acres) in the project area have been harvested since about 2000. Management on these lands must follow existing Washington State Forest Practices Rules for wildlife tree retention. In eastern Washington, 2 snags (if they exist) and 2 green, snag recruitment trees must be left on each harvested acre. **Precise snag quantities within the project area are subject to fluctuation and not known.** (Emphasis added.)

The immediately above paragraph indicates that habitat values assumed by the EA are merely a wild guess, and without the required monitoring to determine occupancy and utilization, any statements about viability and impacts on wildlife are meaningless.

The "Orient Vegetation Management Project: Biological Evaluation for terrestrial wildlife" (Biological Evaluation or BE) states, "In the Orient Project Area, there is presently an over-abundance of stands in middle structural stages and **a deficit of stands in both the early and late structural stages, relative to historic conditions.**" (Emphasis added.) This means the kind of forest of an age that provides the best large snag and down wood habitat is below the historic norm.

So the FS has no idea if conditions in the Orient project area are adequate for supporting reproducing populations of snag and down log-dependent wildlife. Furthermore, the MIS Report admits that the agency expects habitat to be generally worse in other areas: "more snags on average appear available in the Orient project area than in most large project areas analyzed in the recent past." For one example, 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 is **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 Orient project area, where habitat conditions are “expected” to be better because of less intensive management—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 19” dbh trees to be logged tomorrow won’t be available as 20”dbh trees next year, 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.”

The Orient MIS report claims, “Effects of Timber Harvest on Snags - More than 90% of the proposed commercial treatments consist of thinning, which should accelerate the development of large trees in the project area and which should, over the long term, lead to large diameter snags and down logs.” Contrast that with the conclusion in the Middle-South EA:

(Increased light and moisture from vegetation management on about 10,776 acres of variable density thinning/variable retention harvest treatments would result in more robust tree growth. Because harvest would be focused on removal of smaller diameter trees, larger trees would be retained that would eventually be recruited to snags and down logs. Even with this recruitment, snag density and down wood cover would likely remain below HRV for the larger snags. **Long-term, because of lower recruitment on more acres, snag density and down wood cover would be less than** (no-action alternative). (P. 233, emphasis added.)

The Orient EA does not cite any science to support the assumption that FS management will result in a supply of snags and down logs enough to someday support viable populations on the CNF. No monitoring is cited to support any claim of benefits to these species’ population numbers or distribution.

In addition, the results of the DecAID modeling don’t support FS assumptions that project into the future, because “DecAID is not a simulation model”¹
(<http://www.fs.fed.us/r6/nr/wildlife/decaid/pages/Caveats-and->

¹ Nor is DecAID a not a population viability analysis or population demography model. Id.

Cautions.html#Spatial%20and%20historic%20distributions%20of%20snags%20and%20down%20wood%20in%20the%20inventory%20data)

The Orient EA also fails to disclose that the FS's intent is to log many of those future large (>20" dbh) trees before they are allowed to die and become large snags and large down wood. The FS's "Preferred Alternative" for the revised forest plan would drop the current Eastside Screens diameter limits in favor of management flexibility² that would result in logging the size of trees this EA indicates that are below HRV in the project area and forestwide landscapes.

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 Orient 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.

The MIS Report states, "The cumulative effects analysis area for MIS associated with old growth is the Colville National Forest." However this is false on the face of it, because the FS failed to

² http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd490081.pdf

provide any forestwide analysis of habitat for each MIS compared to desired conditions or other Forest Plan MIS direction, including descriptions of habitat conditions Pine Marten Management Areas, Pileated Woodpecker Management Areas, and designated habitats for other species including Sensitive species.

The 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)...” However, the Orient EA and wildlife documents fail to provide an analysis demonstrating consistency with the Forest Plan/Eastside Screens.

The MIS Report states, “Last (sic) and old seral trees shall be maintained and HRV shall be compared to current conditions.” Yet where the wildlife documents compare HRV to current conditions for older forest and find them deficient, the implications and analysis to explain why more logging of such habitat is okay is entirely missing.

The Orient MIS Report states, “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 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. The FS fails to even touch the subject.

The Middle-South EA arrived at a novel interpretation of the forest plan:

The Eastside Screens amend the Forest Plan to incorporate stand structural stages in place of the original Forest Plan stand structural descriptions, especially in reference to “mature” and “old growth” stands, which are referenced as “late and old structural” (LOS) stands in the Eastside Screens.

Until the Middle-South EA, the CNF never claimed that stand structural stages replaced the concept of old growth in the Forest Plan. This interpretation didn’t appear in the North Fork Mill Creek A to Z project EA.

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-1³ - 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 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. (*See* Attachment 3 of AWR’s North Fork project Objection.) 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 Forest Plan FEIS disclosed that under forest plan implementation:

³ “(B)arred owls core areas.” (USDA Forest Service 2001e)

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 Species⁴, ignored by the Orient EA.

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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

⁴ 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.

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

Furthermore, CNF 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).

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 Orient 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 Orient EA.

The Orient 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 Orient MIS Report claims the 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. In other words, producing “old-growth” habitat through active management is an untested hypothesis.

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

Defining characteristics 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 an 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.

We cannot find any analysis that discloses the amount of old growth in the Orient project area or forestwide. Is the FS afraid of the facts?

The EA and supporting documents also fail to comply with HFRA requirements for old growth and large trees.

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 I⁵). While individual members or old growth associated species may be able to feed or reproduce outside of old growth stands, **biologists are concerned that viable populations of these species may not be maintained without an adequate amount of old growth habitat.**

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

⁵ USDA Forest Service 1987b.

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. ... (In 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 Orient 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"⁶ 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. 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.

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

⁶More evidence the FS is lying in the Middle-South EA about the Eastside Screens’ late seral structural stage “replacing” the concept of old growth.

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 Orient 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.

Fisher

The state of Washington Fisher Recovery Plan states, “The fisher ...is listed as a state endangered species (WAC 232-12-011) and has probably been extirpated from Washington. 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.) The Fisher Recovery Plan includes this map:

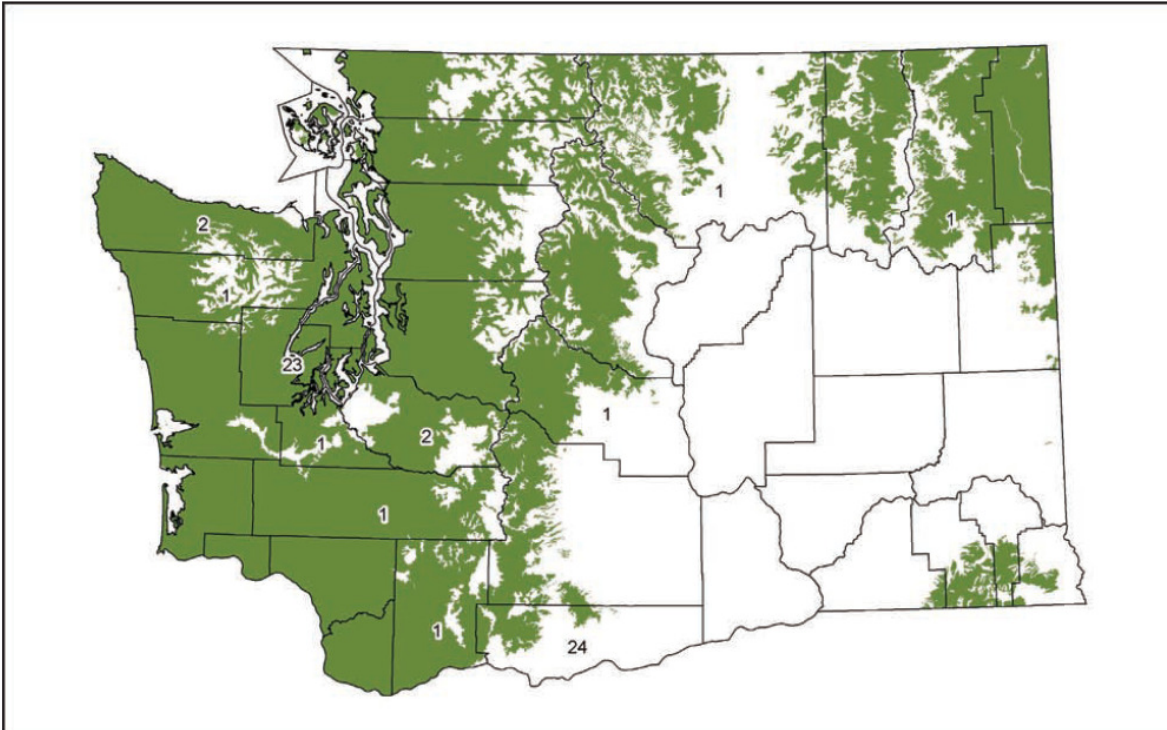


Figure 2. Probable historical distribution (circa 1800) of the fisher in Washington based on specimens (numbers indicated by county), trapping records, and forest zones associated with fisher records (Aubry and Houston 1992) (Forest zones [Cassidy 1997] shaded include: Western Hemlock types, Douglas-fir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

Hayes and Lewis, 2006 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.

After the FS ignored the fisher completely in the original North Fork Mill Creek A to Z EA, public comments called the FS on the fact that its revised forest plan Proposed Action implicated FS management actions in extirpating the fisher from the CNF. Subsequently the FS backtracked in later versions of that EA and with the Middle-South EA, saying there are recent “probable

sightings” of the fisher on the CNF. Still, the FS provides no explanation of why a species so rare on the Forest had been removed from the list of Sensitive species.

The final version of the North Fork Mill Creek A to Z EA states, “Although there is no specific management for the species in the Forest Plan, effects and mitigation measures that are relevant to pine marten (and other old-growth associated species) would apply to fisher as well.” Next, the Middle-South EA changed the FS’s tune, stating “although both species prefer late and old structural stands, fisher typically use lower elevation, more mesic forests than do pine marten.”

And now, with the Orient project the FS reverts to ignoring the fisher—no analysis was conducted at all.

Our discussion on pine marten in this objection points out the failure of FS management to maintain viability of that species—and therefore under the Forest Plan’s scheme—the fisher. Further, the North Fork and Middle-South Objections we incorporate are scientific information the FS has yet to include in any analysis for fisher.

Wolverine

The Orient BE states, “In the state of Washington, the wolverine is a candidate for state listing as threatened or endangered (Washington Department of Fish and Wildlife 2013).” The BE states, “In 2013, the U.S. Fish and Wildlife Service proposed a rule to list the wolverine as threatened under the Endangered Species Act but in 2014, the proposal was withdrawn because the Service determined that the effects of climate change are not likely to place the wolverine in danger of extinction now or in the foreseeable future.” The BE fails to acknowledge that a Federal Court has declared the withdrawal of the proposed listing rule was declared arbitrary and capricious, hence the wolverine’s current status as Proposed.

The EA discloses wolverine have been recorded near the project area:

Due to their large home range size and habitat needs, this species is rare and uncommon throughout their range. Although they are rare in northeastern Washington, there have been both confirmed and unconfirmed reports of wolverine on or near the CNF. North American wolverines have not been documented in the project area but there have been a few documented observations in the vicinity. In 2005, we documented a wolverine near the Kettle River on the west side of the Kettle Range at 2000’ elevation, south of Danville (Pilgrim and Schwartz 2006). A wolverine was filmed on a remote camera in the Wedge in February 2012 (D. Base, pers. comm.). During the winters of 2010 and 2011, we set 2 run-poles and 2 hair-pole wolverine in the Deer Jasper project area, adjacent to and just south of the Orient watershed, but wolverine were not documented.

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.

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/mi² (1.7 km/km²) (Carroll et al. 2001b).

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

Krebs et al. (2007) state, “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 Orient 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.

Canada lynx

The BE states, “The Orient Watershed project area contains the East Deer Lynx Analysis Unit (LAU), which totals 8,231 acres.”

The BE 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 BE documents the incidence and decline of Canada lynx in and around the 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 BE states. “Commercial timber harvest would occur over approximately 1,380 acres of the LAU.”

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 EA and BE fail 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 Orient EA do not include scientifically-based direction that would protect connectivity between Lynx Analysis Units.

The EA and BE do not 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 inches 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.

The BE states:

Unsuitable habitat includes recent regeneration harvest or other disturbance-created openings that have the potential to provide habitat for lynx, but presently do not have enough vegetative cover to be used by the animals to an appreciable degree. These are stands in the stand initiation structural stage. After 5-10 years, shrubs and trees should have grown enough cover for lynx to travel through these sites.

In the Kettle Range, (foraging) habitat typically occurs in ...stands that were harvested approximately 15 to 20 years ago.

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.

The BE describes some portions of the project area as “Unsuitable habitat (all due to fire...some will grow into some form of lynx habitat starting within 5 years.” Contradicting FS assumptions are the results of a study by Vanbianchi et al., 2017, who found, “Lynx used burned areas as early as 1 year postfire, which is much earlier than the 2–4 decades postfire previously thought for this predator.”

Kosterman, 2014, Vanbianchi et al., 2017 and Holbrook, et al., 2018 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 project area LAUs and adjacent LAUs was not analyzed or disclosed.

The BE states, “The cumulative effects area consists of the LAUs on the Kettle Crest, which cover a total of about 199,000 acres.” However, the BE contains a completely inadequate analysis of lynx habitat conditions, over that area.

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. The Orient EA also does not demonstrate project consistency with the Canada Lynx Conservation Agreement, U.S. Forest Service and U.S. Fish & Wildlife Service, 2005.

Pileated woodpecker

The MIS Report states, “Two woodpecker species, pileated and American three-toed, were also named individually as MIS representing other species within specific timber stand conditions.”

The MIS Report states, “About half of the project area (7720 acres) currently contains trees large enough to provide habitat for pileated woodpeckers, and about 1770 acres of these consist of late structural stage that provide the best conditions. It is one of the few watersheds on the west zone that the Douglas-fir biophysical environments are within the historical range of late and old structure.” Unfortunately, the MIS Report fails to disclose how much of the 1770 acres would be degraded by project activities.

And despite the high habitat values in the project area as compare to the rest of the west zone of the CNF, the MIS Report discloses the weak Forest Plan protections for pileated woodpeckers: “The Orient Project Area contains one MA1 area designated by the Forest Plan...and no pileated woodpecker core habitat areas.”

The EA and MIS Report fail to provide sufficient analysis to determine habitat and population trends that would be expected for the No Action vs. Action alternative. The FS’s modeling exercise is extremely inconclusive, as we discussed previously in this objection.

McClelland, 1985 states:

Co-workers and I now have a record of more than 90 active pileated woodpecker nests and roosts, ...the mean dbh of these trees is 30 inches... A few nests are in trees 20 inches or even smaller, but the minimum cannot be considered suitable in the long-term. Our only 2 samples of pileateds nesting in trees <20 inches dbh ended in nest failure... At the current

time there are many 20 inch or smaller larch, yet few pileateds selected them. Pileateds select old/old growth because old/old growth provides habitat with a higher probability of successful nesting and long term survival. They are “programmed” to make that choice after centuries of evolving with old growth.

McClelland (1977), states:

(The Pileated Woodpecker) is the most sensitive hole nester since it requires old growth larch, ponderosa pine, or black cottonwood for successful nesting. The Pileated can be considered as key to the welfare of most hole-nesting species. If suitable habitat for its perpetuation is provided, most other hole-nesting species will be accommodated.

Pileated Woodpeckers use nest trees with the largest dbh: mean 32.5 inches;

Pileated Woodpeckers use the tallest nest trees: mean 94.6 feet;

The nest tree search image of the Pileated Woodpecker is a western larch, ponderosa pine, or black cottonwood snag with a broken top (status 2), greater than 24 inches dbh, taller than 60 feet (usually much taller), with bark missing on at least the upper half of the snag, heartwood substantially affected by *Fomes laracis* or *Fomes pini* decay, and within an old-growth stand with a basal area of at least 100 sq. feet/acre, composed of large dbh classes.

A cluster analysis based on a nine-dimensional ordination of nest tree traits and habitat traits revealed close association between Yellow-bellied Sapsuckers, Mountain Chickadees, and Red-breasted Nuthatches. These three species plus the Pileated Woodpecker and Hairy Woodpecker are relatively grouped by coincident occurrence in old growth. Tree Swallows, Black-capped Chickadees, and Common Flickers are separated from the above five species by their preference for more open areas and their frequent use of small dbh nest trees.

(Most) species found optimum nesting habitat in stands with a major component of old growth, particularly larch. Mean basal area for pileated woodpecker nest sites was 150 square feet per acre. (McClelland. B.R. and others, 1979)

Many large snags are being cut for firewood. Forest managers should limit firewood cutting to snags less than 15 inches in d.b.h. and discourage use of larch, ponderosa pine, and black cottonwood. Closure of logging roads may be necessary to save high-value snags. Logging slash can be made available for wood gatherers.

Bull et al., 2007 compare the effects of natural disturbance with large-scale logging on Pileated Woodpeckers. Also see Bull et al., 1992, Bull and Holthausen, 1993, and Bull et al., 1997 for biology of pileated woodpeckers and the habitats they share with cavity nesting wildlife.

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

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

Pine marten

Regarding the Management Indicator Species pine marten, the Orient MIS report discloses, "Declines in source habitats from historic levels have been extensive in the region."

The Orient MIS Report states "About 40% (6020 acres) of the project area could support pine marten, though about 1260 acres burned in the 2015 fire. The burned areas contain abundant down wood and snags for denning and roosting but the overstory will have to become re-established before it again provides pine marten hunting and denning areas, which will take decades. Of the remaining potential habitat, about 1960 acres consists of high-quality habitat.' The EA and MIS Report fail to analyze and disclose project impacts on the high quality MIS habitat.

As is the case for the pileated woodpecker, the Forest Plan strategy for maintaining viability of pine marten is quite weak. CNF 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). This is consistent with the Orient MIS Report stating, "Because of how the grid system was created, many PM MRs fell in warm, dry habitats that do not support pine marten or three-toed woodpecker habitat, both of which occupy colder, higher-elevation habitats."

The FS does not use best available science for insuring population viability of the pine marten. Moriarity et al., 2016; Bull and Blumton, 1999; Hargis et al., 1999 and Wasserman et al., 2012 should be considered best available science concerning pine marten biology and management impacts.

Pine marten is the MIS in the CNF mature forest which would be logged in the Orient project, and for other sensitive furbearers like fisher. Despite the weakness of the Forest Plan grid system, CNF Plan direction is to monitor marten habitat and utilization trends as affected by timber harvest, including localized population trends in specialized areas. (CNF Plan, A-25.) CNF monitoring reports from 1992 and 1993 document marten in the Kettle Falls Ranger District. (USFS 19934 at 28.) In 1995, no pine marten were detected. (USFS 19955 at 24-25.) This 1995 report was the last mention of the MIS pine marten from "annual" forest plan implementation monitoring reports. The Orient EA provides no population data for the MIS marten, forest-wide or in the project area, thus there is no way of gauging potential environmental impacts on MIS marten.

Northern goshawk

“The existing project, combined with planned future harvest west of the Columbia River, will move the known goshawk nesting numbers close to the minimum in the Forest Plan.” The BE thus reveals how risky the FS is willing to be with goshawk viability based on its own definition.

The BE indicates the FS is pretty certain they know of all nesting goshawks, in the project area. However, 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.)

Further, the Orient EA doesn't use the best available science disclosing adverse impacts in a roughly 6,000-acre northern goshawk home range or the post-fledging area (PFA). The project would log home ranges, but the FS only puts on timing restrictions. This ignores scientific research by Crocker-Bedford (1990), who 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.

Reynolds et al. 1992 goshawk guidelines recommend ratios of (20%/20%/20%) each in the mid-aged forest, mature forest, and old forest Vegetative Structural Stage (VSS) classes for PFAs and foraging areas. However, the EA never discusses the levels of mid-aged, mature, and old forest in the area or the adequacy of such existing at protecting the goshawk. 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.

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)....”

The FS does not use best available science for insuring population viability of the pine marten.

Black-backed woodpecker and northern three-toed woodpecker

The FS conducted no analysis of direct, indirect, or cumulative effects for the black-backed woodpecker.

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 is to negate the natural processes that the black-backed woodpecker biologically relies on; the emphasis in reducing the risk of stand loss due to stand density coupled with the increased risk of stand replacement fire events. Viability of a species cannot be assured, if habitat suppression is a forestwide policy.

The significance of direct, indirect and cumulative effects (including risk to viability) cannot be determined in the absence of a forestwide cumulative effects analysis of the BNF fire suppression policies.

Please see Hanson Declaration, 2016 for an explanation of what a cumulative impact is with regard to the backed woodpecker, how the FS ignores best available science, and why FS management results in an improper minimization of adverse effects and cumulative impacts to black-backed woodpeckers with regard to the agency’s population viability assessment.

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

Contrary to what one might expect to find immediately after a major disturbance event, I detected a large number of species in forests that had undergone stand-replacement fires. Huff et al. (1985) also noted that the density and diversity of bird species in one- to two-year-old burned forests in the Olympic Mountains, Washington, **were as great as adjacent old-growth forests...**

...Several bird species seem to be relatively **restricted** in distribution to early post-fire conditions... I believe it would be difficult to find a forest-bird species more restricted to a single vegetation cover type in the northern Rockies than the Black-backed Woodpecker is to early [first 6 years] post-fire conditions. (Emphasis added).

USDA Forest Service 2011c states:

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

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

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

Cherry (1997) states:

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

The 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, Weinhausen 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.

The FS does not disclose the quantity and quality of habitat necessary to sustain the viability of the northern three-toed and black-backed woodpeckers.

Big game species

The Forest Plan contains the following standard for MA 6:

Roads open for public use will be minimized on big game ranges with the objective not to exceed 1.5 miles of open roads per square mile on deer winter range ... averaged over a three square mile area during the season of use.

The Forest Plan contains the following standard for MA 8:

Roads open for public use will be minimized on big game ranges with the following objective: 1) not to exceed 1.5 miles of open roads per square mile on deer winter range. ... The above objectives will be measured by averaging open roads over a three square mile area during the season of use.

The Forest Plan requires 20 percent of winter range maintained as snow intercept thermal cover consisting of multi-storied stands of evergreen trees with crown closure exceeding 60 percent, including an overstory of trees of 12 inches dbh or greater with crown closure of at least 40 percent.

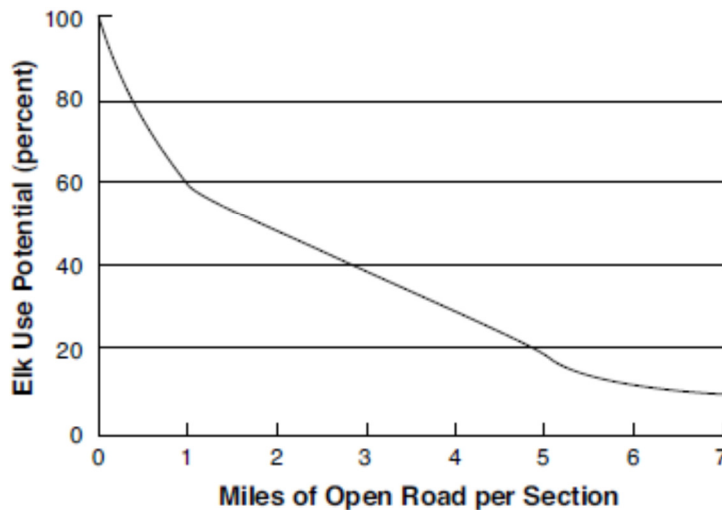
Early forest plan implementation monitoring invalidated assumptions in the forest plan concerning amounts of snow intercept cover for big game (from double-canopied forest). Consequently, Forest specialists recommended in the 1993 5-year Monitoring and Evaluation Report that snow-intercept cover should be maximized "whenever possible" when designing projects, and that ecosystem management principles should be utilized "to view winter range management from a larger landscape perspective... *outside designated winter range areas.*" However, the FS fails to disclose this CNF expert opinion in the EA. Also, the FS did not survey outside designated winter range areas in the Orient project.

The Orient EA does not demonstrate consistency with the above standards and recommendations in terms of road densities and thermal cover, amounts/ratios, and block sizes.

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

5. Levels of habitat effectiveness:

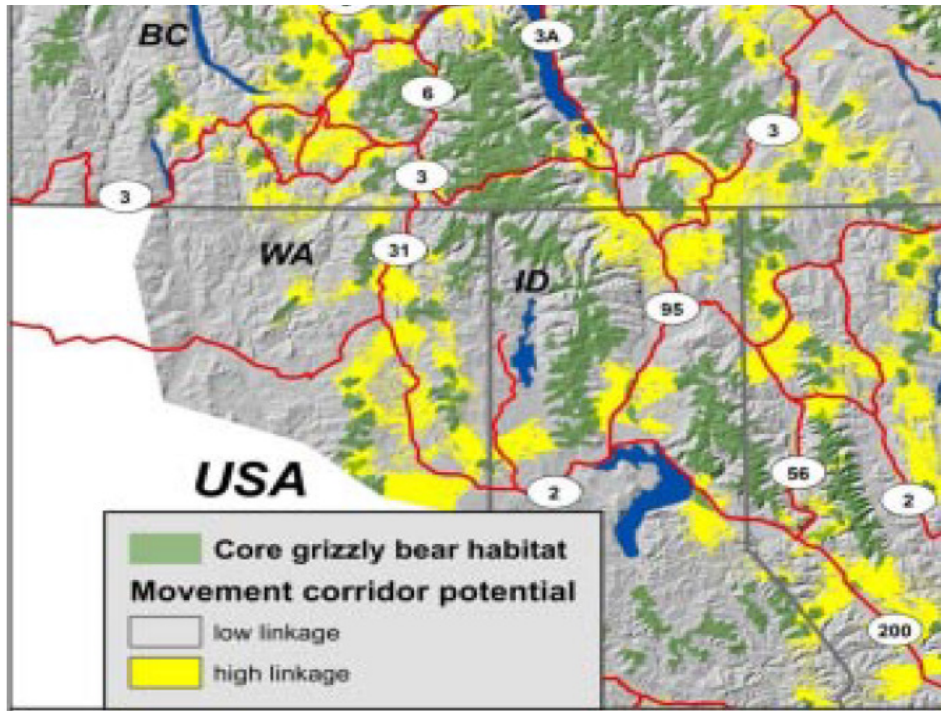


Also, Ranglack, et al. 2017 investigated habitat selection during archery and rifle hunting seasons.

Grizzly bear

The Orient BE recognizes historical use of the project area by grizzly bears, but states that consideration for maintaining or improving habitat is optional. This is consistent with the view that once species are extirpated from an area by human activities, they no longer have a place in the ecosystem, and there is no responsibility for assisting their recovery. However, for ongoing recovery actions in the Selkirks and North Cascades Ecosystems to succeed, grizzly bears must rely on habitat in the project area.

The area encompassing the Orient 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 Orient project area:



Orient project effects on grizzly bears dispersing into the project area include potential disturbance or displacement due to human presence, road construction and use, motorized use and other mechanized equipment, and changes in forested condition classes (depending on type of timber harvest). The presence of these activities and of roads may lead grizzly bears to avoid an otherwise suitable habitat.

The FS fails to disclose and apply the best available science on recommended open motorized route density, total motorized route density, and core habitat thresholds such as those for Northern Continental Divide Ecosystem grizzly bears. The best available science on NCDE grizzly bears allows no more than 19% open motorized route density over 1.0 mi/mi² and 19% total motorized route density over 2.0 mi/mi², and requires at least 68% core habitat (the 19/19/68 rule). There are also habitat standards for the nearby Selkirk-Cabinet-Yaak Ecosystem grizzly bear recovery zones to the east, and lands adjacent to the CYE called Bears Outside Recovery Zone (BORZ). For the latter, the standard is no net increase in roads.

The Orient BE recognizes the value of core habitat at distances from roads, but fails to analyze or disclose quantitative losses in core habitat from project activities. It also fails to disclose road densities in the project area. The BE states, ‘Over the life of the project, the total road density would increase and core habitat would be reduced’ and that’s about it for those important grizzly habitat parameters.

The FS did not use the best available science on grizzly bear habitat security for the Project analysis. The NCDE definition of secure habitat requires exclusion of gated roads and requires exclusion of all areas under 2,500 acres. The CYE/SE definition is similar.

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. There needs to be direction regarding existing road densities located outside of and between security areas.

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

VI. CUMULATIVE EFFECTS OF FIRE SUPPRESSION

We raised this issue on pp. 4, 11 - 12, and 18 of our EA comments. Within this section of the Objection, we incorporate the corresponding sections (with identical headings) 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. Herein we also incorporate the section of this Objection entitled “FOREST PLAN IMPLEMENTATION MONITORING.”

The CNF has never adequately analyzed and disclosed the forestwide impacts of its current policy of all-out fire suppression, and nothing in the Orient EA indicates the management of wildland fire in the project area will be any different following project implementation.

Neither the Orient EA nor the Fire, Fuels & Forest Vegetation Report (Veg Report) contain a cumulative effects analysis of fire suppression.

The Orient EA’s Purpose and Need states, “The primary goal of this project is to increase the probability that the community of Orient would continue to have safe drinking water following a wildfire.” The EA states the project “is located within fire regimes 1, 2 and 3; it is located in proximity to Orient’s water supply infrastructure and East Deer Creek, which feeds into this water supply system; and a significant risk exists that a fire disturbance event would have adverse effects on the water quality of Orient’s water supply.” Yet there is no scientifically sound analysis that justifies any threat to the water supply due to vegetation conditions.

The EA and Veg Report fail to disclose the limitations of the Fire Regime Condition Class modeling, which is the primary justifying analysis tool supporting the EA’s Purpose and Need. In another document, the Colville NF (USDA Forest Service 2012c) states:

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

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 and Veg Report do 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 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.

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.) See also Rhodes and Baker (2008). And Rhodes, 2007 also points out that management with 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.)

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.”

Also see DellaSala et al., 2018 who summarize some of the latest science around top-line wildfire issues, including areas of scientific agreement, disagreement, and ways to coexist with wildfire. It is a synopsis of current literature written for a lay audience and focused on six major fire topics:

1. Are wildfires ecological catastrophes?
2. Are acres burning increasing in forested areas?
3. Is high severity fire within large fire complexes (so called “mega-fires”) increasing?
4. What’s driving the recent increase in burned acres?
5. Does “active management” reduce wildfire occurrence or intensity?
6. Will more wildfire suppression spending make us safer?

The premise that thinning and other mechanical treatments replicate natural fire is contradicted by science (for example see Rhodes and Baker 2008, McRae et al 2001, and Rhodes 2007).

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.”

The Orient EA doesn’t provide a genuine discussion 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. This is true for land of other ownerships also. The EA simply does not disclose how the vegetation patterns that have resulted from past logging and other management actions would influence future fire behavior.

Hutto (2008) states:

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

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).

News articles in the printed media also recognize the ecological benefits of wildland fires and better forest policy (See the folder entitled “News Articles”).

Little in the EA informs the public about wildland fire ecology. The FS seems institutionally incapable of recognizing the highly restorative and beneficial effects of wildland fire, irrationally maintaining a position that management alone restores forests. The EA reflects an extremely narrow bureaucratic perspective which completely misses the uniqueness of the biological diversity found in early post-fire forests, as illustrated by news reporters and the scientists and other people interviewed for the articles in the document we incorporate, “News Media and Fire Ecology.”

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...”

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.

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.

Also, many direct and indirect effects of fire suppression are also ignored in this 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 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 vast majority of acres burn under weather conditions that make control impossible, and that result in fires burning through treated areas as well as untreated. The EA also doesn't recognize the temporal gradients in vegetative recovery following treatments, which are the natural processes acting to regrow the components of natural vegetation the FS calls "fuel."

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.

Baker et al., 2006 state:

Because multiple explanations exist for the presence and abundance of young, shade-tolerant trees, these trees need to be dated and linked definitively to a particular land use (e.g. livestock grazing, logging, fire exclusion) before their removal is ecologically appropriate in restoration, and so that the correct land use, as discussed later, can be modified.

...Identification of which land uses affected a stand proposed for restoration is essential. Fire exclusion, logging and livestock grazing do not have the same effects on these forests, their effects vary with environment, and they require different restoration actions. Before restoration begins, it makes sense to modify or minimize the particular land uses that led to the need for restoration, to avoid repeating degradation and ongoing, periodic subsidies that merely maintain land uses at non-sustainable levels (Hobbs & Norton, 1996). For example, thinning an overgrazed forest, without restoring native bunchgrasses lost to grazing, may simply lead to a new pulse of tree regeneration that will have to be thinned again.

Continuing direction for wildfire suppression on the CNF comes from the Forest Plan, which contains the CNF's fire policy. Alternative A is the "no action" alternative required under NEPA,

and fire suppression is anticipated to be reasonably foreseeable. Fire suppression doesn't imply "no action", but may be included in Alternative A if those actions' environmental impacts have been analyzed and disclosed at the programmatic level, such as in the Forest Plan EIS. The problem with this situation is the scale of ecological damage caused by the wide-scale fire suppression program that began almost 100 years ago wasn't recognized until after the Forest Plan was adopted in 1988. It constitutes significant new information that did not result in any new forest plan decisions or direction, which itself may be adopted properly only as an amendment or revision of the Forest Plan, following proper NEPA procedures.

The Forest Plan EIS itself did not contemplate a range of possible fire planning scenarios, there were no differences under each alternative it analyzed. Nor did the Forest Plan EIS present anything

What we see nowadays are these project-level NEPA documents like the Orient EA, which implement a hybrid, reactionary management scheme, continuing to replace wildland fire with logging and burning, but not in the context of an analysis of cumulative, forestwide impacts.

The Orient EA doesn't provide a genuine discussion 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. This is true for land of other ownerships also. The Orient EA simply does not disclose how the vegetation patterns that have resulted from past logging and other management actions would influence future fire behavior.

We've incorporated research-based scientific information indicating that the vast majority of acres burns under weather conditions that make control impossible, and that result in fires burning through treated areas as well as untreated. The Orient EA also doesn't recognize the temporal gradients in vegetative recovery following treatments, which are the natural processes acting to regrow the components of natural vegetation the FS calls "fuel."

The Forest Plan EIS did not analyze and disclose benefits of wildland fire.

Wisdom et al., 2000 note that the CNF MIS Lewis' woodpecker is associated closely with recent burns and responds favorably to stand-replacing fires—habitat relations not disclosed or analyzed in the Orient EA.

The EA perpetuates the Smoky Bear myth that protection from fire is a promise that the government can and should make. The EA emphasizes actions that attempt to adapt a fire-prone ecosystem to the presence of human development, however we firmly believe the emphasis must be the opposite—assisting human communities to adapt to the fire-prone ecosystems into which they been built.

It make more sense both from a safety and financial perspective to expect homeowners to implement firewise measures on their properties so that management could focus more efficiently on safety of egress routes.

Implicit in the EA is an assumption that fire risk can be mitigated to a significant degree by reacting in opposition to natural processes—namely the growth of various species of native vegetation (misleadingly referred to as “fuels”). We believe the FS oversells the ability of land managers to make conditions safe for landowners and firefighters. This could lead to landowner complacency—thereby increasing rather than decreasing risk. Many likely fire scenarios involve weather conditions when firefighters can't react quickly enough, or when it's too unsafe to attempt suppression. With climate change, this is likely to occur more frequently. Other likely scenarios include situations where firefighting might be feasible but resources are stretched thin because of priorities elsewhere.

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 Landscaping⁷ as recommended by Utah State University, and the Firewise USA website by the National Fire Protection Association⁸ for examples of educational materials.

The 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.

If the FS is serious about preventing sediment from harming water supplies and infrastructure, it would be proposing to reduce the road system to the degree that maintenance activities in the watershed can be conducted annually within current budget limitations, which we discuss in the next section of this objection.

Remedy: Choose the No Action Alternative. In any case, before preparing an EIS for the Orient project, finish the ongoing process of revising the Forest Plan that includes an analysis of the forestwide ecological and economic impacts of CNF fire policies.

VII. IMPACTS OF ROAD SYSTEM NOT ADEQUATELY ANALYZED AND DISCLOSED; ALSO INCONSISTENCY WITH TRAVEL MANAGEMENT REGULATIONS AT 36 CFR 212

We raised this issue on pp. 8 - 9 of our EA comments. Within this section of the Objection, we incorporate the corresponding sections (with the identical headings) 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.

⁷ <https://extension.usu.edu/ueden/ou-files/Firewise-Landscaping-for-Utah.pdf>

⁸ <http://www.nfpa.org/Public-Education/By-topic/Wildfire/Firewise-USA/The-ember-threat-and-the-home-ignition-zone>

Herein we also incorporate the section of this Objection entitled “FOREST PLAN IMPLEMENTATION MONITORING.”

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.

The Travel Management Regulations at 36 CFR § 212.5 state:

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

minimizes adverse environmental impacts associated with road construction, reconstruction, decommissioning, and maintenance.

The 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 Orient EA does not demonstrate how it is minimizing the road system in compliance with the Travel Management Regulations and related Directives.

The Orient 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 Orient project with its forest-level TAR, the Orient 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 Orient 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 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.

The FS proposes 1.7 miles of “Reconstruction on existing non-system templates.” The EA is misleading because such construction has practically all the adverse impacts of new road construction, which is not analyzed and disclosed.

We appreciate that road decommissioning is proposed, as described in the EA: “The proposed action would decommission approximately 6.1 miles of NFS roads in the project area. These roads, and their use, are generally linked to riparian, and/or hydrologic resource damage and have been deemed unnecessary for future activities.” This is a step towards a sustainable road system. But 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, because the EA states the following “may” happen:

Examples of methods that may be used include:

- reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation;
- blocking the entrance to a road or installing water bars;
- removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed;
- completely eliminating the roadbed by restoring natural contours and slopes; or
- Other methods designed to mitigate the specific resource concerns associated with the road.

This concern also applies to the 1.0 miles of new temporary roads, which would be, vaguely, “hydraulically stabilized at the completion of vegetation and fuels treatments.”

The EA also proposes “Restoration of Existing Non-System Roads”:

The project area includes 31.1 miles of existing non-system road templates. These templates include old roads, jeep trails, skid trails, and firelines. The non-system roads that are reasonably accessible and that have resource concerns would be restored through full obliteration or hydrologic stabilization. The remaining non-system roads would be allowed to continue to recover naturally.

The EA fails to disclose how many of these 31.1 miles will be actively restored, and how much “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 these 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 non-system roads and put them on the system, or fully decommission 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 Orient 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 Orient 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 Orient EA does not disclose the Project Area Road Management Objectives, which were to be developed using the Travel Management Regulations.

The FS also proposes to designate roads in the Orient project area to provide loop travel for off-road vehicle (ORV) use, without demonstrating consistency with the Travel Management Rule Subpart B or related Executive Orders. The EA states, “Conversion of Roads to Trail. Would begin at the 6100-215 junction with the 6100-450, north to the junction with the 6120-400, and continuing along the 6120-400 to the junction of the 6120 would be converted to a trail open to all vehicles.”

This is described in the Recreation Report:

Additional motorized routes were proposed by OHV users to be included on the MVUM within the planning area during travel management collaboration meetings between 2005 and 2008. Roads associated with these proposed routes include: 6100215, 6100450, 6120400, and 6120430. These proposed routes could be combined with other proposed routes outside of the planning area to connect with several large loop opportunities and Deer Creek Forest Camp Campground.

Yet the impacts of this additional motorized travel on various resources was not analyzed or disclosed in the EA.

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 Orient EA failed to demonstrate that it implemented or applied the minimization criteria in the route designation process, consistent with the objective of minimizing impacts. The Orient 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 Orient 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 Orient 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 Orient 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 Orient 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 Orient EA violates NEPA in terms of methodology, scientific accuracy, and scientific integrity.

Remedy: Choose the No Action Alternative. In any case, before preparing an EIS for Orient 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.

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.

That is why there are 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. There is no requirement to maintain such an inventory,

VIII. CUMULATIVE IMPACTS ON SOIL PRODUCTIVITY

We raised this issue on pp. 12 - 13 of our EA comments. Within this section of the Objection, we incorporate the corresponding sections (with the identical headings) 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. Herein we also incorporate the section of this Objection entitled “FOREST PLAN IMPLEMENTATION MONITORING.”

The Orient EA:

- fails to justify use of its limiting of detrimental disturbance methodology as a proxy for complying with NFMA's requirements to protect soil productivity;
- fails to 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 and Regional management 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 Orient 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 Orient 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 C of the Soil Report indicates that some activity units have existing DSC well over 20% due to the effects of the Stickpin Fire. However, the EA and Soil Report do not account for the situation in determining consistency with the Region 6 soil quality standards and Forest Plan. This violates NFMA and NEPA.

Discussing very similar R-1 Soil Standards⁹, USDA Forest Service, 2016a explains that a major cumulative effect ignored by the standards is the indirect effect of soil damage, or DSD¹⁰, on sustained yield. It states that the Soil Standards “created the concept of ‘Detrimental Soil Disturbance’ (DSD) for National Forests in Region One as a measure to be used in assessing potential loss of soil productivity resulting from management activities.” 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

⁹ A minor difference between the R-1 15% areal extent standard and the R-6 20% areal extent standard is that for R-6, system roads adjacent to a unit are included within the activity area.

¹⁰ Identical to DSC in the R6 Standards.

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.

USDA Forest Service, 2007 stated:

Sustained yield was defined in the Kootenai Forest Plan, 1987, (Vol. 1, Chapter VI, Glossary) 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 ability of the land to produce.

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 Orient EA does not cite the scientific basis for adopting its percent numerical limits.

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 the Forest Plan standard:

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 Orient EA's assumption that the Forest Plan or R-6 standards would be met following project activities.

NEPA requires the FS to specify the effectiveness of its mitigations. (40 C.F.R. 1502.16.) The Orient 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 Middle-South 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 (DSD¹¹) 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 Soil Report states, "Soil compaction was identified by use of a spade to evaluate alteration of soil structure and other factors." The Soil Report and EA do not disclose how accurate this approximation is for substituting for soil bulk density measures required by 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.

¹¹ Detrimental Soil Disturbance (DSD) is equivalent to Detrimental Soil Conditions (DSC).

It is quite possible that using the spade test to quantitatively determine management-caused increase in soil bulk density is analogous to measuring a person's intelligence based on the size of his/her head.

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:

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 Orient EA and Soil Report also fails to disclose the areal extent of DSC in any area **outside of** Orient 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?

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.)

"(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 Orient 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 Orient 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 Orient Project area and forestwide due to noxious weed infestations, nor how that situation is expected to change. USDA Forest Service, 2005c states:

Weed infestations are known to reduce productivity and that is why it is important to prevent new infestation and 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)udies 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.

The Orient 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 Orient 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.

IX. FOREST SERVICE’S FABRICATED MANDATE FOR LOGGING TO RESTORE THE FOREST. VEGETATION ANALYSIS IS SKEWED AND IGNORES BEST AVAILABLE SCIENCE.

We raised this issue on pp. 10 – 12, 18 of our EA comments. Within this section of the Objection, we incorporate the corresponding sections (with the identical headings) 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. Herein we also incorporate the section of this Objection entitled “FOREST PLAN IMPLEMENTATION MONITORING.”

We've already discussed the failure of the CNF to respond to emerging issues related to wildland fire and fire suppression by amending or revising the forest plan to address it. Additionally, at the project level, the FS uses skewed and narrow, interpretation of science—and in some cases misrepresentation of science—to promote unnecessary and ill-advised logging.

The Orient EA’s Purpose and Need regarding vegetation treatments is hopelessly flawed. The EA states, “This project is needed to reduce potential wildfire severity, improve forest health and resilience to disturbance, and protect water quality.” We discuss below how the HRV analysis is not supported by an analysis whatsoever. Nothing that is scientifically sound indicates that there is a forest health problem or that “resilience” (whatever that means) need to be improved.

On the other hand, the EA states, “The primary goal of this project is to increase the probability that the community of Orient would continue to have safe drinking water following a wildfire.” So the FS is drumming up the fear of fire to bolster its logging project.

Table 7 from the Orient Fire, Fuels & Forest Vegetation Report (Veg Report) claims to be a “Summary of Eastside Screen direction by biophysical environment within the planning area based on the HRV.” Neither the Orient EA nor the Veg Report contain an analysis of fire suppression, nor explain why project area conditions are outside the Historic Range of Variability (HRV).

So, whereas the FS characterizes the project area as outside the HRV or Desired Condition, this does not appear to be based upon any data—period. This is a blatant and obvious violation of the Healthy Forests Restoration Act.

NEPA regulations at 40 CFR § 1500.1 (b) state, “NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA.”

See “Foresters and ecologists see forests differently” for a description of the huge difference between the Industrial Forestry worldview as demonstrated by the FS and an ecological perspective.

The EA analysis includes such statements as “Insect and disease problems in mixed conifer stands will be reduced.” 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”.

In the Veg Report the FS also claims to be analyzing based upon FRV (future range of variability). Interestingly, nothing in the EA informs the public of the FRV scheme. The Veg Report states, “The proposed project activities would not move the landscape away from cover type and structure targets that are based on historic range of variability (HRV) and future range of variability (FRV).” Again how the FRV was determined is anybody’s guess, based on so little explanation in the EA and Veg Report.

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.

In other words, the HRVs the Orient EA relies upon must be evaluated in the context of how realistic—or even “desirable”—achieving them really is in the context of rapidly changing climate.

Former US Forest Service Chief Abigail Kimbell and Hutch Brown (in USDA Forest Service, 2017b) discuss some effects of climate change on forests:

Even if global greenhouse gas buildups were reversed today, global temperatures would continue to rise for the next hundred years, bringing regional warming, changes in precipitation, weather extremes, severe drought, earlier snowmelt, rising sea levels, changes in water supplies, and other effects. As it is, global greenhouse emissions are still rising, exacerbating all of these long-term effects. The capacity of many plant and animal species to migrate or adapt will likely be exceeded. Ecosystem processes, water availability, species assemblages, and the structure of plant and animal communities and their interactions will change. **In many areas, it will no longer be possible to maintain vegetation within the historical range of variability. Land management approaches based on current or historical conditions will need to be adjusted.** (Emphasis added.)

Frissell and Bayles (1996) ask:

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.)

The FS uses the word “resilient” or “resilience” in terms of how the proposal is responding to an alleged “need” by increasing the resilience of the ecosystem. However, the FS provides absolutely no operational definition of resilience that would allow anybody to actually measure the resilience of the ecosystem as it stands now, or measure the change in resilience following

project activities. An essential component of an operational definition is measurement. A simple and accurate definition of measurement is the assignment of numbers to a variable in which we are interested. In this case, the variable in which we are interested is resilience, and how the FS measures it in these ecosystems.

The FS's strategy of "moving toward" the HRV or Desired Conditions (DCs) (e.g., resilience) basically focuses upon static conditions, instead of the natural dynamics of the ecosystem. An abundance of scientific evidence suggests that these Desired Conditions be conceptually replaced with desired future dynamics, to align with best available science. 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.)

DCs must be rejected in favor of desired future dynamics in order to be consistent with the best available 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 conditions¹², 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.)

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 Orient EA violates NEPA in terms of methodology, scientific accuracy, and scientific integrity.

Remedy: Choose the No Action Alternative. In any case, finish the ongoing process of revising the Forest Plan before preparing an EIS for the Orient project, which doesn't bias its analyses

¹²We are aware that NEPA does not require specific analysis of "desired future conditions." Thus we take the authors as referring to commonly included discussions of desired future conditions **during the NEPA process**.

with cherry-picked scientific sources on vegetation and fire ecology, so that proper analyses and disclosure will better inform the public and decisionmaker.

X. SCIENTIFIC INTEGRITY; ALSO DEFICIENCIES OF DATA AND MODELS USED FOR EA ANALYSES

We raised this issue on p. 6 of our EA comments. 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. Herein we also incorporate the section of this Objection entitled “FOREST PLAN IMPLEMENTATION MONITORING.”

Because Orient 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 Orient 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 Orient 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 Orient 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 Orient 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 Orient 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 Orient 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 Orient 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:

- A clear statement of objectives;
- A conceptual model, which is a framework for characterizing systems, stating assumptions, making predictions, and testing hypotheses;
- A good experimental design and a standardized method for collecting data;

- Statistical rigor and sound logic for analysis and interpretation;
- Clear documentation of methods, results, and conclusions; and
- 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 Orient 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. 2016b; Mitchell et al. 2016). Undeniably, social dimensions of management (i.e., impacts on livelihoods and human–wildlife conflict) will remain important. (Emphasis added.)

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

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

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 Orient EA violates NEPA in terms of methodology, scientific accuracy, and scientific integrity.

The Orient 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 Orient 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.

XI. WATER QUALITY

We raised this issue on pp. 17 - 18 of our EA comments. Within this section of the Objection, we incorporate the corresponding sections (with the identical headings) 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. Herein we also incorporate the section of this Objection entitled “FOREST PLAN IMPLEMENTATION MONITORING.”

The water quality analysis in the Orient EA is inadequate and violates the National Environmental Policy Act (NEPA) and the National Forest Management Act (NFMA). The information provided in the EA and associated documents does not support the FONSI. It does not apply the best available science, or provide monitoring data gathered on the CNF in arriving at its decision.

The Orient EA:

- 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.

The Orient EA and the Orient Watershed Aquatics Report (AR) do not adequately disclose the existing conditions of site specific stream reaches and 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 AR states, “The Orient project is entirely within the East Deer Creek watershed but does not include all of the watershed, the basic unit for measuring changes to hydrology and watershed resources.” The AR discloses that water quality in East Deer Creek fails to meet all water quality standards, which means a Total Maximum Daily Load (TMDL, or clean-up plan) is needed to comply with Section 303(d) of the Clean Water Act. The AR states, “...EPA did not approve the DO and pH portion of the TMDL. A TMDL is still needed...” Therefore complete information is lacking to support a FONSI and comply with the Clean Water Act.

The AR states, “Part of the purpose and need of this project is to protect the primary source of clean water for the community of Orient. This water system is on East Deer Creek near the bottom of the project area, the main stream in the East Deer Creek subwatershed.”

The AR states, “The Stickpin and North Boulder 2 fires occurred in 2015 and affected approximately 19% of the subwatershed. About 61% of this total was a high severity fire that effectively mimics clearcut in live basal area reduction.” However the AR does not analyze or disclose effects on water yield from the fire. Lacking any data or analysis, the AR concludes:

This project proposes to reduce basal area on another approximately 14% of the subwatershed with a partial cut. At most overall reduction would barely meet the quantifiable amount of basal reduction to cause change in water yield. If a water yield change occurs it would likely be towards the range of historic variability and would trend back towards current water yield in less than a decade.

The AR states, “Fecal coliform levels would not be directly affected by the project since it is based on feces entering the water. There is a standard practice to mitigate the chance that the project will increase ungulate access to the streams and therefore mitigate the chance of increased fecal coliform.” Yet the logging and road work will increase cattle access to streams, and no “standard practice” exists that can be demonstrably shown to prevent cattle from defecating and further polluting the water supply for the community of Orient. While failing to fully investigate the cumulative effects of cattle grazing in this watershed, the FS cannot credibly claim that this project is protecting the water source.

Regarding native fish, the AR states:

Fisheries in the analysis area include trout fisheries on East Deer Creek. East Deer Creek has Eastern brook trout and hybrid redband trout. Genetics samples of the East Deer redband trout were taken in the fall of 2017 and we are awaiting the results for the genetic integrity of these fish. The town of Orient has a municipal water supply on East Deer Creek which includes a water catchment system. This catchment system most likely blocks fish passage from the Kettle River into East Deer Creek. Natural and man-made blockages occur throughout and limit the interaction of populations in the analysis area and the Kettle River.

For non-fish bearing streams in the project area, the AR notes the following degradation from management activities:

Road construction from the 1980s resulted in degradation in many of the streams. Clearcutting or extensive harvest in the Slide Creek, Martin Creek, Blind Gulch, and Jungle Creek watersheds also caused changes that were detected in the surveys. Range impacts from cattle trailing up stream channels between roads or concentrated use in localized areas has caused channel instability in some channels.

The AR does not disclose its scientific basis for assuming Pfankuch Indicators correlate to INFISH Riparian Management Objectives (RMOs). No numerical correlations are given, no science or data is presented in support. Still, some RMOs are not being met. There is no trend data indicating the FS is on track for meeting RMOs.

Many project area stream reaches are rated Functioning At Risk or Not Properly Functioning. Again, there is no trend data indicating the FS is on track for achieving Properly Functioning Condition.

The AR states, "Watershed condition framework was adopted by the Forest Service to determine the health of subwatersheds in 2006. There are twelve indicators that each contribute between 2% and 15% to the overall score. Road and trail attributes contributes 15% of the score, over half of which is related to road density. This portion of the score currently rates as poor."

The AR indicates several roads are a chronic source of sediment into East Deer Creek:

A Geomorphic Road Assessment and Inventory Package (GRAIP) was completed for the Orient Project. This assessment determined that most of the roads are currently vegetated and show little use. Because of this sediment delivery to East Deer Creek is comparatively low. The analysis did show a few problem areas where road stream interactions are currently delivering sediment from roads to streams, including East Deer Creek and tributaries. The 6100-450 road crosses East Deer Creek and this model indicates that the crossing is in the top 20% of delivery of sediment from roads to streams in the watershed. In the lower half of the watershed the network of 9500-960, 9576-240, and 9576-279 crosses two tributaries and a drainage leading to East Deer Creek delivers higher than average sediment to those tributaries. Finally there are some unclassified roads that cross

Martin Creek and an unnamed tributary near Martin that are currently contributing sediment to those non fish-bearing streams.

The AR states some of the problems will be addressed by the Orient Project: “This alternative also proposes to remove a high sedimentation crossing of Deer Creek on 6100-450.” However the AR is only vague about other problems sources of sediment: “Additionally this alternative proposes to decommission several roads that are currently the most likely to contribute sediment to the East Deer Creek tributaries.”

The AR indicates the FS isn’t serious about reducing road density enough to really protect clean water: “The proposal to decommission 6.1 miles of level 1 roads would reduce overall density from the existing to 3.3 mi/mi² after project completion. ...The alternative also would also hydrologically stabilize approximately 30 miles of non-system roads. Though this reduction is **not enough to improve Watershed Condition framework road density scores** it **incrementally** moves road density towards the desired future condition.” (Emphases added.)

We discuss the problems of chronically undermaintained roads in the Section VII of this objection. In part, we discuss therein the failure of BMPs because they are only short-term solutions to part of the problem—which is mainly too many roads to maintain.

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 the 150-foot standard, the EA provides only a 50-foot buffer for wetlands: “Maintain no-cut buffers within 50 feet of all wetlands.” This violation of the Forest Plan/Eastside Screens Interim riparian standard violates NFMA. With the number of wetlands on national forest land and the vast extent of treatment units, this could result in hundreds or maybe even a few thousand acres of destructive, illegal logging.

The FS does not provide any documentation based on monitoring data from these areas that validates model flow and sediment predictions, sediment input effects, or its effects on the affected stream channels. Again, the paucity of scientifically credible monitoring on the CNF makes it impossible to validate the effects analysis.

The EA does not disclose how much aggradation of fine and/or bedload sediment will increase and persist in the affected streams. Knowledge of existing channel stability is crucial in evaluating how the affected streams would respond to a large peak flow event, and consequently

how these events would impact water quality and fish habitat. The EA does not include high quality information or expert agency comments, in violation of 40 CFR 1500.1(b) regarding water quality issues associated with the proposed timber sale(s).

The Orient EA and AR also fail to provide any quantitative analysis of the sediment caused by log haul and other vehicle traffic on the roads. 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.”

The Recreation Report states, “While Forest System Roads 9576, 9576300 and 6120450 are located outside of the project area, they are likely to be used as primary haul routes during implementation of the Orient Watershed project.” Yet the EA fails to account for the sedimentation and other resource impacts from this log haul.

The FS does not disclose the amount of existing accumulated fine and bedload sediment that remains from the previous logging and road construction. 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 FS does not disclose whether the predictions made in previous NEPA documents for projects carried out in the watershed was 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.

Remedy: Choose the No Action Alternative. Finish the ongoing process of revising the Forest Plan before preparing an EIS for the Orient projects, which remedies the above-noted deficiencies of the water quality analyses. Apply the Forest Plan/Eastside Screens Interim riparian standard 150-foot buffer to all wetlands.

XII. NATIVE FISH

We raised this issue on pp. pp. 17 - 18 of our EA comments. Within this section of the Objection, we incorporate the corresponding sections (with the identical headings) 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. Herein we also incorporate the section of this Objection entitled “FOREST PLAN IMPLEMENTATION MONITORING.”

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.

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.

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 Orient 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.

The Orient EA:

- fails to demonstrate compliance with INFISH standards;
- fails to analyze and disclose road-related impacts to water quality and fish;

- fails to demonstrate that the project is consistent with providing Forest Plan and NFMA viable populations of fish.

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 and AR 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 and AR contain no such analysis.

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 condition does 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. (Fishery Report p. 4)

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 on private land 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.

Given all the Orient EA's deficiencies, it fails to support a 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 Orient project. Complete consultation with the U.S. Fish & Wildlife Service concerning critical habitat and the revised forest plan.

XIII. CLIMATE CHANGE

We raised this issue on pp. 3 - 4 and 6 - 7 of our EA comments. Within this section of the Objection, we incorporate the corresponding sections (with the identical headings) 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.

Some politicians and status quo profiteers pretend there's nothing to do about climate change because it isn't real. The FS acknowledges it's real, focuses mainly on its symptoms and—like those politicians and profiteers—ignores and distracts from the causes it enables.

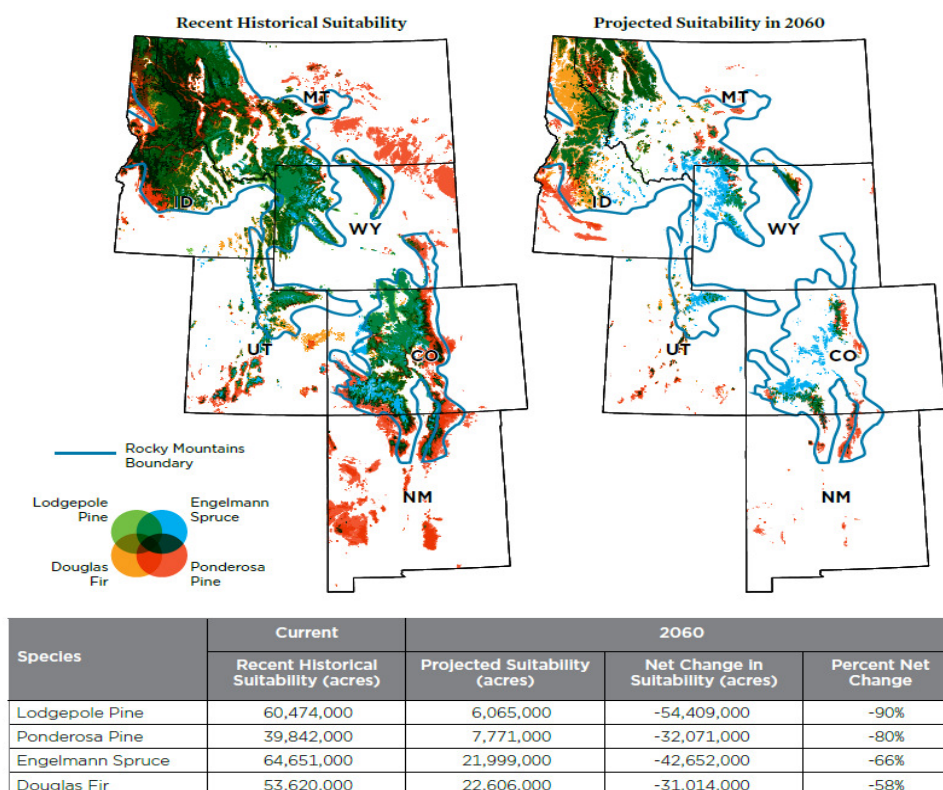
Pecl, et al. 2017 “review the consequences of climate-driven species redistribution for economic development and the provision of ecosystem services, including livelihoods, food security, and culture, as well as for feedbacks on the climate itself.” They state, “Despite mounting evidence for the pervasive 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.)

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.

For only one example of what Pecl et al. are talking about, the Orient EA doesn’t consider climate change effects on reforestation success. From a report by the Union of Concerned Scientists & Rocky Mountain Climate Organization (Funk et al., 2014):

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



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.

Although the Orient project area is not encapsulated on those comparison maps, it's just slightly west so it illustrates the point we're making: climate change-induced differences in tree species composition by 2060 may be drastic by the time Orient project tree regeneration is approaching commercial size. This seriously calls into question the CNF's 1980s forest plan suitable timber determination—which was the basis for all forest plan assumptions concerning commercial logging on the Forest. All timber bets are off, and it's time the FS stops pretending and starts acting on this.

Global climate change is a significant threat to humanity and forests. Climate change is caused by excess CO₂ 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. Since the time the forest plan was written, there is significant new information reinforcing the need to conserve all existing stores of carbon in forests to keep carbon in forests and out of the atmosphere, in order to mitigate climate change. Since all forests are an important part of the global carbon cycle, the agency must do its part by managing forests to maintain and increase carbon storage. Global warming is caused by the *cumulative* buildup of greenhouse gases, including CO₂, in the atmosphere. Logging will add to the cumulative total carbon emissions so it is clearly part of the problem and must be minimized. Logging will 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 will lag behind carbon storage in unlogged forests for decades or centuries.

Global warming and its consequences may be 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). The FS should recognize that all net carbon emissions from logging represent “irretrievable and irreversible commitments of resources.”

Clearly, the management of the planet’s forests is a nexus for addressing the largest crisis ever facing humanity. Yet the Orient EA fails to even provide a minimal quantitative analysis of project- or agency-caused CO₂ emissions or consider the best available science on the topic. This is immensely unethical and immoral. The lack of detailed scientific discussion in the Middle-South EA concerning climate change is far more troubling than the document’s failures on other topics, because the consequences of unchecked climate change will be disastrous for food production, sea level rise, and water supplies, resulting in complete turmoil for all human societies. This is an issue as serious as nuclear annihilation (although at least with the latter we’re not already pressing the button).

Respected experts say that the atmosphere might be able to safely hold 350 ppm of CO₂.¹³ So when we were at pre-industrial levels of about 280 ppm, we had a cushion of about 70 ppm which represents millions of tons of GHG emissions. Well, now that cushion is completely gone. We are already at about 400 ppm CO₂ and rising, so what’s the safe level of additional emissions (from logging or any other activity)? It’s negative. There is no safe level of additional emissions that our earth systems can tolerate. In fact, we need to be removing carbon, not adding carbon to the atmosphere.¹⁴ How could we do that? By growing forests. Logging moves us away from our objective while conservation moves us toward our objective.

¹³ <http://www.350.org/about/science>.

¹⁴ “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/exploring-biocarbon-tools/comment-page-1/#comment-375371>

Also see “Scientists Letter to the Senate on carbon neutrality of forest biomass.”

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 CO₂ 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 CO₂, 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 National Forest 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.

The effects of climate change have already been significant, particularly in the region.

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.

Pederson et al. (2009) note that western Montana has already passed through 3 important, temperature-driven ecosystem thresholds.

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.”

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 Orient EA ignores the large body of science on forest management's adverse effects on carbon sequestration. Also, the FS likes to claim that carbon emissions from projects such as Middle-South are minimal in the overall context of such things, however the FS avoids the logical step of analyzing and disclosing the cumulative effects of overall agency management contributions to climate change.

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..."

The Orient EA does not analyze or disclose the body of science that implicates logging activities as a contributor to reduced carbon stocks in forests and increases in greenhouse gas emissions.

The Idaho Panhandle National Forests plan revision draft EIS defines carbon sequestration: "...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."

The Orient EA fails to provide estimates of the total amount of CO₂ 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 CO₂. The Orient EA doesn't state that simple fact. The 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 Orient EA also ignores CO₂ and other greenhouse gas emissions from other common human activities related to forest management and recreational uses. These include emissions associated with machines used for logging and associated activities, vehicle use for administrative actions, recreational motor vehicles, and emissions associated with livestock grazing. The FS is simply ignoring the climate impacts of 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 CO₂ per year into the atmosphere. Can we really afford this?

Fossil fuel emissions created by motor vehicles can be estimated. The Orient EA fails to disclose the fossil fuel emissions caused by recreational activities and resource management activities.

Nitrous oxide, a by-product generated by the microbial breakdown of nitrogen in livestock manure, is a potent greenhouse gas completely ignored by the Middle-South EA. Also, the digestion of organic materials by livestock is a large source of methane emission. Methane is a far more potent substance than CO₂ causing climate change. 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.”

Saunio 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 CO₂ mitigation.” (Also see Saunio 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.

Returning to logging, 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 CO₂ 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 (CO₂) 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.
(Harmon & Law, 2016.)

Van der Werf, et al. 2009 discuss the effects of land-management practices and state:
(T)he maximum reduction in CO₂ emissions from avoiding deforestation and forest degradation is probably about 12% of current total anthropogenic emissions (or 15% if peat degradation is included) - and that is assuming, unrealistically, that emissions from deforestation, forest degradation and peat degradation can be completely eliminated.

...reducing fossil fuel emissions remains the key element for stabilizing atmospheric CO₂ concentrations.

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

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.

Harmon, 2009 reviews how the forest ecosystem stores carbon, the issues that must be addressed when assessing any proposed course of action, and some common misconceptions. He also reviews and assesses some of the more common proposals as well as general scientific concerns about the forest system as a place to store carbon.

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

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

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.”

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.

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.

Science can estimate the fossil fuel emissions created by recreational vehicles. But the Orient EA fails to disclose the fossil fuel emissions that timber sales and associated activities would cause.

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...”

Remedy: Choose the No Action Alternative. Finish the ongoing process of revising the Forest Plan before preparing an EIS for the Orient project. Conduct a cumulative effects analysis that examines climate change in the context of project activities and Desired Conditions.

XIV. FOREST PLAN IMPLEMENTATION MONITORING

We raised this issue on pp. 6, 7, 9 – 10, 13, 14, 15, 18 of our EA comments. Within this section of the Objection, we incorporate the corresponding sections (with the identical headings) 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. We also incorporate the Declaration of Jeff Juel in Case No. 2:16-CV-294-RMP.

Forest Plan monitoring is a necessary component of evaluating the impacts of implementing the forest plan at the project level. Included in the monitoring portion of the CNF Forest Plan are monitoring tasks to be carried out “continuously” throughout the life of the Forest Plan based upon data gathered in the field, with annual reports and periodic evaluations of the results reported annually. The FS has failed to comply with the monitoring requirements under the Forest Plan for: population trends and habitat uses of primary cavity nesters; management indicator species habitats and utilization of those habitats for species such as the pine marten, pileated woodpecker, three-toed woodpecker and several others; fisheries habitat capability and productivity; and changes in soil productivity after logging operations. Each of those items is relevant to the Orient 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 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 Orient 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 the undisclosed extent of timber harvest authorized by this privatization effort in our Colville National Forest.

Remedy: Choose the No Action Alternative. Complete the ongoing process of revising the Forest Plan before preparing an EIS for the Orient project.

XV. NOXIOUS WEEDS

Objectors discussed noxious weeds in EA comments (pp. 1, 3, 9, 12 - 13.). We supplement those comments with the following discussion.

The Orient EA and specialist reports do not disclose the degree to which the productivity of the land and soil has been affected in the project area and forestwide due to noxious weed infestations, and how that situation is expected to change in the coming years and decades. The EA lacks analysis of the effectiveness of the forestwide noxious weed treatment program, which is merely mitigation for management activities that exacerbate the spread of noxious weeds. The FS fails to disclose the effectiveness of this mitigation. The Lolo NF’s Jam Cracker EA states:

Any activity that exposes soil has the potential to accelerate weed spread. Factors limiting weed spread are shade from tree canopies, higher soil moisture, needle and grass litter that provides a mulch-like covering of the ground, lack of exposed soil, and native plant competition.

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.

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.

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.

XVI. ROADLESS AREAS AND ROADLESS EXPANSE

We raised this issue on pp. 7 - 8 of our EA comments.

The FS's Responses to Comments on the EA states: "The Orient Watershed Project decision would authorize fuels reduction treatments in about 750 acres of the Deer Creek PWA¹⁵ designed to help protect the drinking water supply for the Town of Orient. This would result in those 750 acres no longer meeting the criteria for potential wilderness." There is no consideration in the EA of project impacts to roadless characteristics and wilderness qualities of the Deer Creek PWA, and its likelihood to be designated Wilderness based upon project impacts.

Furthermore, the FS failed to respond to provide any analysis of uninventoried roadless areas that make up the Roadless Expanse. Roadless characteristics and Wilderness values would be degraded.

The FS's Responses to Comments on the EA defines the Roadless Expanse for the IRAs: "The 'roadless expanse' in the Orient project corresponds with the current boundary of the Deer Creek PWA."

This interpretation of the Roadless Expanse ignores the plain language of FS guidance and interpretation of legal precedents for roadless area analysis as documented in "Our Approach to Roadless Area Analysis of Unroaded Lands Contiguous to Roadless Areas" (12/2/10). There is no consideration in the EA of uninventoried, unroaded lands adjacent to the IRA/PWA and of project impacts to roadless characteristics and wilderness qualities of those areas. There is no map displaying boundaries, the adjacent roads, and proposed activities that potential impact roadless/unroaded.

The failure to take a hard look at the impacts to the PWA and the Roadless Expanse in its entirety violates NEPA.

¹⁵ Potential Wilderness Area

Remedy: Select the No Action Alternative. Otherwise, prepare an EIS that includes a proper analysis of impacts on inventoried and uninventoried roadless areas.

XVII. RANGE OF ALTERNATIVES

We raised this issue on pp. 2 - 5 of our comments on the EA. The failure to consider and fully analyze other alternatives violates NEPA. And because the FS is obligated to prepare an EIS as we explain above, the project is not consistent with the HFRA.

Remedy: Select the No Action Alternative. Otherwise, prepare an EIS that fully analyzes other reasonable alternatives, especially one as described in our EA comments.

Sincerely submitted,

/S/

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