From:	Michael Garrity
To:	FS-appeals-northern-regional-office
Subject:	Corrected Objection: Buckskin Saddle Integrated Restoration Project.
Date:	Thursday, August 27, 2020 12:58:37 PM
Attachments:	Buckskin Saddle Objection copy.pages 160621_USCan_Linkage_SCY_compressed-1.pdf

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August 27, 2020
To: Objection Reviewing Officer
USDA Forest Service Northern Region
26 Fort Missoula Road
Missoula, MT 59804

Pursuant to 36 CFR Part 218, the Alliance for the Wild Rockies (AWR) (lead objector), Paul Sieracki, and Wild Idaho Rising Tide file this attached Objection in pdf format to the Environmental Assessment (EA) and draft Decision Notice (DN) for the Buckskin Saddle Integrated Restoration Project. Please accept this objection as a replacement for the one I emailed yesterday.

Please continue to accept the additional objection that Sara Johnson filed for the Alliance for the Wild Rockies.

Buckskin Saddle Integrated Restoration Project.

Sincerely yours,

Mike Garrity (lead objector)
Executive Director Alliance for the Wild Rockies
P.O. Box 505
Helena, Montana 59624
406-459-5936

And for

Paul Sieracki
77 E Lincoln Ave
Priest River, ID 83856

And for
Helen Yost
Community organizer
Wild Idaho Rising Tide
301 N. First Avenue 209B
Sandpoint, Idaho 83864

August 27, 2020

Sent via email to: appeals-northern-regional-office@usda.-gov

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

Pursuant to 36 CFR Part 218, the Alliance for the Wild Rockies (AWR) (lead objector), Paul Sieracki and Wild Idaho Rising Tide file this Objection to the Environmental Assessment (EA) and draft Decision Notice (DN) for the Buckskin Saddle Integrated Restoration Project. This timber sale is proposed for the Sandpoint Ranger District in Bonner County and Shoshone County, Idaho on the Idaho Panhandle National Forest (IPNF) and the Responsible Official is Michelle L. Caviness – Acting District Ranger.

The draft DN's Selected Alternative is alternative 2 Modified Proposed Action and features "Regeneration" logging on an estimated 2,860 acres with 13,217 of commercial logging and 6469 of non commercial logging, 27.2 miles of new road system construction and .39 miles of so called temporary roads. AWR fully participated during the public involvement process, including submitting comments on February 6, 2020. Paul Sieracki submitted separate comments.

Wild Idaho Rising Tide is a member group of the Alliance for the WildRockies.

The Alliance for the Wild Rockies also submitted an additional objection written by Sara Johnson.

We are concerned that the EA did not adequately address the following issues:

1) Cumulative sediment and scenery impacts on Lake Pend Oreille, from all the planned, lakeside, deforestation projects
2) Project-induced sedimentation of the Sandpoint lake water supply, from which we drink
3) Steep, project-denuded, lakeside mountains more prone to landslides and exacerbating tsunami threats during earthquakes, like the dozens under and around the lake in 2015 and 2016
4) Logging/roadbuilding sediment disturbance, mobilization, or burial of heavy metal and toxin pollution settled out in the Clark Fork River delta inlet to lake from upstream Superfund sites
5) Degraded forest scenery diminishing recreation and tourism opportunities and local economic pursuits, businesses, and benefits
6) Lack of transparency and public invitation and involvement in the PFC, apparent in its May 2019 meeting minutes not posted on the BS project website, but found by WIRT elsewhere on the internet
7) Use of project-killed trees as fuel for increasing numbers of purportedly clean/green energy, “biomass” and “biofuel” incinerators and/or the thousands-of-degrees hot furnaces of the PacWest silicon smelter planned near Newport

8) Removal of BS forests as overburden above silicon deposits for which IPNF recently permitted exploration and excavation and may also fuel the proposed Newport smelter.

This is new information that we did not have when we submitted our comments. The Forest Service did not, as required by NFMA, consult on the Buckskin Saddle project with the Kalispel Tribe, whose traditional territory encompasses the lake and surrounding lands (see attached map provided by the Kalispel tribe).

The Remedy is to withdraw the draft decision and consult with the Kalispel Nation.

In regards to the issues we raised in comments, the Forest Service (FS) responded inadequately. We therefore incorporate by reference our earlier comments into this Objection.

AWR submitted comments during the forest plan revision process, notifying the FS of the legal and ecological shortcomings of the agency's management direction at each step. Following publication of the Forest Plan and its Final EIS, we continued our participation by filing an objection identifying the many ways the Forest Plan and its EIS continued to provide unlawful and ecologically dangerous management direction of the Idaho Panhandle National Forest (IPNF). The agency's response to our objection did nothing to alleviate our concerns. The Buckskin Saddle Integrated Restoration EA and draft DN provide further evidence of the FS's ill-advised direction.

NFMA requires the FS to "not allow significant or permanent impairment of the productivity of the land." [36 C.F.R. § 219.27(a)(1).] NFMA requires the FS to "ensure that timber will be harvested from National Forest System lands only where—soil, slope, or other watershed conditions will not be irreversibly damaged." [16 U.S.C. 1604 (g)(3)(E).] AWR notified the agency of the many ways its revised forest plan fails to meet the letter of NMFA and fails to follow its own planning regulations, and how the process of forest plan development failed to comply with NEPA. At this juncture, with the unlawful implementation of the revised forest plan being initiated at the site-specific project level, AWR opposes this unlawful forest plan implementation project. This objection fully incorporates all of AWR's comments and other submissions made during the forest plan revision process, our Forest Plan Objection, and all the attachments and references included with those submissions, within these comments—on this site-specific project proposal.

On November 28, 2011 the FS issued the Record of Decision for the Revised Forest Plan Amendments for Motorized Access Management within the Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones on the Kootenai, Idaho Panhandle and Lolo National Forests (aka "Access Amendments"). AWR fully participated in the public process during the development of the Access Amendments, and incorporates its comments and appeal of that Decision within this objection.

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

The lynx issue was also raised in AWR's Forest Plan lion concerning Indicator MON-FLS-01-02 and FW-DC-VEG-04.

As this Objection discusses, multiple aspects of the Buckskin Saddle project raise questions of significant and/or cumulative effects, necessitating the preparation of an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA). These environmental impacts would not be "insignificant" under any definition, nor without cumulative effects.

ILLEGITIMATE PURPOSE AND NEED OF THIS PROJECT

AWR's comments raised the issue of the FS's improper Purpose and Need for developing the Buckskin Saddle Integrated Restoration proposal several times in our comments.

The EA claims there is a need to “Promote resilient vegetation conditions” and “Reduce the potential for high intensity wildfire while promoting desirable fire behavior characteristics and fuel conditions;”

First, the EA doesn’t demonstrate insect and disease or fire activity in the project area is in any way unusual or uncharacteristic of the forests in this ecosystem.

“Resiliency” tends to be a black box or red herring used by the FS to claim the forest isn’t healthy in the absence of data or analysis to back up such claims. The FS doesn’t disclose the metrics the agency uses to measure resiliency, so that objective measures of resiliency can be applied to the Buckskin Saddle project area by a scientist or any rational person now, immediately after the project is completed, and/or at later intervals.

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

The FS's view of ecosystems is inconsistent with a holistic ecosystem management approach, which would acknowledge the forest's capability of operating in a self-regulatory manner. For example, Harvey et al., 1994 state:

Although usually viewed as pests at the tree and stand scale, insects and disease organisms perform functions on a broader scale.

...Pests are a part of even the healthiest eastside ecosystems. Pest roles—such as the removal of poorly adapted individuals, accelerated decomposition, and reduced stand density—may be critical to rapid ecosystem adjustment.

...In some areas of the eastside and Blue Mountain forests, at least, the ecosystem has been altered, setting the stage for high pest activity (Gast and others, 1991). This increased activity does not mean that the ecosystem is broken or dying; rather, it is demonstrating functionality, as programmed during its developmental (evolutionary) history.

Castello et al. (1995) state:

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

In dozens of places the EA uses the word "resilient" or "resilience" in terms of how the project increases it, or how its chasing Forest Plan DCs by increasing the "resilience" of the ecosystem or some aspect of it. The Forest Plan defines "resilience" as: "The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to adapt to stress and change." The Forest Plan defines "restoration" in part, as "the process of assisting the recovery of resilience." And the Forest Plan defines Forest Health as "An ecological perspective that looks at the resiliency of an ecosystem and its ability to be sustainable."

However, the Buckskin Saddle Integrated Restoration EA 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.

Resilience is a scientific term that may be used to characterize forest ecosystems. However, mostly what we read about resilience from the EA and Forest Plan is that it's what happens when the forest is managed (i.e., mostly logged or prescribe burned), and the more the forest is logged and burned, the more resilient it becomes. Also we read that nothing that happens naturally, without management, will increase resilience. In other words, from the FS's perspective, resilience can only be manufactured, engineered, or imposed by management. So the term "resilience" as used by the FS is invalid, rendering much of the analyses confusing and misleading.

There is a need to "Improve big game winter range conditions and promote forage opportunities"[3] but such a need is not validated. It is merely thinly veiled justification for logging.

AWR's Objection to the Forest Plan notes that the scientific basis for its standards, guidelines, and other components/direction is not well established. Consequently since the Buckskin Saddle Integrated Restoration project is tiered to the Forest Plan, then in order to consider best available science the FS must finally explain what science it has considered for all forest plan components/direction.

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

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

Other scientific information contradicts some of the premises upon which the EA is based. Bradley, et al. 2016 "found forests with higher levels of protection had lower severity values even though they are generally identified as having the highest overall levels of biomass and fuel loading." Among the major findings were that areas undisturbed by logging experienced significantly less intensive fire compared with areas that have been logged. From a news release announcing the results of the study (http://www.biologicaldiversity.org/publications/papers/):

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

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

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

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

Elsewhere we explain there is no need to "Maintain or improve old growth character within existing old growth" nor is there scientific support for this agenda.

The EA claims there is a need to "Promote early seral tree species" but if this were true, there is no explanation why the FS doesn't manage consistently with Forest Plan direction to accept natural processes and respond to the EA's expressed need to "Encourage fire's ecological function" which would do the job if the FS wasn't continuously suppressing fire and other natural processes.

The EA also fails to provide a rational explanation of the alleged need to conduct logging with "treatments ...consistent with the patch size and pattern" that would naturally occur anyway. Churchill, 2011 points out:

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

(Emphases added.) Churchill describes above the ongoing natural processes that will alleviate the need to "Diversify successional stages" alleged in the EA—without expensive and ecologically risky logging and road building. Since no proper spatial analysis of the landscape pattern's departure has been completed, the EA has no scientifically defensible logging solution.

The definition of Wildland Urban Interface does not conform to any rational criteria, in regards to the alleged need to reduce fire risk in the project area.

Remedy: Select the No Action alternative plus the proposed road decommissioning and storage. Otherwise, respond to Objections as if they were comments on an EIS, and withdraw the Draft DN and prepare an Environmental Impact Statement.

UNLAWFUL FOREST PLAN

We wrote in our comments:

- ***The Forest Plan revision process itself violated NEPA and NFMA and failed to utilize the best available science. Implementing actions under the Forest Plan would be significant. Therefore these comments identify legal deficiencies of the Forest Plan as well as the project proposal.***
  The Forest Plan exhibits a relative absence of explicit reference to the 1982 planning rule. The Forest Plan is inconsistent with the regulations written to guide planning under NFMA.
  Many Forest Plan Objectives are not linked with Forest Plan Goals, as required.
  The use of the word "should" in Forest Plan Standards and Guidelines allows land managers to have too much or undefined levels of discretion.
  "Short term" and "long term" are not adequately defined in the Forest Plan.
  The Forest Plan desired ranges for dominance groups are not supported by reliable historic data taken from IPNF surveys or scientific research. Also, the FS has not explained how the effects of climate change and white pine blister rust affect the attainability of those desired ranges.

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The Forest Plan desired ranges for Size Class are not supported by reliable historic data taken from IPNF surveys or scientific research. And the FS has not explained how the effects of climate change and white pine blister rust affect the attainability of those desired ranges.

In FW-DC-VEG-03 the term "substantial amounts" is not defined. The desired "greater increase" related to the identified tree species is not supported by citation to specific reliable historic data taken from IPNF surveys or scientific research. The FS has not explained how the effects of climate change and white pine blister rust affect the attainability of those increases.

In FW-DC-VEG-04 the implication that trees are generally too dense on the IPNF is not supported by specific reliable historic data gathered from IPNF surveys or scientific research.

In FW-DC-VEG-05 the desired increase in size of forest patches in the seedling and sapling size classes and decreases in size of forest patches in the small and medium size classes is not supported by specific reliable historic data gathered from IPNF surveys or scientific research.

In FW-DC-VEG-06 the implied assertion that root fungi and forest insects are causing too much tree mortality on the IPNF is not supported by specific reliable historic data gathered from IPNF surveys or scientific research.

In FW-DC-VEG-07 the desired ranges for snags are not supported by reliable historic data taken from IPNF surveys or scientific research. The scientific basis for the delineation of snags into two diameter groups using 20” d.b.h. as the division point is not established.

In FW-DC-VEG-11 the desired ranges for forest composition, structure, and pattern for each biophysical setting are not supported by reliable historic data taken from IPNF surveys or scientific research. The Forest Plan does not explained how the effects of climate change and white pine blister rust affect the attainability of those desired ranges.

The Forest Plan does not cite the scientific basis for the minimum amounts of coarse woody debris to be retained under Guideline FW-GDL-VEG-03.

In FW-GDL-VEG-05 it is unclear if the use of the word “should” is intended to recognize the second consistency requirement on page 4 of the Forest Plan, or if it is intended to render the entire Guideline to be discretionary. Also, the “fire salvage” provision for using untreated areas to meet snag requirement would lead to insufficient retention in logged areas.

In FW-GDL-VEG-06 it is unclear if the use of the word “should” is intended to recognize the second consistency requirement on page 4 of the Forest Plan, or if it is intended to render the entire Guideline to be discretionary.

The first sentence of FW-GDL-VEG-08 along with the consistency requirement on page 4 of the Forest Plan *suggest that any silvicultural system may be used in any proposed treatment unit, regardless of its appropriateness.*

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Essentially, FW-DC-FIRE-02 and Guideline MA6-GDL-FIRE-01 can be used to justify treatments regardless if they result in forest conditions that would not likely occur naturally, or if the biophysical setting would require frequent, intensive fuel treatments to maintain the desired fuel conditions. Regardless of natural fire regime, "Fire behavior is characterized by low- intensity surface fires with limited crown fire potential." Also, they prioritize fuel reduction over natural processes that create important wildlife habitat components and maintain soil productivity.

The wording of FW-DC-TBR-03 essentially nullifies any meaningful distinction between suitable and unsuitable land, and together FW-OBJ-TBR-01, MA6-STD-TBR-01, and the ASQ (FW-DC-TBR-04), encourages logging in unsuitable land. One or more of the "purposes" of logging it allows in land that is "unsuitable" appear in every timber sale NEPA document.

FW-DC-TBR-04. The Allowable Sale Quantity (ASQ) of 120 million board feet annually is not based upon scientifically sound modeling that adequately considers ecological and economic constraints. It is simply not ecologically sustainable. It creates a sense of false expectations for forest products industries.

FW-OBJ-TBR-01. This timber target provides incentives which conflict with ecological sustainability. The annual target of offering 45 million board feet is not based upon scientifically sound modeling that adequately considers ecological and economic constraints. It creates a sense of false expectations for forest products industries

FW-STD-TBR-02 perpetuates the fiction that there is a category of natural processes that are some sort of "catastrophe." This effectively translates to dead trees not being logged (not maximizing timber volume produced) as the catastrophe rather than there really being something truly ecologically harmful.

Desired Condition FW-DC-SES-04 perpetuates the Smoky Bear myth that protection from fire is a promise that the government can and should make. Unlike the direction provided in the Forest Plan Fire section, there is no recognized balance with ecological considerations. This Desired Condition does not provide any further increment of public safety.

The EA states, "Fifty-seven percent of the National Forest System lands within the project area have been determined to be suitable for timber production: Please cite the specific documentation which determined that these specific lands (57% of the national forest land in the project area) are suitable for timber production. We want to know when and how this was determined.

To the degree the forest plan direction has legitimacy, the EA fails to state all the relevant Plan direction and demonstrate consistency with it.

We also wrote:

Ecologically Deficient Forest Plan "Desired Conditions"

The FS's "desired conditions" rationale is inconsistent with a more holistic ecosystem management approach, which acknowledges the forest's capability of operating in a self- regulatory manner. For example, Harvey et al., 1994 state:

Although usually viewed as pests at the tree and stand scale, insects and disease organisms perform functions on a broader scale.

...Pests are a part of even the healthiest eastside ecosystems. Pest roles—such as the removal of poorly adapted individuals, accelerated decomposition, and reduced stand density—may be critical to rapid ecosystem adjustment.

...In some areas of the eastside and Blue Mountain forests, at least, the ecosystem has been altered, setting the stage for high pest activity (Gast and others, 1991). This increased activity does not mean that the ecosystem is broken or dying; rather, it is demonstrating functionality, as programmed during its developmental (evolutionary) history. (Emphasis added.)

Would the above statement—made by government scientists as part of their participation with the Interior Co-

lumbia Basin Ecosystem Management Project—be automatically rejected from consideration as Best Available Science for the Buckskin Saddle process, because it is inconsistent with the assumptions contained in the Scoping Notice?

The EIS must demonstrate consistency with all the applicable direction in the Forest Plan to comply with NEPA and NFMA.

The IPNF Forest Plan and its wildlife viability methodology rely heavily upon the assumption that the FS knows the Historic Range of Variability (HRV) of a wide enough set of vegetation/habitat parameters, upon which "Desired Conditions" are constructed, and toward which "movement" is most of what's necessary for determining Forest Plan/NFMA compliance. Yet the reliability of the data sources used to construct the HRV is not disclosed. The data sources themselves are not identified or obscure.

The Forest Plan relies upon static Desired Conditions (DCs) to direct active management on the IPNF. The philosophy driving the FS strategy to "move toward" and replicate historic vegetative conditions (basically, replace natural processes with logging and prescribed burning) is that emulation of the results of disturbance processes would conserve biological diversity. McRae et al. 2001 provide a scientific review summarizing empirical evidence that finds marked contrasts between the results of logging and wildfire. A plethora of scientific evidence directs that DCs be more properly stated in terms of desired *future dynamics, in line with best available science. Hessburg and Agee (2003) for example, state:*

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

Likewise, Sallabanks, et al., 2001 state:
Given the dynamic nature of ecological communities in Eastside (interior) forests and woodlands, particularly regarding potential effects of fire, perhaps the very concept of defining "desired future conditions" for planning could be replaced with a concept of describing "desired future dynamics."

McClelland (undated) criticizes the aim to achieve desired conditions by the use of mitigation measures calling for retention of specific numbers of certain habitat structures:

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

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

Noss 2001 describes basic ecosystem components: Ecosystems have three basic components: composition, structure, and function. Together, they define biodiversity and ecological integrity and provide the foundation on which standards for a sustainable human relationship with the earth might be crafted.

(Emphasis added.) Noss 2001 goes on to define those basic components:
Composition includes the kinds of species present in an ecosystem and their relative abundances, as well as the composition of plant associations, floras and faunas, and habitats at broader scales. We might describe the composition of a forest, from individual stands to watersheds and regions.

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

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

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

Noss and Cooperrider (1994) state:

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

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

Forest Service researcher Everett (1994) states:
To prevent loss of future options we need to simultaneously reestablish ecosystem processes and disturbance effects that create and maintain desired sustainable ecosystems, while conserving genetic, species, community, and landscape diversity and long-term site productivity. ...We must address restoration of ecosystem processes and disturbance effects that create sustainable forests before we can speak to the restoration of stressed sites; otherwise, we will forever treat the symptom and not the problem. ...

One of the most significant management impacts on the sustainability of forest ecosystems has been the disruption of ecosystem processes through actions such as fire suppression (Mutch and others 1993), dewatering of streams for irrigation (Wissmar and others 1993), truncation of stand succession by timber harvest (Walstad 1988), and maintaining numbers of desired wildlife species such as elk in excess of historical levels (Irwin and others 1993). Several ecosystem processes are in an altered state because we have interrupted the cycling of biomass through fire suppression or have created different cycling processes through resource extraction (timber harvest, grazing, fish harvest). (Emphases added.)

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

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

The EA also fails to provide a rational explanation of the alleged need to conduct logging to mimic natural processes' effects creating patch size and pattern. Churchill, 2011 points out:

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

(Emphases added.) Churchill describes above the ongoing natural processes that will alleviate the vegetative imbalances alleged in the EA—without expensive and ecologically risky logging and road building. Since no proper spatial analysis of the landscape pattern's departure has been completed, the EA has no scientifically defensible logging solution.

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

(W)hat may be more important than restoring structure is restoring the process of fire (Stephenson 1999). By allowing fire to resume its natural role in limiting density and reducing surface fuels, competition for growing space would be reduced, along with potential severity in subsequent fires (Fule and Laughlin 2007). As a result, we contend that the forests in Illilouette and Sugarloaf are becoming more resistant to ecosystem perturbations (e.g. insects, disease, drought). This resistance could be important in allowing these forests to cope with projected changes in climate. ... Although it is not ubiquitously ap-

plicable, (wildland fire use) could potentially be a cost-effective and ecologically sound tool for "treating" large areas of forested land. Decisions to continue fire suppression are politically safe in the short term, but ecologically detrimental over the long term. Each time the decision to suppress is made, the risk of a fire escaping and causing damage (social and economic) is essentially deferred to the future. Allowing more natural fires to burn under certain conditions will probably mitigate these risks. If the public is encouraged to recognize this and to become more tolerant of the direct, near-term consequences (i.e. smoke production, limited access) managers will be able to more effectively use fire as a tool for restoring forests over the long term.

Typically, vegetation management proposals and their accompanying NEPA documents on the IPNF acknowledge that attempts to control or resist the natural process of fire have been a contributor to deviations from DCs. This Buckskin Saddle proposal is no exception. Often these same documents characterize fire as well as native insects and other natural pathogens as threats to the ecosystem rather than rejuvenating natural processes. They seem to need such an obsolete viewpoint in order to justify and prioritize the proposed vegetation manipulations, tacitly for *replacing natural processes with "treatments" and "prescriptions." However the scientific support for assuming that large landscapes and ecosystems can be restored or continuously maintained by such manipulative actions is entirely lacking.*

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

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

(Emphases added.) In their conclusion, Hessburg and Agee, 2003 state "Desired future conditions will only be realized by planning for and creating the desired ecosystem dynamics represented by ranges of conditions, set ini-

tially in strategic locations with minimal risks to species and processes."

The Forest Service Responded:

Land Management Plan (IPNF 2015 Forest Plan) direction is explained in the EA pp. 2-3. The Forest Plan was signed in 2015 and is the legal planning document for this project. Please refer to https://www.fs.usda.gov/detail/ipnf/landmanagement/planning/?cid=stelprdb5436518

The DDN and EA violate NFMA, NEPA, the APA, the ESA and the Clean Water Act.

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

We wrote in our comments:

Cumulative Effects

"The existing vegetation condition encompasses the cumulative effects analysis area and captures the effects of past activities on the forest vegetation resource in the planning area. Direct and indirect effects of the activities proposed in alternative 2 are additive to the activities which have led to the existing condition." This is typical of cumulative effects (non)analysis in the EA. To paraphrase, things are the way they are now because things happened in the past, and never mind that data is lacking to adequately describe the way things are now.

Project activities and their environmental impacts will extend beyond the mapped project area boundary shown on the map, and the FS is obligated to acknowledge and disclose those impacts. The FS should utilize an analysis area formed by the watershed boundaries encompassing all the logging and any other proposed active management.

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

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

- A list of the monitoring commitments made in all previous NEPA documents covering the analysis area.

- The results of all that monitoring.

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

- A summary of all monitoring of resources and conditions relevant to the proposal or analysis area as a part of the Forest Plan monitoring and evaluation effort.

- A cumulative effects analysis which includes the results from the monitoring required by the
  Forest Plan.
  Please provide an analysis of how well those past FS projects met the goals, objectives, desired conditions, etc. stated in the corresponding NEPA documents, and how well the projects conformed to forest plan standards and guidelines.
  Those items are a critical part of the NEPA analysis. Without this critical link the validity of the FS's current assumptions are baseless. Without analyzing the accuracy and validity of the assumptions used in previous NEPA processes one has no way to judge the accuracy and validity of the current proposal. The predictions made in previous NEPA processes also need to be disclosed and analyzed because if these were not accurate, and the agency is making similar decisions, then the process will lead to failure. For instance, if in previous processes the FS said they were going to do a certain monitoring plan or implement a certain type of management and these were never effectively implemented, it is important for the public and the decision maker to know. If there have been problems with FS implementation in the past, it is not logical to assume that implementation will now all of a sudden be appropriate. If prior logging, prescribed fire and other "forest health treatments" have not been monitored appropriately, then there is no valid reason for this project.
  Please analyze and disclose the cumulative effects of past, ongoing, and proposed management actions, within a logically defined cumulative effects analysis area, on land of all ownerships. Please disclose if the FS has performed all of the monitoring and mitigation required or recommended in those

NEPA documents, and the results of the monitoring. The FS would be unable to properly analyze and disclose cumulative effects of management plan implementation if it is not adequately informed by past project monitoring and plan-mandated monitoring.

8

Please provide an analysis to determine if implementation of past management activities contributed to the claimed deficiency in resiliency.

The Forest Service responded:

The project boundary follows watershed boundaries where applicable. Each resource will use different cumulative effects boundaries depending on what they are analyzing for. The Hydrology Report includes a cumulative effects /watershed map on p. 9 and cumulative effects are listed on pp. 25-28.

The EA fails to analyze and disclose all of the cumulative impacts such as the cumulative effects of the ongoing North Zone Roadside Salvage Project and the foreseeable Chloride Gold Project.

The Remedy is to choose the No Action Alternative or to withdraw the draft DN and write an EIS that fully complies with the law.

We wrote extensively about climate change in our comments starting on page 13:

Climate Change and Carbon Sequestration

Please analyze how proposed management actions would be affected by likely climate change scenarios. Please quantify all human-caused CO_2 emissions for all project activities. Please quantify carbon sequestration for each alternative. Please disclose how climate change has affected ecological conditions in the project area, and include an analysis of these conditions under climate change scenarios.

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

Global climate change is a massive, unprecedented threat to humanity and forests. Climate change is caused by excess CO_2 and other greenhouse gases transferred to the atmosphere from other pools. All temperate and tropical forests, including those in this project area, are an important part of the global carbon cycle. There is significant new information reinforcing the need to conserve all existing large stores of carbon in forests, in order to keep carbon out of the atmosphere and mitigate climate change. The agency must do its part by managing forests to maintain and increase carbon storage. Logging would add to cumulative total carbon emissions so is clearly part of the problem, so it must be minimized and mitigated.

Logging would not only transfer carbon from storage to the atmosphere but future regrowth is unlikely to ever make up for the effects of logging, because carbon storage in logged forests lags far behind carbon storage in unlogged forests for decades or centuries. And before recovery, the agency plans even more activities causing greenhouse gas emissions.

The Forest Service responded:

Changing climate conditions, carbon cycling,and how they pertain this project are explained in the response to comments # 14-18, 14-19 and 14-56.

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

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

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

We add this observation from Frissell and Bayles (1996):
Most philosophies and approaches for ecosystem management put forward to date are limited (perhaps doomed) by a failure to acknowledge and rationally address the overriding problems of uncertainty and ignorance about the mechanisms by which complex ecosystems respond to human actions. They lack humility and historical perspective about science and about our past failures in management. They still implicitly subscribe to the scientifically discredited illusion that humans are fully in control of an ecosystemic machine and can foresee and manipulate all the possible consequences of particular actions while deliberately altering the ecosystem to produce only predictable, optimized and socially desirable outputs. Moreover, despite our well-demonstrated inability to prescribe and forge institutional arrangements capable of successfully implementing the principles and practice of integrated ecosystem management over a sustained time frame an at sufficiently large spatial scales, would-be ecosystem managers have neglected to acknowledge and critically analyze past institutional and policy failures. They say we need ecosystem management because public opinion has changed, neglecting the obvious point that public opinion has been shaped by the glowing promises of past managers and by their clear and spectacular failure to deliver on such promises.

And as the KNF's March 2017 Galton Final Environmental Impact Statement explains:
This analysis identifies specific disturbance processes, together with landform and other environmental elements, which have influenced the patterns of vegetation across the Decision Area. Vegetative Response Units (VRUs) were used to define and describe the

components of ecosystems. VRUs are used to describe an aggregation of land having similar capabilities and potentials for management. These ecological units have similar properties in natural communities: soils, hydrologic function, landform and topography, lithology, climate, air quality, and natural processes (nutrient and biomass cycling, succession, productivity, and fire regimes).

Each VRU has a characteristic frequency and type of disturbance based on its climate, soils, vegetation, animals, and other factors. Populations of native plants and animals have responded and adapted to these characteristic disturbance regimes over time (~2500 years) and the resulting vegetation patterns, processes, and structure within a historical range of variability. These characteristic processes, patterns, and structure are termed “Reference Conditions”.

It’s clear that “reference conditions” are no longer valid conceptually as a management target. Pederson et al. (2009) note that western Montana has already passed through 3 important, temperature-driven ecosystem thresholds. Westerling, et al. 2006 state:

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

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

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

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

The EA fails to analyze and disclose how climate change is already, and is expected to be even more in the future, influence forest ecology. This has vast ramifications as to whether or not the forest in the project area will respond as the FS assumes. As the forest plan FEIS states, "Forest Plan management strategies may affect the composition, structure, and landscape pattern of forests. This could influence the susceptibility and resiliency of the forests to significant disturbance agents such as large intense wildfires, insect and disease epidemics, weather events, and climate change." One of the needs for forest plan revision revolves around "concerns that the forest composition, structure, and pattern had shifted away from historical conditions to the extent that ecosystems, and the goods and services that it provided, may not be sustainable, especially in light of potential impacts from climate change." (Id.) It also states:

The 1987 Forest Plan does not contain direction on moving towards historic conditions or to improve resistance and resiliency in the light of climate change. Continued deviation from historic conditions would lead to changes in disturbance and succession processes, making it difficult to provide for a sustainable ecosystem.

The EA fails to
to water stress, competing vegetation, and repeat fires that burn young stands," which will likely lead to a dramatic increase in non-forest land acres. (Johnson, et al., 2016.)

acknowledge the likelihood that "...high seedling and sapling mortality rates due

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

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

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

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

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

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

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

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

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

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

KEY MESSAGES

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

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

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

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

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

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

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

occur during summer in the central and southern parts of the state. [moderate agreement, moderate evidence]

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

The FS's position on project impacts on climate change is that the project would have a miniscule impact on global carbon emissions. The obvious problem with that viewpoint is, once can say the same thing about every source of carbon dioxide and other greenhouse gas emission on earth, and likewise justify inaction as does this EA. In their comments on the KNF's Draft EIS for the Lower Yaak, O'Brien, Sheep project, the EPA rejected that sort of analysis, basically because that cumulative effects scale dilutes project effects. We would add that, if the FS wants to refer to a wider scope to analyze its carbon footprint, we suggest that it actually conduct such a cumulative effect analysis and disclose it in a NEPA document.

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

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

We incorporate the following article from the *Missoulian* (" 2019):

March 11,

Fire study shows landscapes such as

Bitterroot's Sapphire Range too hot, dry to restore trees") written by Rob Chaney (

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

Courtesy Kim Davis

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

“The drier aspects aren’t coming back, especially on north-facing slopes,” said Kim Davis, a UM landscape ecologist and lead investigator on the study. “It’s not soil sterilization.

Other vegetation like grasses are re-sprouting. It’s too warm. There’s not enough moisture for the trees.”

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

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

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

“We did over 4,000 miles of road-tripping across the West, as well as lots of miles hiking and backpacking,” Davis said. The survey crews brought back everything from dead seedlings to 4-inch-diameter tree rings; nearly 3,000 samples in total. Then they analyzed how long each tree had been growing and what conditions had been when it sprouted.

Before the 1990s, the test sites had enough soil moisture, humidity and other factors to recruit new seedlings after forest fires, Dobrowski said.

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

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

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

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

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

The study also found that soil sterilization wasn’t a factor in tree regrowth, even in the most severely burned areas. For example, the 2000 Sula Complex of fires stripped forest cover in the southern end of the Bitterroot Valley. While the lodgepole pine stands near

Lost Trail Pass have recovered, the lower- elevation Ponderosa pine and Douglas firs haven’ t.

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

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

The Resources Planning Act of 1974 (RPA) and National Forest Management Act of 1976 (NFMA) mandate long-range planning which impose numerous limitations on timber extraction practices and the amount of timber sold annually. These long range plans are based on assumptions, which are based on data, expert opinion, public participation and other factors which mostly view from a historical perspective. So it's time to peer into the future to examine closely (NEPA: "take a hard look at") those assumptions.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The EA doesn't address the question of how lands were determined to be suitable for the type of management ongoing or proposed. It does not cite the specific documentation which determined that the specific areas proposed for logging in this proposal are suitable for timber production.

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

Davis et al., 2019 state: "

At dry sites across our study region, seasonal to annual climate

conditions over the past 20 years have crossed these thresholds, such that conditions have

become increasingly unsuitable for regeneration. High fire severity and low seed availability

further reduced the probability of postfire regeneration. Together, our results demonstrate that

climate change combined with high severity fire is leading to increasingly fewer opportunities

for seedlings to establish after wildfires and may lead to ecosystem transitions in low-elevation

ponderosa pine and Douglas-fir forests across the western United States."

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

The EA does not disclose restocking monitoring data and analysis.

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

The FS must finally accept scientific research and opinion that recognizes the critical challenge posed by climate change to global ecosystems and the IPNF. The statement in the 2010 KIPZ Climate Change Report, "Harvested wood products increase the net sequestration on these forests by an undetermined amount" is unsubstantiated by cited scientific research or information. The statement frames the position of denial that FS officials adopt as policy.

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

The EA fails to analyze how proposed management actions would be affected by likely climate change scenarios. The EA fails to quantify all human-caused CO_2 emissions for all project activities or quantify carbon sequestration for each alternative. The EA doesn't disclose how climate change has affected ecological conditions in the project area, and include an analysis of these conditions under climate change scenarios.

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

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

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

There is no cumulative effects analysis of IPNF carbon sequestration over time.

Respected experts say that the atmosphere might be able to safely hold 350 ppm of CO_2.[5] So when the atmosphere was at pre-industrial levels of about 280 ppm, there was a cushion of about 70 ppm which represents millions of tons of greenhouse gas emissions. Well, now that cushion is completely gone. The atmosphere is now over 400 ppm CO_2 and rising. Therefore the safe level of additional emissions (from logging or any other activity) is negative. There is no safe level of additional emissions that our earth systems can tolerate. We need to be removing carbon from the atmosphere—not adding to it.[6] How? By allowing forest to grow. Logging moves us away from our objective while conservation moves us toward our objective.

Pecl, et al. 2017 "review the consequences of climate-driven species redistribution for economic development and the provision of ecosystem services, including livelihoods, food security, and

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

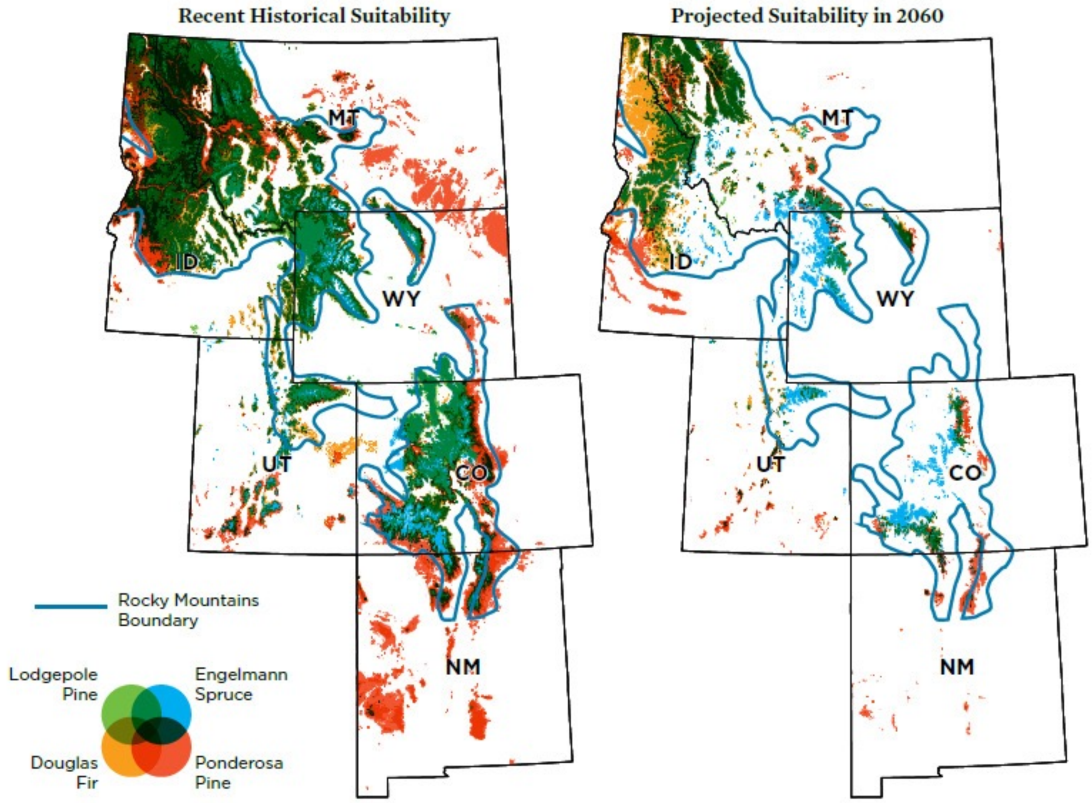
culture, as well as for feedbacks on the climate itself." They state, "Despite mounting evidence for the pervasive and substantial impacts of a climate-driven redistribution of Earth's species, current global goals, policies, and international agreements fail to account for these effects. ... To date,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

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

The caption under Funk et al.'s Figure 5 and Table 1 states: Much of the current range of these four widespread Rocky Mountain conifer species is projected to become climatically unsuitable for them by 2060 if emissions of heat-trapping gases continue to rise. The map on the left shows areas projected to be climatically suitable for these tree species under the recent historical (1961–1990) climate; the map on the right depicts conditions projected for 2060 given medium-high levels of heat-trapping emissions. Areas in color have at least a 50 percent likelihood of being climatically suitable according to the models, which did not address other factors that affect where species occur (e.g., soil types). Emissions levels reflect the A2 scenario of the Intergovernmental Panel on Climate Change. For more about this methodology, see www.ucsusa.org/forestannex.

Pecl, et al. 2017 conclude:

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



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

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

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

Global climate change is caused by excess CO_2 and other greenhouse gases transferred to the atmosphere from other pools. Human activities, including combustion of fossil fuels and bioenergy, forest loss and degradation, other land use changes, and industrial processes, have contributed to increasing atmospheric CO_2, the largest contributor to global warming, which will cause temperatures to rise and stay high into the next millennium or longer.

The most recent measurements show the level of atmospheric carbon dioxide has reached 400 parts per million and will likely to remain at that level for millennia to come. Even if all fossil fuel emissions were to cease and all other heat-trapping gases were no longer emitted to the atmosphere, temperatures close to those achieved at the emissions peak would persist for the next millennium or longer.

Meeting the goals of the Paris Agreement now requires the implementation of strategies that result in negative emissions, i.e., extraction of carbon dioxide from the atmosphere. In other words, we need to annually remove more carbon dioxide from the atmosphere than we are emitting and store it long-term. Forests and soils are the only proven techniques that can pull vast amounts of carbon dioxide out of the atmosphere and store it at the scale necessary to meet the Paris goal. Failure to reduce biospheric emissions and to restore Earth's natural climate stabilization systems will doom any attempt to meet the Paris (COP21) global temperature stabilization goals.

The most recent U.S. report of greenhouse gas emissions states that our forests currently “offset” 11 to 13 percent of total U.S. annual emissions. That figure is half that of the global average of 25% and only a fraction of what is needed to avoid climate catastrophe. And while the U.S. government and industry continue to argue that we need to increase markets for wood, paper, and biofuel as climate solutions, the rate, scale, and methods of logging in the United States are having significant, negative climate impacts, which are largely being ignored in climate policies at the international, national, state, and local levels.

The actual carbon stored long-term in harvested wood products represents less than 10 percent of that originally stored in the standing trees and other forest biomass. If the trees had been left to grow, the amount of carbon stored would have been even greater than it was 100 years prior. Therefore, from a climate perspective, the atmosphere would be better off if the forest had not been harvested at all. In addition, when wood losses and fossil fuels for processing and transportation are accounted for, carbon emissions can actually exceed carbon stored in wood products.

Like all forests, the IPNF 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 IPNF Forest Plan draft EIS defines carbon sequestration: "The process by which atmospheric carbon dioxide is taken up by trees, grasses, and other plants through photosynthesis and stored as carbon in biomass (trunks, branches, foliage, and roots) and soils."

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

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

Off-road vehicles in California currently emit more than 230,000 metric tons — or
5000 million pounds — of carbon dioxide into the atmosphere each year. This is equivalent to the emissions created by burning 500,000 barrels of oil. The 26 million gallons of gasoline consumed by off-road vehicles each year in California is equivalent to the amount of gasoline used by 1.5 million car trips from San Francisco to Los Angeles.

. . . Off-road vehicles emit considerably more pollution than automobiles. According to the California Air Resources Board, off-road motorcycles and all-terrain vehicles produce 118 times as much smog-forming pollutants as do modern automobiles on a per-mile basis.

. . . Emissions from current off-road vehicle use statewide are equivalent to the carbon dioxide emissions from 42,000 passenger vehicles driven for an entire year or the electricity used to power 30,500 homes for one year.

Also, Sylvester, 2014 provides data on the amount of fossil fuel being consumed by snowmobiles in Montana, from which one can calculate the carbon footprint. The study finds that resident snow-mobilers burn 3.3 million gallons of gas in their snowmobiles each year and a similar amount of fuel to transport themselves and their snowmobiles to and from their destination. Non-residents annually burn one million gallons of gas in snowmobiles and about twice that in related transportation. So that adds up to 9.6 million gallons of fuel consumed in the pursuit of snowmobiling each year in Montana alone. Multiply that by 20 pounds of carbon dioxide per gallon of gas (diesel pickups spew 22 pounds per gallon) and snowmobiling releases 192 million pounds (96 thousand tons) of climate-warming CO_2 per year into the atmosphere. Can we really afford this?

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

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

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

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

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

Moomaw and Smith, 2017 state:
Multiple studies warn that carbon emissions from soil due to logging are significant, yet under-reported. One study found that logging or clear-cutting a forest can cause carbon emissions from soil disturbance for up to fifty years. Ongoing research by an N.C. State University scientist studying soil emissions from logging on Weyerhaeuser land in North Carolina suggests that "logging, whether for biofuels or lumber, is eating away at the carbon stored beneath the forest floor."

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

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

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

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

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

Van der Werf, et al. 2009 discuss the effects of land-management practices and state:
(T)he maximum reduction in CO_2 emissions from avoiding deforestation and forest degradation is probably about 12% of current total anthropogenic emissions (or 15% if peat degradation is included) - and that is assuming, unrealistically, that emissions from deforestation, forest degradation and peat degradation can be completely eliminated.

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

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

Keith et al., 2009 state:
Both net primary production and net ecosystem production in many old forest stands have been found to be positive; they were lower than the carbon fluxes in young and mature stands, but not significantly different from them. Northern Hemisphere forests up to 800 years old have been found to still function as a carbon sink. Carbon stocks can continue to accumulate in multi-aged and mixed species stands because stem respiration rates decrease with increasing tree size, and continual turnover of leaves, roots, and woody material contribute to stable components of soil organic matter. There is a growing body of evidence that forest ecosystems do not necessarily reach an equilibrium between assimilation and respiration, but can continue to accumulate carbon in living biomass, coarse woody debris, and soils, and therefore may act as net carbon sinks for long periods. Hence, process-based models of forest growth and carbon cycling based on an assumption that stands are even- aged and carbon exchange reaches an equilibrium may underestimate productivity and carbon accumulation in some forest types. Conserving forests with large stocks of biomass from deforestation and degradation avoids significant carbon emissions to the atmosphere. Our insights into forest types and forest conditions that result in high biomass carbon density can be used to help identify priority areas for conservation and restoration.

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

Our forests are functioning as carbon sinks (net sequestration) where logging has been reduced or halted, and wildland fire helps maintain high productivity and carbon storage.

Even large, intense fires consume less than 3% of the biomass in live trees, and carbon emissions from forest fires is only tiny fraction of the amount resulting from fossil fuel consumption (even these emissions are balanced by carbon uptake from forest growth and regeneration).

"Thinning" operations for lumber or biofuels do not increase carbon storage but, rather, reduce it, and thinning designed to curb fires further threatens imperiled wildlife species that depend upon post-fire habitat.

Campbell et al., 2011 also refutes the notion that fuel-reduction treatments increase forest carbon storage in the western US:

It has been suggested that thinning trees and other fuel-reduction practices aimed at reducing the probability of high-severity forest fire are consistent with efforts to keep carbon (C) sequestered in terrestrial pools, and that such practices should therefore be rewarded rather than penalized in C-accounting schemes. By evaluating how fuel treatments, wildfire, and their interactions affect forest C stocks across a wide range of spatial and temporal scales, we conclude that this is extremely unlikely. Our review reveals high C losses associated with fuel treatment, only modest differences in the combustive losses associated with high-severity fire and the low-severity fire that fuel treatment is meant to encourage, and a low likelihood that treated forests will be exposed to fire. Although fuel-reduction treatments may be necessary to restore historical functionality to fire-suppressed ecosystems, we found little credible evidence that such efforts have the added benefit of increasing terrestrial C stocks.

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 (IPNF) may not be viable—or as viable—under emerging climate conditions.

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

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

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

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

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

Some FS scientists recognize this changing situation, for instance Johnson, 2016:
Forests are changing in ways they’ve never experienced before because today’s growing conditions are different from anything in the past. The climate is changing at an unprecedented rate, exotic diseases and pests are present, and landscapes are fragmented by human activity often occurring at the same time and place.

The current drought in California serves as a reminder and example that forests of the 21st century may not resemble those from the 20th century. “When replanting a forest after disturbances, does it make sense to try to reestablish what was there before? Or, should we find re-plant material that might be more appropriate to current and future conditions of a changing environment?

“Restoration efforts on U.S. Forest Service managed lands call for the use of locally adapted and appropriate native seed sources. The science-based process for selecting these seeds varies, but in the past, managers based decisions on the assumption that present site conditions are similar to those of the past.

“This may no longer be the case.”

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

Patterns, mechanisms, projections, and consequences of tree mortality and associated broad-scale forest die-off due to drought accompanied by warmer temperatures—hotter drought", an emerging characteristic of the Anthropocene—are the focus of rapidly expanding literature.

...(R)ecent studies document more rapid mortality under hotter drought due to negative tree physiological responses and accelerated biotic attacks. Additional evidence suggesting greater vulnerability includes rising background mortality rates; projected increases in drought frequency, intensity, and duration; limitations of vegetation models such as inadequately represented mortality processes; warming feedbacks from die-off; and wildfire synergies.

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

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

Moomaw and Smith, 2017 conclude:
With the serious adverse consequences of a changing climate already occurring, it is important to broaden our view of sustainable forestry to see forests ...as complex ecosystems that provide valuable, multiple life-supporting services like clean water, air, flood control, and carbon storage. We have ample policy mechanisms, resources, and funding to support conservation and protection if we prioritize correctly.

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

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

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

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

The FS doesn't consider that the "desired" vegetation conditions may not be achievable or sustainable, nor conduct an analysis as to how realistic and achievable Forest Plan desired conditions are in the context of a rapidly changing climate, along an unpredictable but changing trajectory.

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

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

Harmon, 2009 is the written record of "Testimony Before the Subcommittee on National Parks, Forests, and Public Lands of the

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

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

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

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

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

INVENTORIED ROADLESS AREAS AND OTHER UN-ROADED AREAS

AWR's comments discuss the ecological value of roadless lands issue at p. 4. Also, issues regarding roadless areas and Wilderness were raised in our Objection to the revised forest plan (pp. 43, 47-67).

Please find our objection attached.

The Forest Plan lacks direction to update roadless area boundaries utilizing a transparent public procedures in order to evaluate unroaded areas contiguous with Inventoried Roadless Areas (IRAs) and Wilderness.

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

The Kootenai National Forest's Lower Yaak, O'Brien, Sheep Draft Environmental Impact Statement explains the concept of Roadless Expanse as explained in USDA Forest Service, 2010e:

Northern Region (Region 1) Direction for Roadless Area Analysis Region 1 provides additional guidance for roadless area analysis in a draft document titled "Our Approach to Roadless Area Analysis of Unroaded Lands Contiguous to Roadless Areas" (12/2/10). In summary this paper is based on court history regarding the Roadless Area Conservation Rule. The "Our Approach" document states that "projects on lands contiguous to roadless areas must analyze the environmental consequences, including irreversible and irretrievable commitment of resources on roadless area attributes, and the effects for potential designation as wilderness under the Wilderness Act of 1964. **This analysis must consider the effects to the entire roadless expanse; that is both the roadless area and the unroaded lands contiguous to the roadless area**.

(Emphasis added.) The FS must analyze and disclose impacts on the Roadless Characteristics and Wilderness Attributes of the Roadless Expanse. The public must be able to understand if the project would cause irreversible and irretrievable impacts on the suitability of any portion of Roadless Expanse for future consideration for Recommended Wilderness or for Wilderness designation under forest planning.

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

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

See the report by Friends of the Clearwater, "The Roadless Report: Analyzing the Impacts of Two Roadless Rules on Forested Wildlands" for an observation on how roadless rules are being exploited to downgrade the wilderness values and roadless characteristics of IRAs. The Forest Service responded:

Land Management Plan (IPNF 2015 Forest Plan) direction is explained in the EA pp. 2-3. The Forest Plan was signed in 2015 and is the legal planning document for this project. Please refer to https://www.fs.usda.gov/detail/ipnf/landmanagement/planning/?cid=stelprdb5436518

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

INADEQUATE EMPHASIS ON RESTORATION

AWR's comments at pp. 2-3 raise this issue. True restoration of already logged and roaded watersheds would prioritize removing the impediments to natural recovery. The Montana Forest Restoration Committee, 2007 adopted 13 Principles, written collaboratively by a diverse set of stakeholders which included the Supervisors of the Bitterroot and Lolo national forests along with representatives from timber and forest products industries, conservation groups, recreation interests, and others. Principle #3 states:

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

Consistent with this principle, the FS would have published a landscape assessment so a genuine public scoping process could guide project restoration priorities.

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

The EA reveals that most project activities not directly related to the commercial logging, burning, or other vegetation manipulation activities are dependent upon uncertain and unidentified funding sources and are therefore left optional. As discussed in the EA at p. 211 and 232:

This results in analyses which assume and disclose impacts as if such actions are just as certain as all the logging and road reopening, which is erroneous and a violation of NEPA.

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

ALTERNATIVES

AWR's comment letter expressed our perspective on alternative management direction at p. 3, also in the section entitled INADEQUATE EMPHASIS ON RESTORATION. The EA lacks an alternative that results in a road system which is fully affordable to maintain on an annual basis, within all of the watersheds affected by the proposal. Expected appropriations would be useful as the yardstick to measure "affordable", based on recent years' funding levels.

Such an alternative would reduce road densities to meet science-based ecological conditions for wildlife and fisheries. Wisdom et al. (2000) state:

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

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

Such an alternative would not damage soils, degrade forest wildlife habitat, and introduce sediment into streams by logging and building new roads, but instead focuses on fixing or removing the badly designed or under-maintained roads, restoring damaged soils, upgrading culverts, addressing noxious weeds, and focusing on other sources of erosion.

In analyzing such an alternative, it may turn out that some of the actions proposed for the action alternatives would be unnecessary or would be modified. For example, some roads proposed for maintenance or upgrading may not be affordable to maintain, or may be located where chronic sedimentation into streams persists. In such cases consideration of highest restoration priorities would require full road obliteration.

Such an alternative would reduce the road network in the project area watersheds consistent with best available science for maintaining robust populations of native fish and wildlife.

By reducing the footprint of roads, such an alternative would reduce the spread of noxious weeds and their associated costs and environmental damage.

Such an alternative would not construct any new roads, including temporary roads because, as the FS is aware, construction of temporary roads creates most of the same impacts as system roads.

Such an alternative would be in compliance with the Travel Management Rule Subpart A, which requires the FS to identify the forestwide minimum road system—itself necessarily being maintainable using expected annual appropriations. This alternative would be consistent with Montana Forest Restoration Committee Principle #13, which is to "Establish and maintain a safe road and trail system that is ecologically sustainable."

Such an alternative would maximize immediate carbon sequestration, because already dangerously elevated greenhouse gases are an immediate issue that must be addressed.

Remedy: Select the No Action alternative. Alternatively, prepare an EIS that addresses issues we've raised in timely earlier comments by fully analyzing an alternative as we previously identified.

DISCLOSURE AND ANALYSIS UNDER NEPA

AWR requested disclosure and analysis of project area conditions and other important issues so we and other interested segments of the public could better understand the context of the Buckskin Saddle project proposal. In particular, we listed many in our comments. This was largely ignored.

Also, as stated above, since many project activities not directly related to the commercial logging, burning, or other vegetation manipulations dependent upon uncertain and unidentified funding sources in order to be implemented. This results in resource analyses which disclose impacts as if these actions are just as certain as all the logging and road reopening, which is erroneous and a violation of NEPA.

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

ECOLOGICALLY DEFICIENT FOREST PLAN "DESIRED CONDITIONS"

AWR's comment letter discusses the problem with the FS's "desired conditions" and AWR's incorporated Objection to the revised forest plan also raises this issue in much detail.

Remedy: Select the No Action alternative. Alternatively, amend/revise the Forest Plan to finally address these issues as our Forest Plan Objection requests.

CLIMATE CHANGE AND CARBON SEQUESTRATION

AWR's August 2019 comment letter at p. 3 raises these highly relevant issues. Also, issues regarding climate change and carbon sequestration were raised in AWR's incorporated Objection to the revised forest plan (OBJECTION STATEMENT: FW-DC-VEG- 01, OBJECTION STATEMENT: FW-DC-VEG-02, OBJECTION STATEMENT: FW-DC- VEG-03, OBJECTION STATEMENT: FW-DC-VEG-1, and the section entitled "CARBON SEQUESTRA TION").

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

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

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

We add this observation from Frissell and Bayles (1996):
Most philosophies and approaches for ecosystem management put forward to date are limited (perhaps doomed) by a failure to acknowledge and rationally address the overriding problems of uncertainty and ignorance about the mechanisms by which complex ecosystems respond to human actions. They lack humility and historical perspective about science and about our past failures in management. They still implicitly subscribe to the scientifically discredited illusion that humans are fully in control of an ecosystemic machine and can foresee and manipulate all the possible consequences of particular actions while deliberately altering the ecosystem to produce only predictable, optimized and socially desirable outputs. Moreover, despite our well-demonstrated inability to prescribe and forge institutional arrangements capable of successfully implementing the principles and practice of integrated ecosystem management over a sustained time frame an at sufficiently large spatial scales, would-be ecosystem managers have neglected to acknowledge and critically analyze past institutional and policy failures. They say we need ecosystem management because public opinion has changed, neglecting the obvious point that public opinion has been shaped by the glowing promises of past managers and by their clear and spectacular failure to deliver on such promises.

And as the KNF's March 2017 Galton Final Environmental Impact Statement explains:
This analysis identifies specific disturbance processes, together with landform and other environmental elements, which have influenced the patterns of vegetation across the Decision Area. Vegetative Response Units (VRUs) were used to define and describe the components of ecosystems. VRUs are used to describe an aggregation of land having similar capabilities and potentials for management. These ecological units have similar properties in natural communities: soils, hydrologic function, landform and topography,

lithology, climate, air quality, and natural processes (nutrient and biomass cycling, succession, productivity, and fire regimes).

Each VRU has a characteristic frequency and type of disturbance based on its climate, soils, vegetation, animals, and other factors. Populations of native plants and animals have responded and adapted to these characteristic disturbance regimes over time (~2500 years) and the resulting vegetation patterns, processes, and structure within a historical range of variability. These characteristic processes, patterns, and structure are termed "Reference Conditions".

It's clear that "reference conditions" are no longer valid conceptually as a management target. Pederson et al. (2009) note that western Montana has already passed through 3 important, temperature-driven ecosystem thresholds. Westerling, et al. 2006 state:

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

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

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

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

The EA fails to analyze and disclose how climate change is already, and is expected to be even more in the future, influence forest ecology. This has vast ramifications as to whether or not the forest in the project area will respond as the FS assumes. As the forest plan FEIS states, "Forest Plan management strategies may affect the composition, structure, and landscape pattern of forests. This could influence the susceptibility and resiliency of the forests to significant disturbance agents such as large intense wildfires, insect and disease epidemics, weather events, and climate change." One of the needs for forest plan revision revolves around "concerns that the forest composition, structure, and pattern had shifted away from historical conditions to the extent that ecosystems, and the goods and services that it provided, may not be sustainable, especially in light of potential impacts from climate change." (Id.) It also states:

The 1987 Forest Plan does not contain direction on moving towards historic conditions or to improve resistance and resiliency in the light of climate change. Continued deviation from historic conditions would lead to changes in disturbance and succession processes, making it difficult to provide for a sustainable ecosystem.

The EA fails to
to water stress, competing vegetation, and repeat fires that burn young stands," which will likely lead to a dramatic increase in non-forest land acres. (Johnson, et al., 2016.)

acknowledge the likelihood that "...high seedling and sapling mortality rates due

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

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

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

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

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

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

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

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

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

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

KEY MESSAGES

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

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

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

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

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

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

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

occur during summer in the central and southern parts of the state. [moderate agreement, moderate evidence]

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

The FS's position on project impacts on climate change is that the project would have a miniscule impact on global carbon emissions. The obvious problem with that viewpoint is, once can say the same thing about every source of carbon dioxide and other greenhouse gas emission on earth, and likewise justify inaction as does this EA. In their comments on the KNF's Draft EIS for the Lower

Yaak, O'Brien, Sheep project, the EPA rejected that sort of analysis, basically because that cumulative effects scale dilutes project effects. We would add that, if the FS wants to refer to a wider scope to analyze its carbon footprint, we suggest that it actually conduct such a cumulative effect analysis and disclose it in a NEPA document.

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

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

We incorporate the following article from the *Missoulian* (" 2019):

March 11,

Fire study shows landscapes such as

Bitterroot's Sapphire Range too hot, dry to restore trees") written by Rob Chaney (

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

Courtesy Kim Davis

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

“The drier aspects aren’t coming back, especially on north-facing slopes,” said Kim Davis, a UM landscape ecologist and lead investigator on the study. “It’s not soil sterilization.

Other vegetation like grasses are re-sprouting. It’s too warm. There’s not enough moisture for the trees.”

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

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

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

“We did over 4,000 miles of road-tripping across the West, as well as lots of miles hiking and backpacking,” Davis said. The survey crews brought back everything from dead seedlings to 4-inch-diameter tree rings; nearly 3,000 samples in total. Then they analyzed how long each tree had been growing and what conditions had been when it sprouted.

Before the 1990s, the test sites had enough soil moisture, humidity and other factors to recruit new seedlings after forest fires, Dobrowski said.

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

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

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

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

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

The study also found that soil sterilization wasn’t a factor in tree regrowth, even in the most severely burned areas. For example, the 2000 Sula Complex of fires stripped forest cover in the southern end of the Bitterroot Valley. While the lodgepole pine stands near

Lost Trail Pass have recovered, the lower- elevation Ponderosa pine and Douglas firs haven’ t.

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

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

The Resources Planning Act of 1974 (RPA) and National Forest Management Act of 1976 (NFMA) mandate long-range planning which impose numerous limitations on timber extraction practices and the amount of timber sold annually. These long range plans are based on assumptions, which are based on data, expert opinion, public participation and other factors which mostly view from a historical perspective. So it's time to peer into the future to examine closely (NEPA: "take a hard look at") those assumptions.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The EA doesn't address the question of how lands were determined to be suitable for the type of management ongoing or proposed. It does not cite the specific documentation which determined that the specific areas proposed for logging in this proposal are suitable for timber production.

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

Davis et al., 2019 state: "

At dry sites across our study region, seasonal to annual climate

conditions over the past 20 years have crossed these thresholds, such that conditions have

become increasingly unsuitable for regeneration. High fire severity and low seed availability

further reduced the probability of postfire regeneration. Together, our results demonstrate that

climate change combined with high severity fire is leading to increasingly fewer opportunities

for seedlings to establish after wildfires and may lead to ecosystem transitions in low-elevation

ponderosa pine and Douglas-fir forests across the western United States."

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

The EA does not disclose restocking monitoring data and analysis.

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

The FS must finally accept scientific research and opinion that recognizes the critical challenge posed by climate change to global ecosystems and the IPNF. The statement in the 2010 KIPZ Climate Change Report, "Harvested wood products increase the net sequestration on these forests by an undetermined amount" is unsubstantiated by cited scientific research or information. The statement frames the position of denial that FS officials adopt as policy.

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

The EA fails to analyze how proposed management actions would be affected by likely climate change scenarios. The EA fails to quantify all human-caused CO_2 emissions for all project activities or quantify carbon sequestration for each alternative. The EA doesn't disclose how climate change has affected ecological conditions in the project area, and include an analysis of these conditions under climate change scenarios.

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

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

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

There is no cumulative effects analysis of IPNF carbon sequestration over time.

Respected experts say that the atmosphere might be able to safely hold 350 ppm of CO_2.[5] So when the atmosphere was at pre-industrial levels of about 280 ppm, there was a cushion of about 70 ppm which represents millions of tons of greenhouse gas emissions. Well, now that cushion is completely gone. The atmosphere is now over 400 ppm CO_2 and rising. Therefore the safe level of additional emissions (from logging or any other activity) is negative. There is no safe level of additional emissions that our earth systems can tolerate. We need to be removing carbon from the atmosphere—not adding to it.[6] How? By allowing forest to grow. Logging moves us away from our objective while conservation moves us toward our objective.

Pecl, et al. 2017 "review the consequences of climate-driven species redistribution for economic development and the provision of ecosystem services, including livelihoods, food security, and

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

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

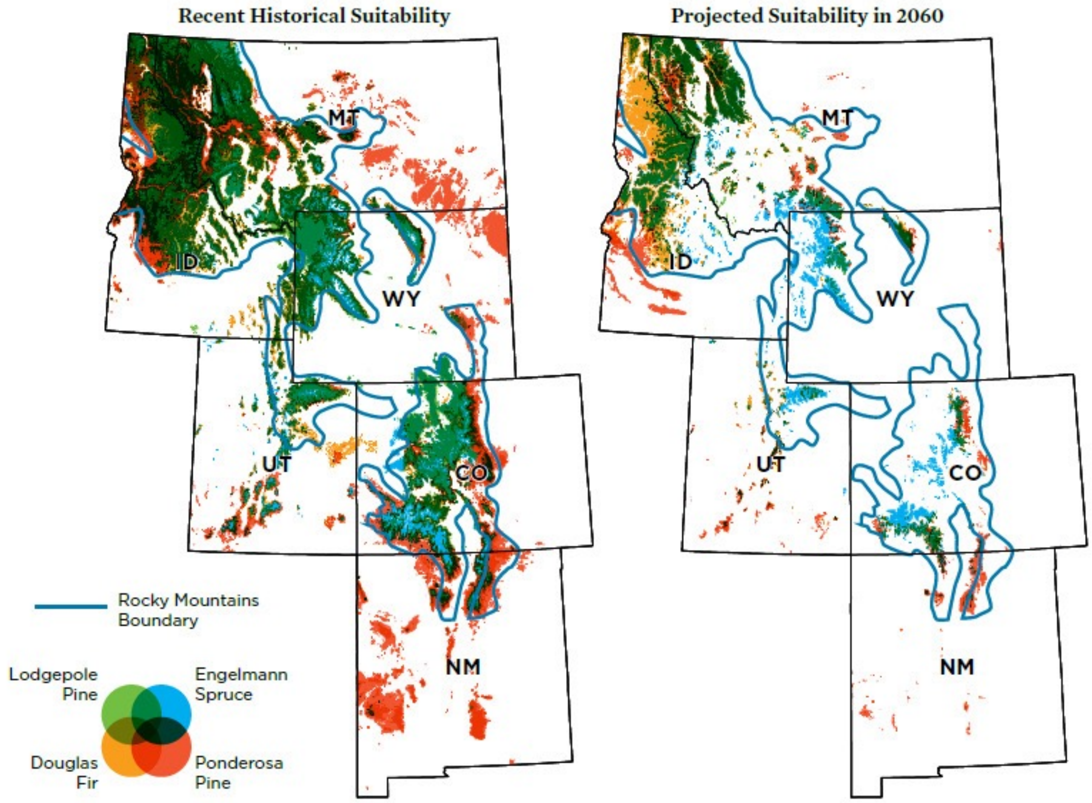
culture, as well as for feedbacks on the climate itself." They state, "Despite mounting evidence for the pervasive and substantial impacts of a climate-driven redistribution of Earth's species, current global goals, policies, and international agreements fail to account for these effects. ... To date,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

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

The caption under Funk et al.'s Figure 5 and Table 1 states:
Much of the current range of these four widespread Rocky Mountain conifer species is projected to become climatically unsuitable for them by 2060 if emissions of heat-trapping gases continue to rise. The map on the left shows areas projected to be climatically suitable for these tree species under the recent historical (1961–1990) climate; the map on the right depicts conditions projected for 2060 given medium-high levels of heat-trapping emissions. Areas in color have at least a 50 percent likelihood of being climatically suitable according to the models, which did not address other factors that affect where species occur (e.g., soil types). Emissions levels reflect the A2 scenario of the Intergovernmental Panel on Climate Change. For more about this methodology, see www.ucsusa.org/forestannex.

Pecl, et al. 2017 conclude:

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



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

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

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

Global climate change is caused by excess CO_2 and other greenhouse gases transferred to the atmosphere from other pools. Human activities, including combustion of fossil fuels and bioenergy, forest loss and degradation, other land use changes, and industrial processes, have contributed to increasing atmospheric CO_2, the largest contributor to global warming, which will cause temperatures to rise and stay high into the next millennium or longer.

The most recent measurements show the level of atmospheric carbon dioxide has reached 400 parts per million and will likely to remain at that level for millennia to come. Even if all fossil fuel emissions were to cease and all other heat-trapping gases were no longer emitted to the atmosphere, temperatures close to those achieved at the emissions peak would persist for the next millennium or longer.

Meeting the goals of the Paris Agreement now requires the implementation of strategies that result in negative emissions, i.e., extraction of carbon dioxide from the atmosphere. In other words, we need to annually remove more carbon dioxide from the atmosphere than we are emitting and store it long-term. Forests and soils are the only proven techniques that can pull vast amounts of carbon dioxide out of the atmosphere and store it at the scale necessary to meet the Paris goal. Failure to reduce biospheric emissions and to restore Earth's natural climate stabilization systems will doom any attempt to meet the Paris (COP21) global temperature stabilization goals.

The most recent U.S. report of greenhouse gas emissions states that our forests currently "offset" 11 to 13 percent of total U.S. annual emissions. That figure is half that of the global average of 25% and only a fraction of what is needed to avoid climate catastrophe. And while the U.S. government and industry continue to argue that we need to increase markets for wood, paper, and biofuel as climate solutions, the rate, scale, and methods of logging in the United States are having significant, negative climate impacts, which are largely being ignored in climate policies at the international, national, state, and local levels.

The actual carbon stored long-term in harvested wood products represents less than 10 percent of that originally stored in the standing trees and other forest biomass. If the trees had been left to grow, the amount of carbon stored would have been even greater than it was 100 years prior. Therefore, from a climate perspective, the atmosphere would be better off if the forest had not been harvested at all. In addition, when wood losses and fossil fuels for processing and transportation are accounted for, carbon emissions can actually exceed carbon stored in wood products.

Like all forests, the IPNF 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 IPNF Forest Plan draft EIS defines carbon sequestration: "The process by which atmospheric carbon dioxide is taken up by trees, grasses, and other plants through photosynthesis and stored as carbon in biomass (trunks, branches, foliage, and roots) and soils."

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

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

Off-road vehicles in California currently emit more than 230,000 metric tons — or
5000 million pounds — of carbon dioxide into the atmosphere each year. This is equivalent to the emissions created by burning 500,000 barrels of oil. The 26 million gallons of gasoline consumed by off-road vehicles each year in California is equivalent to the amount of gasoline used by 1.5 million car trips from San Francisco to Los Angeles.

. . . Off-road vehicles emit considerably more pollution than automobiles. According to the California Air Resources Board, off-road motorcycles and all-terrain vehicles produce 118 times as much smog-forming pollutants as do modern automobiles on a per-mile basis.

. . . Emissions from current off-road vehicle use statewide are equivalent to the carbon dioxide emissions from 42,000 passenger vehicles driven for an entire year or the electricity used to power 30,500 homes for one year.

Also, Sylvester, 2014 provides data on the amount of fossil fuel being consumed by snowmobiles in Montana, from which one can calculate the carbon footprint. The study finds that resident snow-mobilers burn 3.3 million gallons of gas in their snowmobiles each year and a similar amount of fuel to transport themselves and their snowmobiles to and from their destination. Non-residents annually burn one million gallons of gas in snowmobiles and about twice that in related transportation. So that adds up to 9.6 million gallons of fuel consumed in the pursuit of snowmobiling each year in Montana alone. Multiply that by 20 pounds of carbon dioxide per gallon of gas (diesel pickups spew 22 pounds per gallon) and snowmobiling releases 192 million pounds (96 thousand tons) of climate-warming CO_2 per year into the atmosphere. Can we really afford this?

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

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

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

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

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

Moomaw and Smith, 2017 state:
Multiple studies warn that carbon emissions from soil due to logging are significant, yet under-reported. One study found that logging or clear-cutting a forest can cause carbon emissions from soil disturbance for up to fifty years. Ongoing research by an N.C. State University scientist studying soil emissions from logging on Weyerhaeuser land in North Carolina suggests that "logging, whether for biofuels or lumber, is eating away at the carbon stored beneath the forest floor."

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

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

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

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

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

Van der Werf, et al. 2009 discuss the effects of land-management practices and state:
(T)he maximum reduction in CO_2 emissions from avoiding deforestation and forest degradation is probably about 12% of current total anthropogenic emissions (or 15% if peat degradation is included) - and that is assuming, unrealistically, that emissions from deforestation, forest degradation and peat degradation can be completely eliminated.

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

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

Keith et al., 2009 state:
Both net primary production and net ecosystem production in many old forest stands have been found to be positive; they were lower than the carbon fluxes in young and mature stands, but not significantly different from them. Northern Hemisphere forests up to 800 years old have been found to still function as a carbon sink. Carbon stocks can continue to accumulate in multi-aged and mixed species stands because stem respiration rates decrease with increasing tree size, and continual turnover of leaves, roots, and woody material contribute to stable components of soil organic matter. There is a growing body of evidence that forest ecosystems do not necessarily reach an equilibrium between assimilation and respiration, but can continue to accumulate carbon in living biomass, coarse woody debris, and soils, and therefore may act as net carbon sinks for long periods. Hence, process-based models of forest growth and carbon cycling based on an assumption that stands are even- aged and carbon exchange reaches an equilibrium may underestimate productivity and carbon accumulation in some forest types. Conserving forests with large stocks of biomass from deforestation and degradation avoids significant carbon emissions to the atmosphere. Our insights into forest types and forest conditions that result in high biomass carbon density can be used to help identify priority areas for conservation and restoration.

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

Our forests are functioning as carbon sinks (net sequestration) where logging has been reduced or halted, and wildland fire helps maintain high productivity and carbon storage.

Even large, intense fires consume less than 3% of the biomass in live trees, and carbon emissions from forest fires is only tiny fraction of the amount resulting from fossil fuel consumption (even these emissions are balanced by carbon uptake from forest growth and regeneration).

"Thinning" operations for lumber or biofuels do not increase carbon storage but, rather, reduce it, and thinning designed to curb fires further threatens imperiled wildlife species that depend upon post-fire habitat.

Campbell et al., 2011 also refutes the notion that fuel-reduction treatments increase forest carbon storage in the western US:

It has been suggested that thinning trees and other fuel-reduction practices aimed at reducing the probability of high-severity forest fire are consistent with efforts to keep carbon (C) sequestered in terrestrial pools, and that such practices should therefore be rewarded rather than penalized in C-accounting schemes. By evaluating how fuel treatments, wildfire, and their interactions affect forest C stocks across a wide range of spatial and temporal scales, we conclude that this is extremely unlikely. Our review reveals high C losses associated with fuel treatment, only modest differences in the combustive losses associated with high-severity fire and the low-severity fire that fuel treatment is meant to encourage, and a low likelihood that treated forests will be exposed to fire. Although fuel-reduction treatments may be necessary to restore historical functionality to fire-suppressed ecosystems, we found little credible evidence that such efforts have the added benefit of increasing terrestrial C stocks.

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 (IPNF) may not be viable—or as viable—under emerging climate conditions.

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

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

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

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

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

Some FS scientists recognize this changing situation, for instance Johnson, 2016:
Forests are changing in ways they’ve never experienced before because today’s growing conditions are different from anything in the past. The climate is changing at an unprecedented rate, exotic diseases and pests are present, and landscapes are fragmented by human activity often occurring at the same time and place.

The current drought in California serves as a reminder and example that forests of the 21st century may not resemble those from the 20th century. “When replanting a forest after disturbances, does it make sense to try to reestablish what was there before? Or, should we find re-plant material that might be more appropriate to current and future conditions of a changing environment?

“Restoration efforts on U.S. Forest Service managed lands call for the use of locally adapted and appropriate native seed sources. The science-based process for selecting these seeds varies, but in the past, managers based decisions on the assumption that present site conditions are similar to those of the past.

“This may no longer be the case.”

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

Patterns, mechanisms, projections, and consequences of tree mortality and associated broad-scale forest die-off due to drought accompanied by warmer temperatures—hotter drought", an emerging characteristic of the Anthropocene—are the focus of rapidly expanding literature.

...(R)ecent studies document more rapid mortality under hotter drought due to negative tree physiological responses and accelerated biotic attacks. Additional evidence suggesting greater vulnerability includes rising background mortality rates; projected increases in drought frequency, intensity, and duration; limitations of vegetation models such as inadequately represented mortality processes; warming feedbacks from die-off; and wildfire synergies.

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

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

Moomaw and Smith, 2017 conclude:
With the serious adverse consequences of a changing climate already occurring, it is important to broaden our view of sustainable forestry to see forests ...as complex ecosystems that provide valuable, multiple life-supporting services like clean water, air, flood control, and carbon storage. We have ample policy mechanisms, resources, and funding to support conservation and protection if we prioritize correctly.

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

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

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

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

The FS doesn't consider that the "desired" vegetation conditions may not be achievable or sustainable, nor conduct an analysis as to how realistic and achievable Forest Plan desired conditions are in the context of a rapidly changing climate, along an unpredictable but changing trajectory.

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

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

Harmon, 2009 is the written record of "Testimony Before the Subcommittee on National Parks, Forests, and Public Lands of the

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

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

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

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

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

We wrote in our comments starting on page 35:

Alleged forest imbalance

The EA states, "There is a need to shift the composition away from the tree species that are generally more susceptible to those agents (for example, Douglas-fir, grand fir, lodgepole pine and subalpine fir) and towards the species that are more resistant and resilient (such as western larch, western white pine and ponderosa pine). In describing any landscape departures from the historical range of variability (HRV), please provide a spatial analysis, comparing true reference

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conditions to current project area conditions. The EA mentions, "the historic range of structural distribution at the landscape scale (USDA 2000)." If the FS has any sources of data from the project area or IPNF that determine the "historic range of structural distribution at the

landscape scale" please cite them. Since the FS failed to provide a list of references in the EA, we can only guess that USDA 2000 is about the entire Interior Columbia Basin Ecosystem Management Project area—not specific to the IPNF.

The Forest Service responded:

To restore characteristics of this resilience to current landscapes, planning and management are needed at ecoregion, local landscape, successional patch, and tree neighborhood scales (Vegetation Specialist Report, p. 6)

The EA fails to consider the extensive science that argues that the strategy of "moving towards" DCs for restoring wildlife habitat and populations is scientifically deficient. The Committee of

Scientists, 1999 recommended management emphasis contrasts with the IPNF's current management strategy merely emphasizing manipulation of habitat for insuring wildlife viability:

...An emphasis on focal species, including their functional importance or their role in the conservation of other species, combines aspects of single-species and ecosystem management. **It also leads to considering species directly, in recognition that focusing only on composition, structure, and processes may miss some components of biological diversity.** (Emphasis added.)

The heavy bias toward identifying habitat manipulation options (i.e., logging and other active management activities) in the forest plan—which lacks insight into the long-term impacts of an unsustainable road system—has led to a forest plan that is a recipe for failure.

Since the Forest Plan revision process itself violated NEPA and NFMA, the APA and the ESA and failed to utilize the best available science, these comments therefore identify legal deficiencies of the Forest Plan as well as the project proposal.

Remedy: Choose the No Action Alternative for write an EIS that fully complies with the law.

We wrote in our comments starting on page 57:

Water Quality and Fisheries

The existing situation is, "the lack of appropriate levels of road maintenance ...lead(s) to ...chronic sediment delivery to area streams..." Yet the EA fails to disclose the existing elevated sediment levels in any stream reach of the project area, despite "sediment levels in streams" being chosen as an "issue indicator." The same goes for the action alternative analysis. This exemplifies the lack of data upon which the EA's analyses precariously perch.

The Forest Service responded:

Project compliance with the Clean Water Act is discussed beginning on page 28 of the hydrology report. Water quality status of project area streams are described in the hydrology report on pages 2 and 10. Discussions with IDEQ have occurred during the planning phase of this project. Further, a comment letter to the EA received from IDEQ includes suggestions to further minimize effects and di-

rection to meet annually to develop a monitoring plan that would ensure compliance with water quality parameters.

Remedy: Choose the No action alternative or write an EIS that fully complies with the law including disclosing the actual effectiveness of proposed BMPs in preventing sediment from reaching streams in or near the analysis area such aswhat BMP failures have been noted for past projects with similar landtypes. The Forest Service also needs to disclose which segments of roads in the watersheds to be affected by this proposal would not meet BMPs following project activities.

Headwater streams and non-fish bearing streams need more, not less, protection (Rhodes et al., 1994; Moyle et al., 1996; Erman et al., 1996; Espinosa et al., 1997). Both Erman et al., 1996 and Rhodes et al., 1994 conclude, based on review of available information, that intermittent and non-fish-bearing streams should receive stream buffers significantly larger than those afforded by PACFISH/ INFISH. The revised forest plan should have fully protected buffers of at least 300 feet for all waterbodies.

Old Growth

We wrote in our comments starting on page 76:

The EA claims "There is ...a need to protect, maintain and improve conditions within and around old growth stands in the project area and protect them from the negative effects of severe landscape fires." Also, "Paradoxically, continued fire suppression that would contribute greatly to an increase in mature and old growth forests, would

also increase the long-term risk of stand- replacing fire, insect and disease susceptibility, and the eventual loss of some existing allocated old growth and potential old growth." From reading the EA we know the FS refuses to attempt any enlightened approaches to management of fire, which means old growth is doomed despite proposed treatments.

Or else, logging is the only way old growth can be maintained or created. That sounds like a recipe for long-term disaster.

"No moist forest old growth would be treated or affected by the proposed activities." The EA doesn't have enough information other than Table 15 claims that logging old growth is "Dry Site Improvement" to back up that claim. There are no maps of forest types. Which biophysical setting do these units fall into?

Why can't the FS sacrifice some of its timber goals and set diameter limits to compensate for the deficiency compared to the historic range of large diameter trees (regardless of species) to serve wildlife habitat needs? How will the FS emphasize retention of the largest snags and live trees if you don't provide details on how this is to be accomplished?

The Forest Plan FEIS includes a "Large/Very Large" size class (20"+ dbh). It states, "The very large size class (stands that are dominated by 20"+ diameters)... Please explain why none of the

-USDA Forest Service, 1987d

EA's analyses utilize the "Very Large" size class metric. Please disclose how many stands in the project area fall within that Large/Very Large size class, and how many acres of those would be logged. Please estimate how many total trees > 20" dbh would be cut in each unit.

The Forest Plan contains no minimum acreage or distribution requirements for maintaining old growth, ignoring 36 CFR 219.19 viability provisions that would prevent large areas of the IPNF becoming devoid of old growth or old-growth associated wildlife. The FS has not analyzed the wildlife viability implications of managing the IPNF well outside the HRV for old growth, based upon the best available scientific information.

The Forest Service Responded: ***Our plan to leave trees and designate within-unit retention areas as specifiedin the proposed action and associated design features is essential to meeting the multiple management objectives of the Buckskin Saddle project.***

Remedy: Choose the No Action Alternative or write an EIS that fully complies with the law. The project is in violation of NFMA, NEPA, the APA, the Forest Plan, and the ESA.

The IPNF has failed to cite any evidence that its managing for old growth habitat (i.e., logging and burning old growth) strategy will improve old-growth wildlife species' habitats over the short-term or long-term. In regards to this theory often offered by the FS, 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.** (Pp. 11, 15 emphasis added).

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

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

It appears the agency wants to make the definition of old growth to be a simplistic numbers and database analysis game, devoid of biologically vital data gathered in the field which might document what is unique about old growth—not just a few large trees left over after logging, but decadence, rot, snags, down logs, patchy irregular canopy layers—things that can't be created by the agency's version of "restoration" and which would be depleted by such management actions.

Please disclose the natural historic range vs. current conditions regarding patch size, edge effect, and amount of interior forest old growth in the IPNF.

We wrote in our comments starting on page 82:

Snags and dead tree habitat

Please disclose how much snag loss would be expected because of safety concerns and also from the proposed methods of log removal.

The Forest Plan does not cite the scientific basis for the minimum amounts of snags to be retained under Guideline FW-GDL-VEG-04. Also the scientific basis for the delineation of snags into two diameter groups using 15" d.b.h. as the division point is not disclosed.

The Forest Service responded:

It is not our plan to: "completely clearcut every one of the 7,897 acres while drawing circles around adjacent stands not planned to be cut, and calling them the "reserves" that would make up the "average of 10 to 20 trees per acre." That said, regeneration harvest units were specifically located to address the highest hazard and "worst" areas of insect and disease depredation. It is not expected that healthy, relatively low hazard trees will be available for uniform retention across every acre of every regeneration unit. However, the intent is to minimize the size of post-treatment areas devoid of snags and/or green trees (Forest Vegetation Report, Land and Resource Management Plan Compliance, p.10).

Remedy: Choose the No Action Alternative or withdraw the Draft DN and write an EIS that fully complies with the law and the Forest Plan.

The EA does not quantify the degree of snag loss expected because of safety concerns and also from the proposed methods of log removal.

The EA does not cite in the analysis the science that supports the FS assumption that the management will result in snags and down logs in abundance to someday, maybe, several decades later, support viable populations.There is no monitoring to support any claims of benefits to snag and down log-dependent species' population numbers or distribution.

Habitat fragmentation and connectivity

We wrote in our comments starting on page 85:

The Forest Plan lacks meaningful direction maintaining Landscape Connectivity for wildlife.

An accurate ecological analysis of the IPNF and project area would reveal too much forest and habitat fragmentation.

Assuring viability also means addressing the issue of fragmentation, road effects, and past logging on wildlife species' habitat. Viability is only assured if individuals of a species can survive migration and dispersal for genetic diversity. The Forest Plan lacks meaningful direction

maintaining landscape connectivity for wildlife.
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. 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.

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. (Internal citations omitted.)

The FS has still not sufficiently dealt with the issue of fragmentation, road effects, and past logging on old-growth species' habitat. The EA doesn't disclose the natural historic range vs. current conditions regarding patch size, edge effect, and amount of interior forest old growth in the project area and forestwide.

The Forest Service responded:

The silvicultural prescriptions and planning for this project emphasize maintaining and creating opportunities

to increase the amount of resilient old growth in the future. Location of recruitment potential old growth was carefully considered with the goal of increasing patch size and connectivity of old growth structures

In terms of quality of habitat, the continued fragmentation of the IPNF 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:

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Forested connections between old growth patches ...(widths) are important because effective corridors should be wide enough to "contain a band of habitat unscathed by edge effects" relevant to species that rarely venture out of their preferred habitats (Lidicker and Koenig 1996 and Exhibit Q-17).

Timber harvest patterns across the Interior Columbia River basin of eastern Washington and Oregon, Idaho, and western Montana have caused an increase in fragmentation of forested lands and a loss of connectivity within and between blocks of habitat. This has isolated some wildlife habitats and reduced the ability of some wildlife populations to move across the landscape, resulting in long-term loss of genetic interchange (Lesica 1996, U.S. Forest Service and Bureau of Land Management 1996 and 1997).

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

The occurrence of roads can cause substantial edge effects on forested stands, sometimes more than the harvest areas they access (Reed, et al. 1996; Bate and Wisdom, in prep.). Open roads expose many important wildlife habitat features in old growth and other forested stands to losses through firewood gathering and increased fire risk.

Effects of disturbance also vary at the landscape level. Conversion from one stand condition to another can be detrimental to some old growth associated species if amounts of their preferred habitat are at or near threshold levels or dominated by linear patch shapes and limited interconnectedness (Keller and Anderson 1992). Reducing the block sizes of many later-seral/structural stage patches can further fragment existing and future old growth habitat (Richards et al. 2002). Depending on landscape position and extent, harvest or fire can remove forested cover that provides habitat linkages that appear to be "key components in metapopulation functioning" for numerous species (Lidicker and Koenig 1996, Witmer et al. 1998). Harvest or underburning of some late and mid seral/structural stage stands could accelerate the eventual creation of old growth in some areas (Camp, et al. 1996). The benefit of this approach depends on the degree of risk from natural disturbances if left untreated.

Effects on old growth habitat and old growth associated species relate directly to ... "Landscape dynamics—Connectivity"; and ...

“Landscape dynamics—Seral/structural stage patch size and shapes.”

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

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

(Id., internal citations omitted.) Harrison and Voller, 1998 further discuss these mechanisms: Linkages are mechanisms by which the principles of connectivity can be achieved. Although the definitions of linkages vary, all imply that there are connections or movement among habitat patches. Corridor is another term commonly used to refer to a tool for maintaining connectivity. ...the successful functioning of a corridor or linkage should be judged in terms of the connectivity among subpopulations and the maintenance of potential metapopulation processes. (Internal citations omitted.)

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

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

Harris, 1984 discusses habitat effectiveness of fragmented old growth:
(A) 200-acre (80 ha) circular old-growth stand would consist of nearly 75% buffer area and only 25% equilibrium area. ...A circular stand would need to be about 7,000 acres (2,850 ha) in order to reduce the 600-foot buffer strip to 10% of the total area. It is important to note, however, that the surrounding buffer stand does not have to be old growth, but only tall enough and dense enough to prevent wind and light from entering below the canopy of the old-growth stand.

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

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

The EA and DDN are in violation of NEPA, NFMA and the APA.

The Remedy is to Choose the No Action Alternative or write and EIS that fully complies with the law.

Grizzly Bears

We wrote in our comments starting on page 89:

The EA doesn't mention grizzly bears, even though the Wildlife Report cites a statement of the USFWS indicating they may be present in the project area. The Wildlife Report doesn't provide an analysis justifying its "no effects" conclusion.

The Forest Service Responded:

Please refer to page 5 and 8 of the Wildlife Report. According to the IPAC report provided by USFWS (Wildlife project file), grizzly bear are considered "not present" in the project area. The IDFG regulations do state that grizzly bears may be encountered in all the units that overlap the IPNF.

The Project is in violation of the ESA, the Forest Plan, NEPA and the APA.
Please see the following article from KREM 2 News on May 1, 2019.

https://www.krem.com/article/news/local/kootenai-county/grizzly-bear-tracks-spotted-in-coeur-dalene-national-forest/293-365cb180-0fca-406d-a4b7-b5f59f655aeb

Grizzly bear tracks spotted in Coeur d'Alene National Forest

IDFG officials said both grizzly and black bears can be found in most of the Panhandle.

Author: Kaitlin Riordan, Taylor Viydo
Published: 3:54 PM PDT May 1, 2019
Updated: 6:32 PM PDT May 2, 2019

COEUR D'ALENE, Idaho — The tracks of a grizzly bear were spotted in the Coeur d'Alene National Forest on Monday.

Idaho Department of Fish and Game officials knew the grizzly bear had been in North Idaho. It has a tracking collar on it.

IDFG said the tracks belong to a young male grizzly. It had previously been captured, collared, and then placed in Montana, North of Clark Fork. Since then, it's made its way through mountainous terrain to the Magee area in Shoshone County.

"We've seen them move back to where they've came from, we've seen them move out, and we've a number set up shop," said IDFG Regional Supervisor Chip Corsi.

There have been some recent instances of grizzlies on the move in North Idaho in recent years. In 2015, this grizzly was recorded in a backyard in the Silver Valley. Then in August 2018, a bear was caught raiding chicken coops

North of Athol. This most recent grizzly is well in the wild, just in an area they're not known to frequent.

"It's not common. But it's not like we haven't established population in the North Fork of the Coeur d'Alene," Corsi said.

IDFG officials said both grizzly and black bears can be found in most of the Panhandle. They are encouraging people to be aware and take appropriate precautions when recreating in bear country.

Hunters are also asked to review their bear identification skills to avoid mistaken identity.

Officials said grizzly bears are federally protected in northern Idaho and there is currently no hunting season.

IDFG offered a few tips for hunters:

- *Carry bear spray and keep it accessible*
- *Hunt with partners and make each other aware of plans*
- *Look for grizzly bear sign, including fresh tracks. Let partners know if you do see sign*
- *Retrieve meat as quickly as possible*
- *Hang meat, food, and garbage at least 200 yards from camp and at least 10 feet off the ground*
- *When not hunting, make noise, especially around creeks and thick vegetation. Most attacks occur by inadvertently surprising a bear at close range*

The Remedy is to Choose the No Action Alternative or withdraw the DDN and write and EIS that fully complies with the law.

The following attached map shows with a blue circle where the grizzly tracks were found.

IDFG said the tracks belong to a young male grizzly. It had previously been captured, collared, and then placed in Montana, North of Clark Fork. Since then, it's made its way through mountainous terrain to the Magee area in Shoshone County

The attached document from a presentation titled: Grizzly bears, fragmentation, connectivity, and management in the Canada - US trans-border region by Michael Proctor, Wayne Kasworm, Chris Servheen and others shows showing core grizzly habitat in the project area.

The Endangered Species Act was passed in part to protect grizzly bears from extinction. See Crow Indian Tribe v. United States, - - - F.3d. - - - -, 2020 WL 3831636 (9th Cir. 2020). The grizzly bear was listed as a threatened species under the Endangered Species Act on July 28, 1975. A Grizzly Bear Recovery Plan was originally approved in 1982, and then updated in 1993.

The Grizzly Bear Recovery Plan recognizes seven distinct ecosystems that still provide either remnant populations or sufficient habitat S Yellowstone, Northern Continental Divide, Cabinet-Yaak, Selkirk, North Cascades, Bitterroot, and San Juan:

The Bitterroot Ecosystem is centered in the Selway-Bitterroot Wilderness Area in Montana and Idaho, and includes National Forest lands surrounding this area. \The Grizzly Bear Recovery Plan confirmed "that the Bitterroot evaluation area contains sufficient amounts of quality habitat to warrant grizzly bear

Subsequently, the Fish and Wildlife Service published a 1996 Supplement to the Grizzly Bear Recovery Plan to address the Bitterroot Ecosystem (Bitterroot Supplement). The Bitterroot Supplement finds that the "Bitterroot Ecosystem is one of the largest contiguous blocks of Federal land remaining in the lower 48 United
States." The Bitterroot Ecosystem "formerly contained grizzly bears" and "[t]he demise of the grizzly from the [Bitterroot Ecosystem] was due to the
actions of humans." The Bitterroot Supplement recommended artificial reintroduction of grizzly
bears, and mapped a "grizzly bear evaluation area," which it determined to be "the core of grizzly habitat in the Bitterroot Ecosystem" and "the foundation for the future delineation of a recovery area."The map is set forth below:

Consistent with the 1996 Bitterroot Supplement, the Fish and Wildlife Service analyzed the reintroduction of grizzly bears into the Bitterroot Ecosystem.
See 65 Fed. Reg. 69624 (November 17, 2000). On November 17, 2000, the agency issued a final rule adopting a plan to reintroduce grizzly bears. The final rule designated the area shown below as the "Bitterroot Experimental Population Area:"

However, in a surprising about-face, in June 2001, the Fish and Wildlife Service abruptly announced that it planned to withdraw its decision to reintroduce grizzly bears to the Bitterroot Ecosystem. 66 Fed. Reg. 33620 (June 22, 2001).

The agency stated that it planned to select the "No Action Alternative" instead, entitled "Natural Recovery." Id at 33621. The agency apparently never issued a final rule withdrawing its decision; however, it has also taken no action to reintroduce grizzly bears into the Bitterroot Ecosystem.

In 2001, the Fish and Wildlife Service also produced a report on grizzly bear linkage zones between grizzly bear ecosystems. Ex. 2 at 1. One of the linkage
zones mapped by the report is the Cabinet to Bitterroot Linkage Zone,
which is shown below:
The Endangered Species Act was passed in part to protect grizzly bears

from extinction. See Crow Indian Tribe v. United States, - - - F.3d. - - - -, 2020 WL 3831636 (9th Cir. 2020). The grizzly bear was listed as a threatened species under the Endangered Species Act on July 28, 1975. ER693. A Grizzly Bear Recovery Plan was originally approved in 1982, and then updated in 1993. ER690.

The Grizzly Bear Recovery Plan recognizes seven distinct ecosystems that still provide either remnant populations or sufficient habitat S Yellowstone, Northern Continental Divide, Cabinet-Yaak, Selkirk, North Cascades, Bitterroot, and San Juan:

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ER714.

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The Bitterroot Supplement finds that the “Bitterroot Ecosystem is one of the

[2]Pursuant to Circuit Advisory Committee Note to Rule 27-1 part (7), Friends is filing a concurrent motion for judicial notice for the documents referenced herein as exhibits.

largest contiguous blocks of Federal land remaining in the lower 48 United States.” Ex. 1 at 2. The Bitterroot Ecosystem “formerly contained grizzly bears” and “[t]he demise of the grizzly from the [Bitterroot Ecosystem] was due to the actions of humans.” Ex. 1 at 2.

The Bitterroot Supplement recommended artificial reintro-
duction of grizzly
bears, and mapped a “grizzly bear evaluation area,” which
it determined to be “the
core of grizzly habitat in the Bitterroot Ecosystem” and
“the foundation for the
future delineation of a recovery area.” Ex. 1 at 3, 9. The
map is set forth below:

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Service analyzed the reintroduction of grizzly bears into the
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See 65 Fed. Reg. 69624 (November 17, 2000). On No-
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In 2001, the Fish and Wildlife Service also produced a report on grizzly
bear linkage zones between grizzly bear ecosystems. Ex. 2 at 1. One of the linkage
zones mapped by the report is the Cabinet to Bitterroot Linkage Zone,

Although the Fish & Wildlife Service never followed through with its reintroduction plan for the Bitterroot Ecosystem, grizzly bears have slowly started recolonizing the area on their own, in part by using the Cabinet to Bitterroot
Linkage Zone. The first known grizzly attempting to immigrate into the Bitterroot Ecosystem traveled south from the Selkirk Ecosystem in northern Idaho but was
killed in 2007 near Kelly Creek, Idaho.

Grizzly bears are a wide-ranging species: “Movements of grizzly bears may exceed 60 airline miles and their home ranges can encompass up to 1,000-1,500 [square miles].” ER726. As noted above, radio-collared bear 927 moved from the St. Joe area south of Kellogg, Idaho to Kelly Creek, Idaho S a distance of approximately 80 miles S in just three days, according to FWS.

The Forest Service’s refusal to prepare a Biological Assessment for the Project for grizzly bears and/or the Forest Service’s conclusion that the Project will have “no effect” on grizzly bears is arbitrary and capricious and an abuse of discretion. The Forest Service also acted unlawfully by failing to request the most current species list for the project area from FWS. To the extent FWS’s species list for the area excludes grizzly bears, FWS is failing to use the best available scientific and commercial evidence, in violation of the ESA.

Grizzly bears are known to travel through the area. At least one grizzly bear was shot after likely traveling through the area in 2007.

Due to potential presence in the area, the Idaho Fish & Game is now warning black bear hunters to be vigilant regarding potential grizzly bear presence. Grizzly bears are a wide-ranging species and other nearby confirmed grizzly bear locations include locations in and near the project area.

In the Revised Forest Plan Biological Opinion, FWS finds: "Grizzly bears may also be observed infrequently on other areas of the IPNF outside the recovery zones and BORZ areas. Therefore, the action area is the entire IPNF." The "may be present" threshold for preparation of a biological assessment does not require permanent occupancy, but instead includes migratory or transient individuals that may pass through the area. Grizzly bears thus meet the "may be present" threshold in the project area; therefore, a Biological Assessment must be prepared. The Forest Service's failure to prepare a Biological Assessment for grizzly bears violates the ESA.

Additionally, the project meets the low "may affect" threshold. The project allows almost 2,000 acres of clearcutting in an area that has recently been heavily clearcut, and allows new permanent roads. Roads and clearcuts harm grizzly bears by increasing human access and providing greater sight distances to facilitate poaching. As discussed above, the project will remove some of the last best forested buffer zones for wildlife. The grizzly bears use the project area as core habitat and may travel through this project area are likely using those buffers for cover and the removal of those buffers may affect them by disrupting and/or inhibiting their attempts to migrate into areas like the Selway-Bitterroot Wilderness. The project will reduce security, security habitat, and travel corridor habitat. The project thus meets the low "may affect" threshold; the Forest Service's "no effect" conclusion, which is notably mistakenly based on potential occupancy not potential effects, is arbitrary and capricious.

TRAVEL MANAGEMENT

We wrote in our comments:

The EA provides no assurance the FS can adequately enforce such road closures, so wildlife security would be questionable.

In order to meet Forest Plan requirements in the Elk Management Unit, the project "should maintain existing levels of elk security" (Forest Plan guideline FW-GDL-WL-13).

Explain how the project will comply with forest plan big game hiding cover requirements;

The Forest Service responded:

We recognize the difficulty in monitoring road closures, therefore the following design criteria were incorporated into the project design and to the extent possible roads will be stored and access limited during the duration of on the ground activities.•The proposed road storage requires obliteration for a distance of 300 feet, a sight-distance, or

whatever distance is effective to eliminate motorized access. The amount and type of obliteration required would be the minimum needed to effectively prevent motorized vehicle use. This would vary depending on the slope and vegetation present. A guardrail barricade may be used if it can be placed to effectively prevent motorized access. Existing gates would remain in place. Temporary gates would be installed on any road to be used that is not behind a gate and is currently not drivable. During timber hauling, the gate would be closed and locked at the end of each day. For other operations, gates would be closed and locked after the passage of each vehicle.

The purpose of FW-GDL-WL-13 is "to reduce the impacts of management on elk security habitat." (FEIS, p. 361). Note, the purpose of FW-GDL-WL-13 is not to maintain the existing levels of elk security displayed in Table 74 of the FEIS. Information in Table 74 provides baseline information to evaluate the trend or achievement of objective FW-OBJ-WL-02 and assess movement towards desired conditions. Language in the FEIS explicitly states that "FW-GDL-WL-13 will be applied to reduce the impacts on elk security habitat. Timber harvest can benefit security habitat if it is done to trend towards historic conditions and the desired conditions for vegetation. In doing so, the resiliency of the timbered stand component of security habitat will be improved or maintained and security habitat will be less likely to be lost to a large-scale disturbance (e.g. fire, insects, and disease). (FEIS, p. 361 and p. 394). Vegetation management resulting from the proposed

action would change the structure and species composition of the forested community within the elk security blocks over the short term and trend towards desired conditions for multiple resources over the long term (Wildlife Report, p. 20). Lastly, the decision to move forward with regeneration treatments inside elk security blocks was done in coordination with IDFG (see Project File). Based on documentation in the Forest Plan and in the Wildlife Report pp. 18-22, the Buckskin Saddle proposed action is supported and consistent with the intent of guideline FW-GDL-WL-13 and the definition of security habitat.
The project is in violation of the Forest Plan, NFMA, the APA, the ESA and NEPA.

Remedy:
Choose the No Action Alternative or withdraw the Draft DN and write an EIS that fully complies with the law.
The new information is that grizzly bears are in the area when they were not there when the Forest Plan was issued. You must either complete new NEPA analysis for the Travel Plan on this issue or provide that new analysis in the NEPA analysis for this Project. Either way, you must update your open road density calculations to include all roads receiving illegal use. Because of the illegal road use, the elk security standards are not being met. You need to ensure you are meeting these standards.

The project is in violation of NEPA, NFMA, the Forest Plan, The Travel Plan, the APA and the ESA because of the reoccuring road closure violations. your assumptions in the

Travel Plan that all closures would be effective has proven false. For this reason, you cannot tier to the analysis in the Travel Plan because it is invalid.

In the past several years, grizzly bear distribution on the Idaho Panhandle National Forest has significantly changed. Grizzly bears now regularly occupy areas on the IPNF where logging and grazing occur. This is a significantly changed condition.
In the EA, the agency repeatedly represents to the public that there are no Forest Plan standards to protect grizzly bears in these areas:
• "There are no standards for motorized route density inside or outside the
Recovery Zone;"
• "There are no standards in the Conservation Strategy for management of
grizzly bears outside of the [Grizzly Bear Recovery Zone;"
• "There are no 'standards' for road density for grizzly bear as a listed species.

The conservation strategy standard (adopted as a forest plan amendment but only binding if the bear is delisted) is to maintain secure habitat at or above 1998 baseline levels within the Primary Conservation Area (PCA). The project area is OUTSIDE of the PCA. There are no standards in the conservation strategy for habitat outside the PCA.

Adverse impacts and unpermitted take of grizzly bears are likely occurring in these areas of occupied grizzly bear habitat for which there are no standards and no forest plan consultation.

The agencies must reinitiate and complete consultation on the impact of Idaho Panhandle Forest Plan implementation on grizzly bears where they occur today.

The Beaverhead-Deerlodge National Forest and Gallatin National Forest have
already re-initiated consultation on their forest plans to address contemporary grizzly bear distribution. In 2010, the Kootenai National Forest was court-ordered to reinitiate consultation on the impacts of its forest plan on contemporary grizzly bear distribution.
Until the agencies reinitiate and complete reconsultation on the Idaho Panahndle Forest Plan, until the Record of Decision is signed.

Alternatively, if the Biological Opinion/Incidental Take Statement applies to all occupied grizzly habitat, then the Forest Service must designate Management Situations for all current grizzly habitat on the Forest and implement the management direction required under the Guidelines. For the Project area, the Forest Service must designate the area as Management Situation 1 because grizzly use of the area is common, and the agency must demonstrate Project area compliance with the road density standard for Management

Situation 1, which is 1.0 miles/square mile open road density.

The Forest Service must also go through a NEPA analysis or ESA analysis for this attempt to amend the Idaho Panhandle Forest Plan.

The EIS and best available science Schwartz el al (2010) acknowledge open road density as a key factor that impacts grizzly bears.

The FS should be identifying key habitat components for grizzly bears for prioritizing road density reductions (Proctor, et al., 2020) so populations can recover.

"Our analysis shows that grizzly bears have little or no opportunity to select home ranges with lower road density or higher percentages of core... Because grizzly bears could not have selected

Home ranges having more core area and lower road densities, and there has been no growth in the population, there is no basis to conclude the proposed access standards are sufficient to insure the recovery of the Cabinet-Yaak and Selkirk grizzly bear populations" (Merrill 2003).

Great Bear Foundation et al., 2009 discusses in great detail how the Access Amendment Alternative eventually selected leads to a significant deterioration in an already unacceptable baseline condition for grizzly bears. The scientific discussions in Great Bear Foundation et al. 2009, as well as

AWR comments on the Access Amendment DSEIS refute the FS's claim to be utilizing the best available science for the grizzly bear.

The Forest Plan is not consistent with best available science on road density in grizzly bear habitat outside of Bear Management Units.

There is no Biological Assessment (BA) published on the project website, nor a Biological Opinion (BO), so we are unable to see results of U.S. Fish & Wildlife Service consultation, including terms and conditions to regulate "take." The BA and BO must be made available to the public before a draft Decision is published in order for the public to be properly informed at this final step of public involvement—the objection stage.

The veracity of the FS's inventory of system and nonsystem ("undetermined" or "unauthorized") roads is at issue here also. This is partly because the FS basically turns a blind eye to the situation with insufficient commitment to monitoring, and also because violations are not always remedied in a timely manner.

The project area is not within a BMU or BORZ. But by law if there is documention of 3 or more grizzly bears the area shall be included in a BORZ. The BORZ has not been created therefore the project is in violation of the NFMA, NEPA, the Idaho Panhandle Forest Plan, the APA and the ESA.

The Buckskin Saddle project would violate the Forest Plan/ Access Amendment standards, a violation of NFMA.

The EA does not disclose how many years the existing core ares have provided the habitat benefits assumed under the Forest Plan. As pointed out, some has been lost (due to "private infrastructure development") and we're not told of other likely and forseeable reductions.

Since we are awaiting the results of updated ESA consultation on the Forest Plan, the issuance of the Buckskin Saddle draft DN is premature and subverts NEPA and the ESA.

Furthermore, this population is currently warranted for uplisting to Endangered, in recognition of its biological and legal status.

Part of the problem is the lack of connectivity between the Selkirk and the Cabinet-Yaak Ecosystem (CYE), creating virtual isolation between portions the recovery area.

Also, the FS's population estimates of grizzly bears in the Selkirk and CYE ("improvements") are not scientifically defensible. The FS therefore assumes increased impacts with this timber sale are acceptable.

Also, the EA assumes that abundance of huckleberries are demographically limiting for grizzly bears in this region, and further assumes that Project treatments will substantially enhance abundance of huckleberries to an extent sufficient to offset any losses of habitat security.

There is little or no evidence that food abundance is a significantly limiting factor for grizzly bears in the Selkirk and Cabinet-Yaak Ecosystems—especially as manifest in reproduction. On the other hand, there is ample evidence that human-caused mortality had governed and continues to govern the fate of this population, with food effects manifest primarily in the extent to which grizzly bears are exposed to human-related hazards during years when berries are in shorter supply.

The FS should be identifying key habitat components for grizzly bears for prioritizing road density reductions (Proctor, et al., 2020) so populations can recover.

The project area is not within a BMU or BORZ and grizzly bear presence here is a recent occurrence, with documentation by three male grizzly bears over the past 5-7 years

Dr. David Mattson makes the following points.

The assessment of prospective effects of the this project on grizzly bears in the is premised on several critical assumptions.

First, status of the Cabinet-Yaak and Selkirk grizzly bear population is assumed to have improved since 2012. Second, and related, the IPNF assumes that some erosion of security for grizzly bears is therefore permissible, conditioned on a related assumption that security and road access standards employed by the IPNF are sufficient for recovery of grizzly bears in this ecosystem.

All of these assumptions are unwarranted.

Briefly:

• The weight of available evidence does not support concluding that population status has improved. For one, the methods used to estimate trend and current population size are beset with a host of problems. For another, the information able to be distilled from demographic data suggests that any improvement has stalled since 2014.

• Variations in population size and trajectory between 1999 and 2010 are more likely attributable to variations in abundance of natural foods—berries in particular—that affect exposure of bears to humans rather than to any increased mitigations. During years of scant berries, bears likely forage more widely and more often end up in conflict situations or exposed to malicious killing.

• Malicious and other unjustified killing by humans remains the dominant cause of death for grizzly bears in the Selkirk and Cabinet-Yaak Ecosystem. These kinds of killings are predictably associated with roads. As a result, levels of road access need to be substantially reduced and related levels of habitat security substantially increased rather than the opposite, as is being proposed for the Buckskine Saddle Project.

• Road density and habitat security standards used by the IPNF are patently deficient, partly because they are based on research that conflates behavioral phenomena such as avoidance and displacement with demographic phenomena, notably survival. The scale is wrong as well, given that exposure to mortality hazards logically accrues over years as a consequence of cumulative annual movements of bears vis-à-vis hazardous environs. As a corollary, the fact that standards on the IPNF are more lax than standards on the Flathead NF is self- evidently nonsensical given that grizzly bears in the Selkirk Ecosystem remain in a much more precarious status compared to grizzly bears in the Northern Continental Divide Ecosystem.

• There is little or no evidence that food abundance is a significantly limiting factor for grizzly bears in the Selkirk Ecosystem—especially as manifest in reproduction.

On the other hand, there is ample evidence that human-caused mortality had governed and continues to govern the fate of this population, with food effects manifest primarily in the extent to which grizzly bears are exposed to human-related hazards during years when berries are in shorter supply.

• Compounding prospective problems with the project, proposed activities are concentrated in an area that is vital for facilitating movement of grizzly bears between core habitats. Project activities will diminish rather than enhance security needed not only to facilitate transit of bears, but also increase the Buckskin Saddle project promises to harm grizzly bears in the Selkirk Ecosystem.

Wolverine

We wrote in our comments:

The EA doesn't mention wolverine, even though the Wildlife Report cites the USFWS who indicate they may be present in the project area. The Wildlife Report fails to justify its "no effects" conclusion.

The Forest Service responded:

Please refer to pages5and 8of the Wildlife report and the North American Wolverine Biological Assessment in the Project File

The project is in violation of the ESA.

AWR's August 2019 comments raised the issue of travel and access management at page 4. This relates directly to the issue of access management we discuss throughout our comments concerning habitat security for grizzly bears. Also, issues regarding the minimum road system were raised in our Objection to the revised forest plan (OBJECTION STATEMENT: Inadequate direction to designate the minimum road system).

Consistent with genuine restoration, we support implementation of FS policy to **right-size the road network** to achieve the ecologically sustainable **minimum road system** necessary. Annual maintenance must be affordable, leaving no significant chronic unmet needs which tend to cause long-term ecosystem stressors. We believe that the Transportation Analysis Process is something in which the agency should be inviting the public to collaboratively participate, and indeed provisions in the forest plan require this be addressed in all project planning.

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

The EA fails to demonstrate compliance with FW-OBJ-AR-03:
"The outcome is:
• Annually, meet maintenance level requirements on 20 to 30 percent of Operational Maintenance Level 3, 4, and 5 roads (roads that are drivable by passenger vehicles and provide primary access to many recreation opportunities).
• Annually, meet maintenance level requirements on 10 to 20 percent of Operational Maintenance Level 2 roads (roads that are drivable by high clearance vehicles and provide additional access to recreation opportunities)."

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

INFISH Forest Plan Standard #RF-2 requires development and implementation of a Road Management Plan or a Transportation management Plan, which must address, among other items, 'Criteria that govern road ...maintenance and management.' Project area criteria were not disclosed in the EA analysis. The EA also fails to address “Requirements for pre-, during, and post storm inspection and maintenances.”

The EA doesn’t disclose how the project would be consistent with the Travel Management Rule 36 CFR Part 212, Subparts A, B, and C, which are regulations that affect the project area.

The EA doesn’t provide an analysis demonstrating consistency with the Road Management Objectives for each road in the project area.

The EA doesn’t the annual expenditures for road maintenance in the project area, nor the level of maintenance deferred due to insufficient funding.

The EA doesn’t disclose ongoing soil and water impacts from roads not being adequately maintained. Please disclose the impacts of roads that are not maintained because they are unauthorized or non-system.

The EA doesn’t provide documentation of surveys of conditions on all roads (system, non- system, undetermined, etc.) conducted in the project area.

To address its unsustainable and deteriorating road system, the FS promulgated the

Roads Rule (referred to as “subpart A”) in 2001. 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.

Early in the forest plan revision process, the FS recognized the opportunity the process provided for addressing the excessive road system on the Forest. This was indicated in statements made in the AMS:

The revised Forest Plans need to be in compliance with new laws, regulations, and management direction. Forest Plans also need to incorporate new research and science that has been developed. The new strategies have been developed to aid in the sustainability of all native and desired non-native species.

In January of 2001, a new Forest Roads Rule and Policy was issued which revised regulations concerning the management, use, and maintenance of the National Forest Transportation System. Forest Plan Revision provides the opportunity to incorporate this direction into the Forest Plans (USDA 2001b).

Possible Strategies in Revising Management Direction for Access and Recreation:

• Provide management direction for Access and Travel Management Planning, including criteria for developing access strategies by appropriate modes and season of use.

On the verge of taking bold, necessary strides towards reforming its roads and access management into something ecologically sustainable, the FS issued the revised Forest Plan and FEIS which failed to analyzed or address the problem, and then followed that up with a sham Region 1-directed Travel Analysis Process that failed to follow the Travel Management Rule Subpart A requirements for involving the public in a science-based effort to identify the forestwide minimum road system. The FS is obligated to disclose the project area road system's long-term financial liabilities, and the associated ecological impacts due to inadequate maintenance funding.

Huge bibliographies of scientific information indicate the highly significant nature of departures from historic conditions that are the impacts on forest ecosystems caused by motorized travel routes and infrastructure. That there are no road density standards in the forest plan suggests the biased and arbitrary manner of the FS's use of its own "best available science." From the Wisdom et al. (2000) Abstract:

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

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

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

(Emphases added.) Wisdom et al., 2000, which was cited heavily in the forest plan FEIS and is thus considered to be “Best Available Science” by the FS, state in their Abstract:

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

The heavy bias toward identifying habitat manipulation options (i.e., logging and other active management activities) in the forest plan—which lacks Wisdom et al. (2000) implications for road management—has led to a forest plan that is a recipe for failure.

The EA does not reduce ecological damage the way it intends for vegetative historical range of variability (HRV). Other factors that have been heavily influenced by management along with their historical range of variability include:

FACTOR HRV Road density zero Noxious weed occurrence zero Milesoflong-termstreamchanneldegradation(“press”disturbance) zero Culverts zero Human-induced detrimental soil conditions <1% Maximum daily decibel level of motorized devices zero Acres of significantly below HRV snag levels for many decades zero

Roadless extent 100% Extent of veg. communities affected by exotic grazers (livestock) rare Extent of veg. communities affected by fire suppression zero

The Buckskin Saddle project would not "move" those factors anywhere close to the HRV, and thus the adverse legacy impacts would continue. Holistic restoration is beyond the scope of the Buckskin Saddle project.

The EA does not demonstrate the project area is being managed consistent with Travel Management Regulations at 36 CFR 212 (Subparts, A, B, and C) and the Executive Orders related to Subpart B. Subpart A requires the FS to involve the public in a scientifically based process which designates the Minimum Road System both in the analysis area and forestwide, so that unnecessary or ecologically damaging roads are targeted for decommissioning and the economic liabilities of roads are minimized.

The Buckskin Saddle EA does not disclose compliance with motorized route restrictions, and if violations exist, perform an analysis of the resultant harm to wildlife habitat, soil, and water.

We ask the FS disclose the following information concerning the project area:

- The deferred road maintenance backlog
- The annual road maintenance funding needs
- The annual road maintenance budget
- The capital improvement needs for existing roads

- The road density in the project area

- The number of miles of project area roads that fail to meet BMP standards or design
  standards
  The Forest Plan makes a **Decision** prioritizing vast but unspecified acreage of the IPNF for motorized recreation, in the absence of the travel planning required by the Travel Management Regulations.
  The Forest Plan makes **Decisions** designating unspecified mileages of the IPNF for motorized recreation, in the absence of the travel planning required by Travel Management Regulations and completed by 2015.
  The EA states, "Both storage and decommissioning would be primarily passive; that is, there is no on-the ground watershed or other stabilization needed." It's clear that the FS is making it standard practice to re-use such abandoned road templates—and even roads actively decommissioned—not including them on the official road inventory therefore constantly avoiding responsibilities, regulations, and forest plan requirements for roads.
  Remedy: Select the No Action alternative. Alternatively, prepare an EIS that addresses the analytical and scientific issues identified above.

WILDLIFE AND DIVERSITY

AWR's comments raised wildlife and biological diversity issues. Also, issues regarding old growth and associated wildlife were raised in our Objection to the revised forest plan (pp. 4-5, 7-11, 31-40, 71-72).

Because the EA fails to adequately specify the amount of large live and dead tree structure to be retained in treated areas, and since most of the EA's wildlife analyses pretend or assume to know otherwise, the analyses of impacts on most wildlife are base upon insufficient analysis, in violation of NEPA.

AWR objected to the use of "Landbird Assemblage" in the revised forest plan. The EA provides inadequate analyses for the Forest Plan MIS landbird assemblage (olive-sided flycatcher, dusky flycatcher, Hammond's flycatcher, chipping sparrow, and hairy woodpecker). Little or nothing is presented on the specific habitat needs of all of these bird species, nor any analysis of cumulative impacts. The Forest Plan and FEIS do not include scientific justification for the adoption of the MIS Landbird Assemblage as MIS representing other wildlife (including old-growth associated wildlife species) on the IPNF. In fact the FEIS contains an explicit assumption that its implementation cannot possibly affect viability of its chosen indicator species: "These MIS, elk and insectivores, were not proposed because of a viability concern." The EA fails to their current population abundance, so that a baseline is established for later comparisons to determine population trends.

The FS has not disclosed the connection between population monitoring, management activities, and habitat condition for the landbird assemblage species. The FS has not provided reasoning as to why these species are responsive to forest activities, nor explained the monitoring objectives for those MIS.

There is no accuracy assessment including confidence intervals in the Forest Plan EIS wildlife analyses.

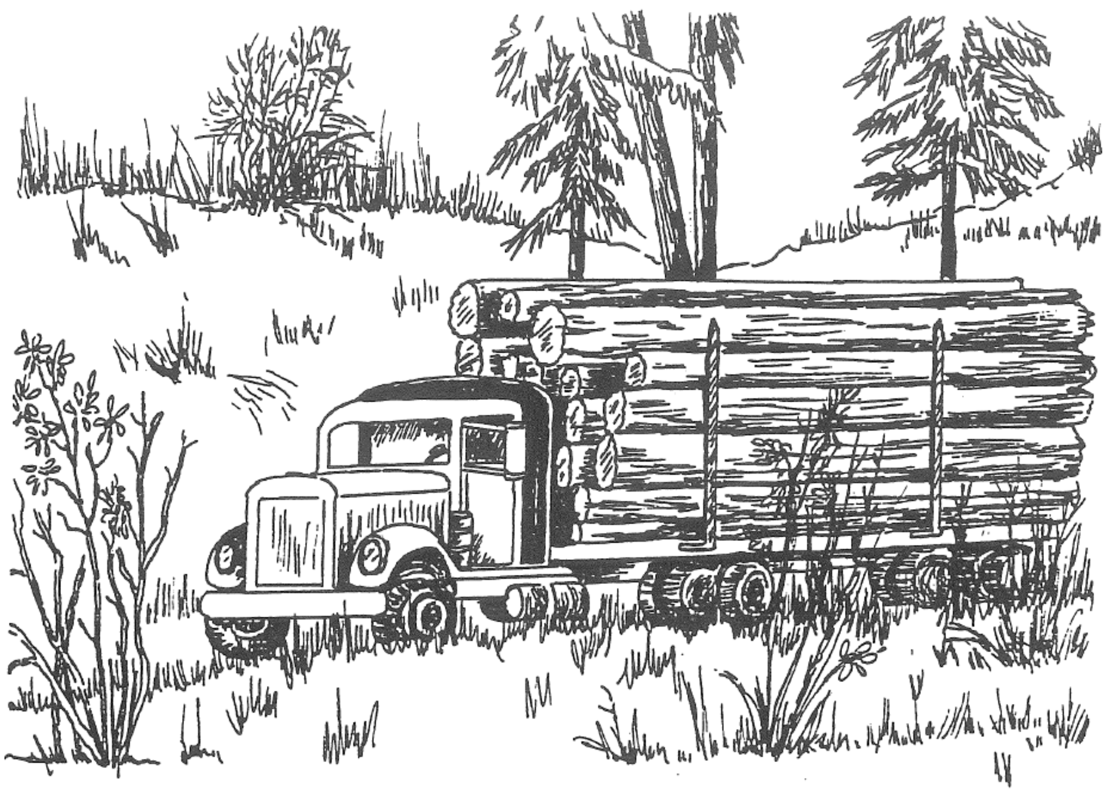
The FS has not disclosed statistically robust estimates of population trends for all Sensitive species. There isn't a sound scientifically-based explanation for any species' apparent absence from the project area. The EA doesn't disclose whether or not surveys for wildlife, or their dens or nests, have been conducted in the project area. It doesn't disclose the intensity of surveys for Sensitive species that have been conducted in the project area.

The Forest Plan does not cite the scientific basis for the minimum amounts of coarse woody debris to be retained.

The use of vegetation habitat proxy is invalid for insuring viable populations of wildlife.

The EA doesn't disclose the cumulative effects of recreational activities and motorized/mechanic access on wildlife populations.

Old Growth



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

Gautreaux, 1999 states:
...research in Idaho (Lesica 1995) of stands in Fire Group 4, estimated that over 37% of the dry Douglas-fir type was in an old growth structural stage (>200 years) prior to European settlement, approximately the mid 1800's.

Based on research of Fire Group 6 in northwest Montana (Lesica 1995) it was estimated that 34% of the moist Douglas-fir type was in an old growth structural stage (>200 yrs.) prior to European settlement, approximately the mid 1800's.

Based on fire history research in Fire Group 11 for northern Idaho and western Montana (Lesica, 1995) it was estimated that an average of 26% of the grand fir, cedar, and hemlock cover types were in an old growth structural stage prior to European settlement.

...fire history research in Fire Group 9 for northern Idaho and western Montana (Lesica, 1995) estimated that 19-37% of the moist lower subalpine cover types were in an old growth structural stage (trees > 200 yrs.) prior to European settlement. While this estimate is lower than suggested by Losensky's research...

(USDA Forest Service, 1987d)

Lesica found an estimated 18% of the cool lodgepole pine sites was in an old growth structural stage (>200 years) prior to European settlement, approximately the mid 1800's. ... This same research in Fire Group 8 in drier, lower subalpine types of Montana had over 25% of the stands in an old growth structural stage during the same historical period.

Despite the IPNF's previously developed estimations of historic forestwide old growth, the EA attempts to walk this back:

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

We notice the FS has no qualms about speculating on the amounts of various other categories of forest on the IPNF and in the project area based upon Forest Plan Desired Conditions, and basing the goals of projects such as Buckskin Saddle on such speculation. In essence the FS admits it doesn't know the amount of old-growth habitat historically needed to maintain viability of its 1987 forest plan old-growth Management Indicator Species and other old-growth associated wildlife. The FS refuses to discuss the issue because the amount of old growth on the IPNF is far below amounts estimated by best available science—and its own experts.

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**. 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.)

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

The FS relies upon the rather vague promise of the concept of "recruitment old growth" or "recruitment potential old growth" as some sort of supplement to the Forest Plan's weak conservation of old-growth habitat. The EA doesn't explain the criteria used for designation of "recruitment potential" old growth other than vaguely stating, "These stands have the potential to develop into old growth within 40 years."

Recruitment potential old growth is defined in the forest plan as forest stands that do not meet the definition of old growth currently but that are being managed with the goal of meeting that definition in the future. This is another erratic characteristic of the Forest Plan; although its Glossary mentions some "goal" of meeting the old growth definition in the future, the Forest Plan actually contains no such goal. The FS also doesn't disclose the best available science the IPNF uses to manage recruitment potential old growth stands. There is no official decision document designating recruitment/potential old growth in the project area. The IPNF has no formal, official process for documenting this forestwide old-growth recruitment policy.

The EA doen't indicate if any stands in the Buckskin Saddle project area were previously identified and designated in the past as old growth, since switched to recruitment old growth, or potential old growth.

The EA also does not engender confidence in the FS's estimates of either project area or forestwide old growth amounts, based vaguely on "IPNF Old Growth Layer File" for forestwide and vaguely "updated as of March 2019[8]" for the project area.

The Forest Plan FEIS includes a "Large/Very Large" size class (20"+ dbh). Yet the EA does not utilize such a metric in the EA—probably to avoid any analysis that would assist the public in seeing through the smokescreen and understanding the FS's old growth inventory problem. This is seen by reading between the lines of the EA's analyses, e.g.:

> "Old-Growth Forest Types of the Western Montana Zone" was used as the criteria to identify stands that may qualify as old growth habitat (Green et al., 1992). Data sources to identify old growth stands include district files and surveys, R1 summary database old growth reports, the Kootenai National Forest old growth GIS layer which was developed from stand-level old growth inventory that was aggregated and summarized at the forest scale, and the Forest Inventory and Analysis (FIA) data which collects and reports data at the forest scale. The most current information and data for old growth are displayed in this analysis.

The EA doesn't indicate how old the FIA data is, which the old growth analysis (forestwide and project level) relies upon. It doesn't say how many FIA plots fall within the project area, and how many of those are classified as old growth.

The FS Region 1 report Bollenbacher, et al., 2009 (cited in the EA) states concerning the FIA inventory: "All northern Idaho plots utilized a primary sample unit (PSU) composed of four fixed radius plots with trees 5 – 20.9 inches tallied on a 1/24th acre plot and trees 21.0 inches DBH and larger tallied on a 1⁄4 acre plot." We assume the methodology was similar for the IPNF. Also, Czaplewski, 2004 states, "Each FIA sample location is currently a cluster of field sub-plots that collectively cover an area that is nominally one acre in size, and FIA measures a probability sub-sample of trees at each sub-plot within this cluster." In addition, Bollenbacher and Hahn, 2008 under "Defining Old Growth" state: "There are no specific criteria for minimum patch size for OG in the Northern Region definitions" but recognize "There are, however, some Forest Land Management Plans that may include guidance for a minimum map unit for OG stands." Despite that, Bollenbacher and Hahn, 2008 try to make a case for smaller minimum stand sizes, saying "The regional vegetation minimum map unit of 5 acres for a stand polygon would be a reasonable lower limit for all vegetation classes of forest vegetation including OG stands." Clearly, whether the FS is using a 1⁄4-acre, one-acre, or five-acre minimum map unit, none conform to the Forest Plan old-growth minimum stand size criteria. Furthermore, it would be ludicrous to propose that any old-growth associated MIS, Sensitive, or ESA-listed species could survive on even a five-acre old-growth stand—there is no scientific evidence to support such a premise.

The EA does disclose the amount of publicly-owned old growth the FS would log:

The EA explains that the Forest Plan allows logging of virtually all old growth found outside of Wilderness on the IPNF:

(T)he 2015 Forest Plan deliberately includes language within two components (FW-DC- VEG-03, FW-GDL-VEG-01) that would allow vegetation management activities to occur within old growth stands **if** the activities were designed to increase the resistance and resiliency of the stands to disturbances or stressors, **and** if the activities would maintain the criteria for age and number of trees and basal area for the specific old growth type as described in Green et al., 1992. (Emphases in the original.)

As the footnote explains, though: “the terms resilience as well as resistence (see 2015 Forest Plan glossary...) are used **in the context of forest ecosystems** and the desire to increase the resistance

resilience to disturbances. Alternatives 2 and 3 propose to treat 922 and 780 acres in old growth and 441 and 435 acres in recruitment potential old growth to increase their resistance and resilience by modifying their structure and species composition. They are designed not to modify the characteristics beyond meeting Green et al., the definition of old growth. Therefore, the Black Ram project was designed in accordance with this guideline.

and resiliency of the forest vegetation to disturbances and stressors...” (Emphasis added.) In other words, the FS is conflating a landscape level attribute (which has no numerical measurement attached to it) with stand level attributes. This leaves the Green et al., 1992 criteria as the only criteria, as EA describes: “age and number of trees and basal area for the specific old growth type”. This is an extremely narrow, and scientifically undefensible definition of old growth.

Furthermore, the EA itself nullifies the FS’s claim to be helping old growth by logging it. It cites model results the FS apparently believe, indicating “a dramatic increase in old growth-like stands ...despite a substantial amount of predicted wildfire, root disease, bark beetle and defoliator caused disturbances ...**if no active management (except for fire suppression) were to occur on the Forest for the next 50 years** and the future climate scenario of a warmer/drier climate is assumed” resulting in “78 percent over current amounts.” (Emphasis added.) So where’s the scientific support for the risky, likely destructive proposed logging of old growth? And the “need” to conduct “intermediate” logging of old growth? They don’t exist.

The EA indicates that 148 acres are proposed for logging and or burning. That leaves 513 acres of old-growth logging outside of the Warm/Dry. The EA attempts to justify this using the results of the Forest Vegetation Simulator showing how fire burning through old growth would leave fewer live large trees under treatment scenarios vs. no action. Yet the accuracy of such modeling isn't disclosed. Nor does the EA say the duration of such claimed benefits—a few years, 5 years, 10, 20? Who knows? Regardless, the EA already says old growth would increase "dramatically" over the next 50 years, without such Project-proposed meddling in old growth.

The EA does not identify the old growth type for each stand the FS would log, nor does it state in any quantitative terms what would be left of the logged old growth. All it offers is:

> alternatives 2 and 3 would be designed to maintain the characteristics of the old growth stands so they would continue to meet the definition of old growth post treatment. All the proposed units within old growth have pre-treatment exams, units would have a silvicultural prescription written by a silviculturist and would have post treatment monitoring scheduled to monitor the effects of the treatment and verify the old growth character. Stands identified as recruitment potential old growth would have post treatment monitoring scheduled as well and future treatments would help them reach old growth status. The Black Ram project activities

The EA doesn't even cite the results of the compliance or success of past logging in old growth, merely assuming all results of this heavy-handed logging will be fine.

The Forest Plan contains no minimum acreage or distribution requirements for maintaining old growth, ignoring 36 CFR 219.19 viability provisions that would prevent large areas of the IPNF becoming devoid of old growth or old-growth associated wildlife. The FS has not analyzed the wildlife viability implications of managing the IPNF well outside the HRV for old growth, based upon the best available scientific information.

The FS has not compared patch size of old-growth areas to scientific information on minimum size needed for utilization by old-growth associated wildlife.

The IPNF failed to monitor populations of old-growth associated wildlife, in favor of striving towards DCs for 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.)

In USDA Forest Service, 1987a the IPNF 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.)

Since old growth is below the historic range for the Forest and project area, then viability for old- growth associated species cannot be assured—especially in the context of more proposed logging of mature/old forest and large trees.

The defining characteristics of old growth, discounted by the Forest Plan, are acknowledged by Green et al., 1992:

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

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

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

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

Green et al., 1992 also recognize that “Rates of change in composition and structure are slow relative to younger forests.”

In preparing and adopting Green et al. 1992 old-growth guidelines, the FS did not use an independent scientific peer review process, as discussed by Yanishevsky, 1994:

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

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

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

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

The FS wants to make the definition of old growth to be a simplistic numbers and database analysis game, devoid of biologically vital data gathered in the field which might document what is unique about old growth—not just a few large trees left over after logging, but decadence, rot, snags, down logs, patchy irregular canopy layers—things that can't be created by the agency's version of "restoration" and which would be depleted by such management actions.

The IPNF's 1987 Forest Plan included standards for protection of old growth and associated wildlife (USDA Forest Service 1987c). The IPNF's 1987 Forest Plan Appendix 27 (USDA Forest Service, 1987d) provided other direction and biological information concerning old growth and old-growth associated wildlife species. The FS has never explained what it is about the IPNF's 1987 Forest Plan's old growth standards, and its Appendix 27 that is *inconsistent with the best available science*.

The IPNF has conducted no research or monitoring comparing pre- and post-logging old growth occupancy by or abundance of the wildlife species with strong biological association with habitat components found in old growth. Biologically speaking, the FS refuses to check in with the real experts to see if logged old growth is still functioning for their survival.

The IPNF has failed to cite any evidence that its managing for old growth habitat (i.e., logging and burning old growth) strategy will improve old-growth wildlife species' habitats over the short-term or long-term. In regards to this theory often offered by the FS, 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. (Pp. 11, 15 emphasis added).

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

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

The Buckskin Saddle project would log dense forest old growth.

Forest Plan allows active mechanical treatments in old growth but as or plan objection asserts, this ignores scientific information indicating such active management is the very antithesis of old growth. The Forest Plan cites no scientific research or monitoring results from the IPNF that demonstrate management manipulations will create net ecological benefit rather than harm old growth and old-growth associated wildlife.

Viability

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

Traill et al., 2010 and Reed et al., 2003 are published, peer-reviewed scientific articles addressing what a true "minimum viable population" would be, and how that number is typically drastically underestimated. The FS has not identified the best available science that provides scientifically sound, minimum viable populations of any Sensitive species or MIS on the IPNF.

Considering potential difficulties of using population viability analysis at the project analysis area level (Ruggiero, et. al., 1994a), the cumulative effects of carrying out multiple projects simultaneously across the IPNF makes it imperative that population viability be assessed at least at the forestwide scale (Marcot and Murphy, 1992). Also, temporal considerations of the impacts on wildlife population viability from implementing something with such long duration as a Forest Plan must be considered (id.) but this has never been done by the IPNF. It is also of paramount importance to monitor population during the implementation of the Forest Plan in order to validate assumptions used about long-term species persistence i.e., population viability (Marcot and Murphy, 1992; Lacy and Clark, 1993).

In the absence of meaningful thresholds of habitat loss and no monitoring of wildlife populations at the Forest level, projects will continue to degrade wildlife habitat across the IPNF over time.

(See also Schultz 2012.). The FS would never be able to detect the likelihood of complete extirpation of any wildlife species from the IPNF, using such methodology.

The EA provides no analysis for the RFP MIS “Landbird Assemblage.” Nothing about the analysis considers the specific habitat needs of any of those bird species, nor does it analyze impacts. Population trend monitoring—a key part of MIS under the NFMA regulations—is also neglected by the forest plan and Buckskin Saddle EA.

The FS has still not sufficiently dealt with the issue of fragmentation, road effects, and past logging on old-growth species’ habitat. The Forest Plan lacks meaningful direction maintaining Landscape Connectivity for wildlife. Lehmkuhl, et al. (1991) state:

Competition between interior and edge species may occur when edge species that colonize the early successional habitats and forest edges created by logging (Anderson 1979; Askins and others 1987; Lehmkuhl and others, this volume; Rosenberg and Raphael 1986) also use the interior of remaining forest (Kendeigh 1944, Reese and Ratti 1988, Wilcove and others 1986, Yahner 1989). Competition may ultimately reduce the viability of interior species’ populations.

Microclimatic changes along patch edges alter the conditions for interior plant and animal species and usually result in drier conditions with more available light (Bond 1957, Harris 1984, Ranney and others 1981).

Fragmentation also breaks the population into small subunits, each with dynamics different from the original contiguous population and each with a greater chance than the whole of local extinction from stochastic factors. Such fragmented populations are metapopulations, in which the subunits are interconnected through patterns of gene flow, extinction, and recolonization (Gill 1978, Lande and Barrowclough 1987, Levins 1970).

In terms of "quality of habitat" the continued fragmentation of the IPNF 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."

The FS relies upon unpublished reports by Samson alleged to prove viability is being maintained for various wildlife species of concern on the IPNF. However, those reports have not been subject to scientific peer review and thus fail to meet the best available science standard. The Samson reports rely upon the databases of outdated, unreliable information as its quantitative source.

The Forest Plan omits old-growth Management Indicator Species (MIS), which means there would be no monitoring of wildlife whose special habitat needs are best found in old growth. The Forest Plan's failure to designate MIS according to the requirements of the 1982 planning regulations violates NFMA.

The Committee of Scientists (1999) report stresses the importance of monitoring as a necessary step for the FS'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) provide still more emphases on the importance of monitoring:

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.

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

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

The FS relies upon Region-wide database analyses by Samson to conclude that species viability is assured, although the FS does not address the age and reliability of the data. The EA fails to consider Samson's conclusions for any wildlife species over the long term, which is very uncertain.

Sampson did not evaluate long-term viability for the fisher and marten, but did for the goshawk, pileated woodpecker, flammulated owl and black-backed woodpecker. Sampson concluded that "In regard to long-term viability, this conservation assessment has found that long-term habitat conditions in terms of Representativeness, Redundancy, and Resiliency are "low" for all species." The FS must disclose Sampson's long-term viability conclusions. Sampson merely uses home range size for each species and makes assumptions of overlap in ranges of males and females. Home range size is then multiplied by the effective population size (n_e - a number that includes young and non-breeding individuals - Allendorf and Ryman 2002) and this is projected as the amount of habitat required to maintain a minimal viable population in the short-term. This simplistic approach ignores a multitude of factors and makes no assumptions about habitat loss or change over time. For the fisher and marten, Samson uses a "critical habitat threshold" as calculated in another publication (Smallwood 2002).

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

Samson also admits that "Methods to estimate canopy closure, forest structure, and dominant forest type may differ among the studies referred to in this assessment and from those used by the FS to estimate these habitat characteristics" and that "FIA sample points affected within the prior 10 years by either timber harvest or fire are excluded in the estimates of habitat for the four species" and finally that "FIA does not adequately sample rare habitats." This especially concerning given the reliance on the FIA queries to identify suitable habitat and the fact that the data used in the analysis is now likely mostly out-of-date.

Habitat fragmentation and connectivity

Assuring viability also means addressing the issue of fragmentation, road effects, and past logging on wildlife species' habitat. Viability is only assured if individuals of a species can survive migration and dispersal for genetic diversity. The Forest Plan lacks meaningful direction maintaining landscape connectivity for wildlife. Lehmkuhl, et al. (1991) state:

Competition between interior and edge species may occur when edge species that colonize the early successional habitats and forest edges created by logging (Anderson 1979; Askins and others 1987; Lehmkuhl and others, this volume; Rosenberg and Raphael 1986) also use the interior of remaining forest (Kendeigh 1944, Reese and Ratti 1988, Wilcove and others 1986, Yahner 1989). Competition may ultimately reduce the viability of interior species' populations.

Microclimatic changes along patch edges alter the conditions for interior plant and animal species and usually result in drier conditions with more available light (Bond 1957, Harris 1984, Ranney and others 1981).

Fragmentation also breaks the population into small subunits, each with dynamics different from the original contiguous population and each with a greater chance than the whole of local extinction from stochastic factors. Such fragmented populations are metapopulations, in which the subunits are interconnected through patterns of gene flow, extinction, and recolonization (Gill 1978, Lande and Barrowclough 1987, Levins 1970).

The EA doesn't disclose the natural historic range vs. current conditions regarding patch size, edge effect, and amount of interior forest old growth in the project area and forestwide.

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

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

(Id., internal citations omitted.) Harrison and Voller, 1998 further discuss these mechanisms: Linkages are mechanisms by which the principles of connectivity can be achieved. Although the definitions of linkages vary, all imply that there are connections or movement among habitat patches. Corridor is another term commonly used to refer to a tool for maintaining connectivity. ...the successful functioning of a corridor or linkage should be judged in terms of the connectivity among subpopulations and the maintenance of potential metapopulation processes. (Internal citations omitted.)

Harris, 1984 discusses connectivity and effective interior habitat of old-growth patches:
Three factors that determine the effective size of an old-growth habitat island are (1) actual size; (2) distance from a similar old-growth island; and (3) degree of habitat difference of the intervening matrix. ...(I)n order to achieve the same effective island size a stand of old- growth habitat that is surrounded by clearcut and re-

generation 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.

Remedy: Select the No Action alternative. Alternatively, prepare an EIS that addresses the analytical and scientific issues identified above. Display the IPNF inventory of forestwide and project area “recruitment potential old growth” on a map and provide links on the Forest website to the forestwide spreadsheet of stands which are designated or otherwise considered to be “recruitment potential old growth.” Do the same for old growth the IPNF alleges meets sufficient criteria to be considered effective old growth.

BIG GAME SPECIES

Road density and habitat were discussed in AWR’s comments. Also, issues regarding the elk were raised in our Objection to the revised forest plan (pp. 31, 32, 42, 46, 77).

The EA claims there is a need to “Improve big game winter range conditions and promote forage opportunities.” This EA fails to cite any data supporting this alleged “need” of the project area. What does Montana Fish, Wildlife and Parks say about the population trends of big game species here? Below objective levels. What are their concerns about factors affecting these populations?

The EA says all the newly accessible roads and routes to be created for logging access would not be “open during the firearms hunting season” so there would be no impacts to elk security. The biologically insufficient definition in the Forest Plan is highlighted here. The analysis is not credible given the FS’s inability to effectively prevent motorized traffic behind roads, as discussed in the grizzly bear section of this objection. Moreover, it’s not just hunters in season— it’s poachers during every season. Also, this ignores the fact that lawful hunters find easier travel on newly accessible routes. Although this is usually by walking, it is also increasingly by bicycle—even eBikes not considered in the Forest Plan EIS.

The science is clear that motorized access via trail, road, or over-snow 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.

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

The EA doesn't demonstrate consistency with Forest Plan requirements for these medium priority Planning Subunits, probably because of its false assumptions noted above.

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

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

Optimum size for thermal cover on summer and spring-fall range is 12 to 24 ha (30 to 60 acres). Areas less than 12 ha (30 acres) are below the size required to provide necessary internal stand conditions and to accommodate the herd behavior of elk.
...Cover requirements on winter ranges must be considered separately and more carefully. Animals distributed over thousands of square miles in spring, summer and fall are forced by increasing

snow depths at higher elevations to concentrate into much restricted, lower- elevation areas in mid- to late-winter. Winter range, because of its scarcity and intensity of use, is more sensitive to land management decisions.

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

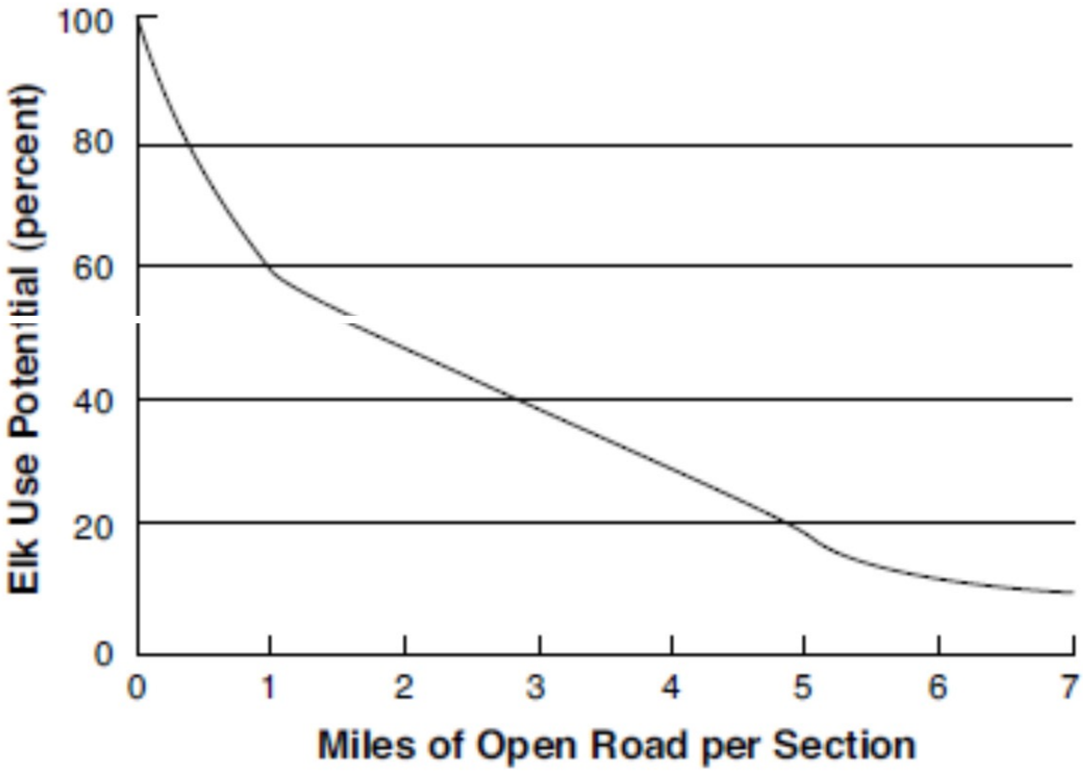
Thomas et al., 1988a also state:
Thomas and others (1979, p. 104-127) defined two types of cover: thermal and hiding. Thermal cover was "any stand of coniferous trees 12 meters (40 ft) or more tall, with an average canopy closure exceeding 70 percent" (p. 114). Disproportionate use of such cover by elk was thought to be related to thermoregulation. Whether such thermoregulatory activity occurs or is significant has been argued (Geist 1982,Peek and others 1982). In the context of the model presented here, arguing about why elk show preference for such stands is pointless. They do exhibit a preference (Leckenby 1984; see Thomas 1979 for a review). As this habitat model is based on expressed preferences of elk, we continue to use that criterion as a tested habitat attribute. We cannot demonstrate that the observed preference is an expression of need, but we predict energy exchange advantages of such cover to elk (Parker and Robbins 1984). We consider it prudent to assume that preferred kinds of cover provide an advantage to the elk over nonpreferred or less preferred options.

The EA acknowledges that noxious weeds are an issue, so where is the analysis of how weed populations and trends are affecting and will affect the forage the FS claims will be improved by the project?

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:

58

5. Levels of habitat effectiveness:



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

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

GRIZZLY BEAR

Issues regarding the grizzly bear were raised in our incorporated Objection to the revised forest plan (OBJECTION STATEMENT:

Landscape Connectivity, OBJECTION STATEMENT: FW-OBJ-AR-04, OBJECTION STATEMENT: Road Density, pp. 51-52, 56, 59-60, 64, 67, OBJECTION STATEMENT: Monitoring Question MON-FLS-01). We fully incorporate all of those previous submissions. Road density was raised in our comments. Grizzly bears will be reised in our forthcoming 60 day notice.

The EA states"Grizzly bears and a portion of their home ranges are documented within the project area" and "may affect, is likely to adversely affectgrizzly bears." There is no Biological Assessment (BA) published on the project website, nor a Biological Opinion (BO), so we are unable to see results of U.S. Fish & Wildlife Service consultation, including terms and conditions to regulate "take." The BA and BO must be made available to the public before a draft Decision is published in order for the public to be properly informed at this final step of public involvement—the objection stage.

The veracity of the FS's inventory of system and nonsystem ("undetermined" or "unauthorized") roads is at issue here also. This is partly because the FS basically turns a blind eye to the situation with insufficient commitment to monitoring, and also because violations are not always remedied in a timely manner.

The project area is not within a BMU or BORZ and grizzly bear presence here is a recent occurrence, with documentation by three male grizzly bears over the past 5-7 years. (EA p. 123.)

By law if thereis documention of 3 or more grizzly bears the area shall be included in a BORZ. The BORZ has not been created therefore the project is in violation of the NFMA, NEPA, the Kootenai Forest Plan, the APA and the ESA.

The Buckskin Saddle project would violate the Forest Plan/Access Amendment standards, a violation of NFMA.

The EA does not disclose how many years the existing core ares have provided the habitat benefits assumed under the Forest Plan. As pointed out, some has been lost (due to "private infrastructure development") and we're not told of other likely and forseeable reductions.

Since we are awaiting the results of updated ESA consultation on the Forest Plan, the issuance of the Buckskin Saddle draft DN is premature and subverts NEPA and the ESA.

Furthermore, this population is currently warranted for uplisting to Endangered, in recognition of its biological and legal status.

Part of the problem is the lack of connectivity between the Selkirk, Cabinet and Yaak portions of the Selkirk and Cabinet-Yaak Ecosystem, creating virtual isolation between portions the recovery area.

Also, the FS's population estimates of grizzly bears in the CYE ("improvements") are not scientifically defensible. The FS therefore assumes increased impacts with this timber sale are acceptable.

Also, the EA assumes that abundance of huckleberries are demographically limiting for grizzly bears in this region, and further assumes that Project treatments will substantially enhance abundance of huckleberries to an extent sufficient to offset any losses of habitat security.

There is little or no evidence that food abundance is a significantly limiting factor for grizzly bears in the Selkirk Ecosystem—especially as manifest in reproduction. On the other hand, there is ample evidence that human-caused mortality had governed and continues to govern the fate of this population, with food effects manifest primarily in the extent to which grizzly bears are exposed to human-related hazards during years when berries are in shorter supply.

The FS should be identifying key habitat components for grizzly bears for prioritizing road density reductions (Proctor, et al., 2020) so populations can recover.

The project area is not within a BMU or BORZ and grizzly bear presence here is a recent occurrence, with documentation by three male grizzly bears over the past 5-7 years

Dr. David Mattson makes the following points.

The assessment of prospective effects of the this project on grizzly bears in the is premised on several critical assumptions.

First, status of the Selkirk grizzly bear population is assumed to have improved since 2012. Second, and related, the

IPNF assumes that some erosion of security for grizzly bears is therefore permissible, conditioned on a related assumption that security and road access standards employed by the Kootenai National Forest (NF) are sufficient for recovery of grizzly bears in this ecosystem.

All of these assumptions are unwarranted.

Briefly:

- The weight of available evidence does not support concluding that population status has improved. For one, the methods used to estimate trend and current population size are beset with a host of problems. For another, the information able to be distilled from demographic data suggests that any improvement has stalled since 2014.

- Variations in population size and trajectory between 1999 and 2010 are more likely attributable to variations in abundance of natural foods—berries in particular—that affect exposure of bears to humans rather than to any increased mitigations. During years of scant berries, bears likely forage more widely and more often end up in conflict situations or exposed to malicious killing.

- The population of grizzly bears in the Yaak/Yahk is far smaller than even the smallest size posited to be viable by any researcher. Related, the population remains acutely vulnerable to even the smallest increases in bear mortality that are predictably more likely to occur with any increase in road access and associated human activity.

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• Malicious and other unjustified killing by humans remains

the dominant cause of death for grizzly bears in the Cabinet-Yaak Ecosystem. These kinds of killings are predictably associated with roads. As a result, levels of road access need to be substantially reduced and related levels of habitat security substantially increased rather than the opposite,

as is being proposed for the Buckskin Saddle Project.

• Road density and habitat security standards used by the Kootenai NF are patently deficient, partly because they are based on research that conflates behavioral phenomena such as avoidance and displacement with demographic phenomena, notably survival. The scale is wrong as well, given that exposure to mortality hazards logically accrues

over years as a consequence of cumulative annual movements of bears vis-à-vis hazardous environs. As a corollary, the fact that standards on the Kootenai NF are more lax than standards on the Flathead NF is self- evidently nonsensical given that grizzly bears in the Selkirk

Ecosystem remain in a much more precarious status compared to grizzly bears in the Northern Continental Divide Ecosystem.

• There is little or no evidence that food abundance is a significantly limiting factor for grizzly bears in the Cabinet-Yaak Ecosystem—especially as manifest in reproduction.

On the other hand, there is ample evidence that human-caused mortality had governed and continues to govern the

fate of this population, with food effects manifest primarily in the extent to which grizzly bears are exposed to human-related hazards during years when berries are in shorter supply.

• Compounding prospective problems with the project, proposed activities are concentrated in an area that is vital for

facilitating movement of grizzly bears between core habitats. Project activities will diminish rather than enhance security needed not only to facilitate transit of bears, but also increase odds that exposed bears will survive.

In short, the Buckskin Saddle project promises to harm grizzly bears in the Selkirk Ecosystem.

As a practical upshot, all of the population growth rates calculated to date have uncertainty intervals (e.g., 95% confidence intervals) that not only substantially overlap zero (i.e., no growth)

but also, over time, each other. More specifically, despite purporting to show trend in cumulative growth rate over time, the confidence intervals shown in Figure 10 (ibid: 37) all overlap—most almost completely (see also Figure 2A herein). Because of this, there is little or no basis for concluding that growth rate has varied with time. Likewise, taking a precautionary approach, there is little or no justifiable basis for concluding that growth rate is currently positive, despite statements in Kasworm el al. such as "The probability that the population was stable or increasing was 73%" (ibid: 36), especially in light of the fact that the point estimate of 2.1% per annum is a cumulative rate spanning 1983-2016 with little or no known relationship to current rate of population increase or decline.

Moreover, when the totality of point estimates and uncertainty is taken into consideration for the period 1998-2017, there is a cumulative 62% probability that the population was declining during these 19 years, consistent with the 2017 estimate of population size for Yaak females still being around 52% less than the estimate of population size for 1998 (Figure 2A and 2B herein).

The implications of uncertainty are thrown into relief by examining the specifics of projecting population size forward in time from 1983 to 2017 using the 1.021 (95% CI = 0.949-1.087) growth rate, noting up front that uncertainty in annual growth rate magnifies exponentially over time when manifest in population size. For example, after back-casting to obtain a plausible 1983 population starting point, deterministic projections of population size using the upper and lower confidence intervals of growth allow for a current population (2017) of anywhere between 3 and 256. Stochastic projections, e.g., using the software RISKMAN, generate a similar and not particularly useful range of 4 to 154 individuals.

The point here is that the raw cumulative uncertainty is huge, especially when dealing with a time period as long as 1983-2017. It is also important to note that this exercise takes the 1.021 estimate of lambda at face value, which, as per my previous points, is unwarranted.

Related to this last point, the current basis for modeling population growth rate using Booter (ibid: 10- 11) is egregiously simplistic given the self-evident structural complexity of grizzly

bear population demography in the Selkirk Ecosystem.

For any estimate of growth rate to be realistic, explanatory, relevant, and accurate, all of the main structure needs to be accommodated. More specifically, a relevant demographic model

would ideally include source-sink structures accounting for management- trapped versus research-trapped bears, bears in the Yaak area versus the Cabinet Mountains, augmentation bears versus in situ bears—in addition to accounting for the male segment as well as inter-annual variation attributable to variation in key food resources (see later). The model described in Kasworm et al. does none of this.

Again, the probable retort would be that sample sizes are too small to support estimating the many rates required for such a

model. But that is, indeed, the point. And no amount of hand-waving or protest will make it otherwise nor redeem the deficiencies in current estimates of demographic rates. The uncertainty is real and unavoidable, and should be acknowledged in management decision-making.

A.2. Even taking estimated growth rate at face value, current population status is problematic

Even taking the population growth rate estimated by Kasworm et al. at face value, the most defensible conclusions would be, first, that status of the population has worsened during 2014-2017 compared to 2006-2013, and, second, that numbers are still substantially less than the presumed peak reached around 1998. These conclusions are based on trend in population growth rate over time (as per ibid: 37), and trend in population size estimated by projections using year-specific cumulative population growth rates (e.g., projecting population size for 1998 using the 1983-1998 growth rate estimate, and then doing the same for each successive year, with 1983 the starting year throughout).

Figure 2 (herein) shows seminal results. In Figure 2A I've identified three periods typified by trends in population growth:

rapid decline of 2% per annum during 1998-2006, coincident with the berry famine (see below); a nearly as rapid 1.1% rate of improvement during 2006-2014; followed by stalling in the rate of improvement to around 0.2% per annum since 2014—an 82% decline in rate of change— coincident with population growth rate finally reaching positive territory. Importantly, this refers to the per annum rate of deterioration or improvement in population trajectory, which is perhaps the most relevant information to be gleaned from the estimates of population growth rate presented by Kasworm et al.

Finally, Figure 2B (herein) shows trend in estimated size of the

Yaak female population, both as a central tendency (dark green line) as well as bounding uncertainty (light green band, based on projections using the upper and lower confidence intervals for each cumulative estimate of growth rate). Parenthetically, I transformed the values to a natural log scale in Figure 2B to visually emphasize trends given that the bounds of uncertainty explode with projections increasingly farther forward in time. The take-away point is that, according to these values, population size peaked during 1998, reached a nadir during the height of the berry famine in 2006, increased through 2014, and then stalled during 2015-2017 at a size that was still around 52% less than peak numbers reached during 1998.

The key points here are that improvement in status of the female segment of the Yaak population stalled beginning in 2014 at numbers that were still approximately 52% less than the peak reached during 1998. Having said this, both of these conclusions remain severely compromised by the intrinsic uncertainties, lack of relevance, and bias of methods used by Kasworm et al.

A.3. Conclusion

The upshot of all this is that there is no legitimate basis for estimating current population size (e.g., 55- 60) by applying a biased 1983-2017 growth rate—based on high-graded data representing only a fraction of the population—to a point population estimate made during 2012. Moreover, even taken at face value, the current cumulative population growth rate shows stalled improvement in population status and a population still substantially less than peak numbers reached during 1998.

The best that can be perhaps be invoked is a contrast between the presumed minimum estimate of 35 bears during 2014-2017 (ibid: 27) and the 2012 estimate of 49 (44-62) bears reported by Kendall et al. (2016). The estimate of 35 for 2014-2016 is self-evidently less than the lower bound of the 2012 confidence interval, more consistent with a static or even declining population than with an increasing one. Of greater relevance to the draft EIS, this general conclusion also holds for comparisons specific to the Cabinet population (a current minimum of 13 bears compared to lower confidence intervals of around 20 reported by Kendall et al. for 2012).

The important point is, here again, that rote statistical uncertainty debars any conclusion about increase, stasis, or decrease in numbers of human-caused deaths. The confidence intervals of annual averages overlap substantially, which is not surprising given the small sample of years and dead bears. This statistical uncertainty is amplified by uncertainty attached to detecting any bear death other than that of an actively radio-monitored animal. Considering only human-caused deaths, this certainly holds for poached bears, deaths ‘under investigation,’ and deaths from unknown (but human-related) causes. A back-of-the-envelope calculation suggests that such deaths need to be increased by around 70 to 120% in year-end tallies.

In the face of such irrefutable uncertainty, Kasworm et al resort to focusing on and then emphasizing female mortality, which reduces the absolute values of calculated averages even further.

When an estimate of unreported human-caused female mortalities is added to known mortalities (using the long- term proportion of F:M deaths=0.4), the result is an annual average of 1.75 (95% CI 0.83-2.67) female deaths for 1999-2006 and 0.80 (95% CI 0.34-1.54) female deaths for 2007-2018. All of the reported differences in mean values are so far within the range of statistical uncertainty as to render these comparisons a bit absurd.

C.3. Conclusion

Again, researchers and managers in this ecosystem might argue that small samples prevent any degree of certainty about conclusions, but this does not obviate the obligation to acknowledge uncertainty. Nor does it eliminate the practical consequences of

small sample sizes and the compromising effects of chance processes—highlighted recently by a jump in recorded deaths from 1 in 2017 to 3 in 2018, a tripling in just one year. More certainly, it recommends humility and precaution in the face of such statistical ambiguities.

But all of this still leaves open the question of why natural mortalities as well as mortalities that cannot be definitively ascribed

to human causes are not accounted for in assessing population status. This question is especially relevant given that Kasworm et al comment in several places on the extent to which variation in abundance of key natural foods likely drives population dynamics, often through the 'natural' death of dependent young (see below). Or, even, why, when considering only human-caused mortality, adjustments to account for unrecorded deaths were not included. This is all a bit mystifying as well as prima facie unjustified.

D. Status of the Selkirk Population Remains Highly Precarious

The current vulnerability of the Selkirk population can be illustrated through a simple exercise, even without accounting for spatial structure of the Cabinet and Yaak subpopulations. I input vital rates into a commonly-used risk management program named RISKMAN (currently being proposed for management of grizzly bear mortality in the NCDE). Using the stochastic function, I was able to reconstruct the c. 2.1% growth

rate reported by Kasworm et al (2018) for 1983-2017. More

specifically, the cumulative geometric mean growth rate (lambda) varied from a maximum of 1.035 to a minimum of 1.008.

Accounting for variation in vital rates, the median ending population size at year 34 was 43, although the upper and lower 95% percentiles of simulated trajectories produced ending populations as small as 4 and as large as 154. I then simulated what would have happened if just one addition-

al female died each year. In this scenario, the geometric cumulative mean growth rate dropped from 0.952 (already much less

than 1) to an astounding 0.202 at year 34 of the simulation (Figure 3 herein). Median total population size had reached 0 by

year 23, with an upper 95th percentile of only 11 animals at the

end of simulations. Results were not much improved when an additional 1 female was lost only once every 2 or 3 years. This is-not presented as any definitive modeling result, but rather illustrative of how little the margin of error is, and how vulnerable this

population is to even the smallest increased increments of mortality (e.g., Kendall et al. 2016). This point is especially germane given that one adult female was killed by humans each of the last two years, during 2018 and 2019. And this does not account for adult females that died and were not documented.

Figure 3. Results of RISKMAN projections for the Cabinet-

Yaak population using vital rates reported by Kasworm et al. (2018), but introducing the death of an additional female grizzly bear once every 2 years. The thick green line represents the median trend of projections; the dusky green band above and below the variability of projections.

E. Weight of Available Evidence Emphasizes the Continued Importance of Malicious Killing

The extent to which poaching, malicious killing, or other suspect circumstances are associated with human-caused deaths is also instructive regarding the overall effectiveness of conflict mitigation efforts during 1999-2017 to offset the problematic effects of road-access and poaching. By its nature, malicious killing/poaching is a criminal act undertaken by criminals. Such behavior is rooted in attitudes and outlooks that are notoriously unresponsive to education and 'outreach'. The phenomenon is about willful malfeasance. As such, limitations on road access coupled with improved law enforcement and successful prosecutions are logically the most appropriate redress—not, for example, conflict mitigation by a specialist who is not tasked primarily with law enforcement.

Before pursuing this any farther, some clarification of obfuscations in the dead bear database is needed. During 1999-2017 a number of deaths were ascribed to ‘Undetermined’ human causes, ‘Poaching’ or listed as ‘Under investigation’. The first and last categories are not explicit, but nonetheless strongly suggestive. Certainly, ‘Under investigation’ suggests that the death occurred under suspicious circumstances warranting investigation—with a strong likelihood of either poaching or other unwarranted lethal action by the involved people. Such suspicions are rarely definitively resolved. ‘Undetermined’ is also more suggestive of malfeasance rather than innocence on the part of the involved people. Given the alternatives, such deaths are more defensibly allocated to causes more resistant than notto mitigation.

With all of this as context, there were a total of 7 known-probable deaths during 1999-2006 attributed to either poaching or undetermined causes, representing 58% of total human-caused deaths. During 2007-2018 there were a total of 13 deaths either under investigation or ascribed to poaching, representing a nearly identical 59% of the total known-probable human-caused deaths. These are major fractions in their own right, but leave estimated numbers of unreported deaths unaccounted for. As

Kasworm et al make clear (ibid: 33), their estimate of 'unreported' deaths did not apply to bears that were radio-collared or removed by managers, which leaves this unreported estimate

levied almost entirely against malicious or otherwise suspect causes. When these unreported estimates are added to the known-probable toll taken by poaching, unknown causes, or suspicious circumstances, the percentage increases to around 70% during 1999-2006 and approximately 77% during

2007-2016.

Taken together, these figures support concluding that (1) malicious or otherwise suspect causes account for a large portion—if not majority—of grizzly bear deaths in the Selkirk Ecosystem; (2) the fraction and even total numbers of deaths attributable to such causes did not decrease from 1999-2006 to 2007-2018; and (3) that aggressive limitations to road access by the USFS are needed, especially in areas with concentrations of productive habitat (Proctor et al. 2015, 2017).

F. Access Management is Critical to Limiting Malicious & Other Unjustified Killing

The consensus of relevant research is unambiguous about the link between road access and grizzly bear mortality. The more access, the more dead bears there are, with disproportionate concentrations near roads (Brannon et al. 1988; Benn & Herrero 2002; Nielsen et al. 2004; Wakkinen & Kasworm 2004; Boulanger & Stenhouse 2014; McLellan 2015; Proctor et al. 2017, 2018). Dead bears tend to be concentrated within 100 to 500 m of roads, averaging around 300 m (± 195 m) among studies where distance was noted.

Unfortunately, there is a common conflation of the extent to which radio-marked grizzly bears spatially avoid roads with the geospatial configuration of mortality risk and, even more important, decrements in survival and population growth. These parameters are not synonymous. Even though a bear might underuse habitats within a certain distance of roads, this does not translate into a 1:1 correlation with exposure to risk of human-related mortality during a bear's lifetime. Conflation of avoidance with mortality risk has led to the unstated assumption that the former can be used to set standards for the latter. Such is the case for road density and habitat security standards set by the Kootenai National Forest based on the results of Wakkinen & Kasworm (1997).

Taking 300 m as a ballpark figure, road densities of roughly 0.6 km/km2 translate into areas remote from where human-caused mortality is concentrated that amount to only 84 ha (208 acres), which is trivially small for a grizzly bear. This sort of geospatial buffer still means that grizzly bears are frequently exposed to hazards of human-caused death to the predictable extent that they must and willmove from one presumably secure area to another—even assuming that these bears exhibit "average" avoidance of human features such as roads. In other words, the level of buffering from human-caused mortality offered by road density and related security standards invoked in the Buckskin Saddle Project is guaranteed to be inadequate.

The inadequacy and inappropriateness of road density and security standards used by the Kootenai National Forest in application to the Bickskin Saddle Project are highlighted in contrast to standards applied in the Northern Continental Divide Ecosystem (NCDE), as well as in contrast to trajectories of populations in the NCDE and Greater Yellowstone Ecosystem. The populations of already relatively numerous grizzly bears in the NCDE and GYE have increased substantially since the early 1990s to 2000s, in contrast to in the Selkirk where precariously few bears have fared poorly (see my Points A-D, herein). Tellingly, Wilderness Areas and Inventoried Roadless Areas where road access is not allowed comprise around 56% of the NCDE and GYE. In the Selkirk Ecosystem this figure is less than half as much, nearer 21%. This difference alone can explain much of the corresponding difference in fates of grizzly bear populations.

Despite these telling differences in fates and trajectories of grizzly bear populations, the road density and habitat security standards applied by the Kootenai National Forest are more lax, not less, than those applied on the Flathead National Forest. On the Kootenai, areas allowed with >1 mile/mile2 of roads are 1.7-times greater; areas with >2 miles/mile2 of roads are 1.4-times greater; and extents of secure habitat nearly 20% less compared

to what is ostensibly allowed on the Flathead NF. These disparities are perverse and not able to be explained on the basis of differences in the extent of movements by grizzly bears. If anything, bears range more widely in the Selkirk and Cabinet-Yaak Ecosystems
compared to the NCDE (Kasworm et al. 2018).

As a bottom line, existing and proposed access management in the Buckskin Saddle Project Areas has jeopardized and will continue to jeopardize grizzly bears.

G. More Grizzly Bear Deaths Are Occurring On USFS Jurisdictions Now Compared to During 1999-2006

The argument for more aggressive management to prevent human-caused grizzly bear mortality on USFS jurisdictions is given greater weight by differences in locations of bear deaths between 1999-2006 and 2007-2018. Data from Kasworm et al.

(2018) and Kasworm (2018)show an increase in the proportion of grizzly bear deaths on USFS lands from 25% (95% CI = 0.5-49.5%) during 1999-2006 to 56.5% (36.3-76.8%) during 2007-2018. Although sample sizes are small, confidence intervals large, and overlap of the intervals non-trivial (17%), these results do not support concluding that hazards for grizzly bears have remained constant or declined on USFS lands. Rather, by weight of evidence, the better supported conclusion is that hazards have increased and, because of that, imperatives to control mortality on public lands have likewise increased, including on lands part of the proposed Buckskin Saddle Access Project. As per my

point F, above, the most efficacious means available to the

USFS for addressing this imperative is through providing increased rather than diminished habitat security, axiomatically through reducing road access in the Project area.

Activities of the Buckskin Saddle Project Are Problematic in a Larger Geospatial Context

Please examine the cumulative effects of this project.

Please evaluate the impacts of proposed activities on grizzly bears in a larger geospatial context. Mattson & Merrill (2004) and Proctor et al. (2015) are perhaps most relevant to such an evaluation. The former research mapped existing core habitat as well as higher-probability source habitats in the Selkirk

Moreover, with the Selkirk Recovery Area as a logical unit of analysis, any assessment of cumulative effects needs to

account for other on- going and planned human activities associated with forest treatments and harvest in this Ecosystem, as

well as foreseeable impacts associated with the proposed Rock Creek and Montanore Mines; as well as on-going and foreseeable impacts associated with the human transportation infrastructure (e.g., railways and associated highways that already fragment grizzly bear distribution in this Ecosystem, Mattson et al. [2019b]), all with the potential to amplify impacts arising from the Buckskin Saddle Project.

The Selkirl grizzly bear population is smaller than the smallest census population size ever posited as being viable. The Yaak/Yahk subpopulation has limited connectivity with grizzly bear populations elsewhere, and the Cabinet Mountains subpopulation is more isolated yet (Apps et al. 2016; Kendall et al. 2016; Proctor et al. 2012, 2015). Such isolation is well-known to magnify risk. The degree of this risk is evident in the fact that fates of populations as small of that of the Selkirk grizzlies can be dictated solely by chance variation in birth and death rates, known as demographic variation. Yet demographic variation is a relatively minor stressor compared to environmental variation, catastrophes, negative deterministic trends, and loss of genetic diversity—all of which are documented or potential factors in the Selkirk. The contemporary consensus of

researchers is that populations of large mammals such as grizzly bears need to consist of thousands of animals to withstand all of these stochastic and deterministic threats over meaningful periods of time.

The Yaak and Cabinet grizzly bear populations remain acutely vulnerable to even small changes in levels of mortality. Under such circumstances, a precautionary approach to managing spatial hazards and habitat security is not only advisable, but mandatory. Unfortunately, there is no evidence of caution or even meaningful recognition of threats to the Cabinet population.

K.2. Variation in Population Trajectory Has Likely Been Driven by Exposure to Humans

As a hypothetical, it is worth taking claims regarding an improvement in status of the Selkirk grizzly bear population between 1999-2006 and 2007-2018 at face value. Again, the emphasis here is on the hypothetical given all of the compromising or even fatal flaws in analyses and conclusions reported in

Kasworm et al. More specifically, if an improvement did occur, what was (were) the likely driver(s)?

Causation is notoriously hard to establish with any reliability or confidence. Nonetheless, even taking comments in Kasworm et al (again) at face value, one can establish how these authors ascribed causation based on the balance of their comments. The relevant quotes include:

“The increase in total known mortality beginning in 1999 may be linked to poor food production during 1998-2004 (Fig. 9). Huckleberry production during these years was about half the long term average...Poor nutrition may not allow females to produce cubs in the following year and cause females to travel further for food, exposing young to greater risk of mortality from conflicts with humans, predators, or accidental deaths.” (emphasized in Figure 10; ibid: 32; see Fig. 6, herein).

“Some of this decrease [in survival] in the 1999-2006 period could be attributed to an increase in natural mortality probably related to poor berry production during 1998-2004. Mortalities on private lands within the U.S. increased during this period, suggesting that bears were searching more widely for foods to replace the low berry crop.” (ibid: 34).

In reference to a probable increase in size of the Cabinet Mountains subpopulation from around <15 (possibly 5-10) in 1988 to around 22-24 in 2012: “These data indicate the Cabinet Mountains population has increased 2-4 times since 1988, but this increase is largely a product of the augmentation effort with reproduction from that segment.” (ibid: 36).

L. Conclusion

Reiterating my conclusion in the Introduction to these comments, the Buckskin Saddle Project promises to harm grizzly bears in the Selkirk Ecosystem. The Forest Service could unequivocally benefit grizzly bears in this area by the closure and retirement of roads.

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Management, 61(4), 1032-1039.The FS manages most of the habitat in the CYE, but instead of exercising its discretion to increase habitat security via substantial road reductions and minimizing industrial and motorized disturbance, the agency prefers to log, mine, and otherwise manipulate and disrupt the grizzly's habitat to the limits allowed by its already inadequate regulatory mechanisms. Since 2010, the FS:

- Declined the opportunity to select an Access Amendment alternative that would have provided a higher level of habitat protections for grizzly bears and for a whole host of other wildlife species;

- Continued to neglect its duty to identify the forestwide minimum road system under the Travel Management Rule Subpart A;

- Recommended a minimum of the inventoried roadless areas in the CYE Recovery Zone (RZ) for Wilderness in the RFP; and

- Approved more major timber sales and mining in the CYE RZ.

  Such actions reveal a practice and pattern of failing to prioritize the needs of the grizzly bear. The FS must undertake a full cumulative effects analysis that considers all management activities (public and private) in the CYE.

  We also incorporate into these comments Louisa Willcox's commentary entitled "The Future of the Cabinet-Yaak Grizzlies" (https://www.counterpunch.org/2017/09/08/95644/).

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

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

Cumulative incidental take under the revised forest plan has not been low.

The BO also states:

The Revised Plan's desired condition for patches which includes a range of larger opening sizes may result in adverse effects if lack of cover leads to under use of foraging habitat or increased risk of human-grizzly bear conflicts causing mortality of a grizzly bear. Openings created by timber harvest, depending on site conditions, may retain features that interrupt the line of sight and provide cover for bears (J. Anderson 03/12/2012 pers. comm.).

The FS does not show that the openings to be newly created by the project don't exceed levels of allowed incidental take. The Buckskin project will have many even-aged regeneration opening bigger than 40 acres. As explained elsewhere in this Objection, the EA makes no meaningful distinction between the types of "regeneration" logging methods to be utilized. Although commonly known that clearcuts leave fewer trees that seed tree cuts, and seed tree cuts leave fewer trees than shelterwood cuts, this EA and DN do not require the FS to meet any measurable, numerical

[10] The FS's "Request..." document actually lists 20—not 21 openings.

criteria or distinctions for such cuts during implementation. The best the EA does is provide blurry forest stand pizza diagrams as copied here via screenshot:

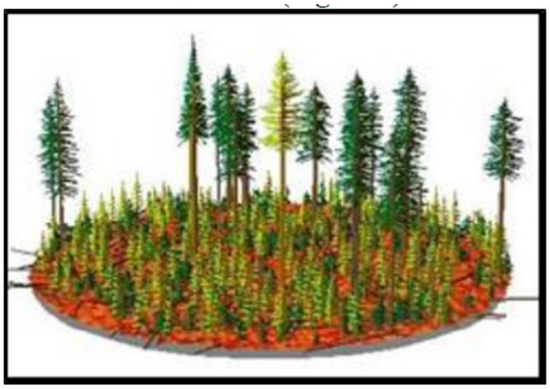

Figure 3. Simulation of a shelterwood cut.

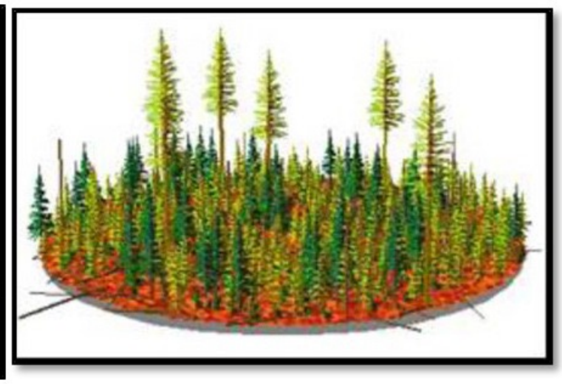

Figure 4. Simulation of a seed-tree cut

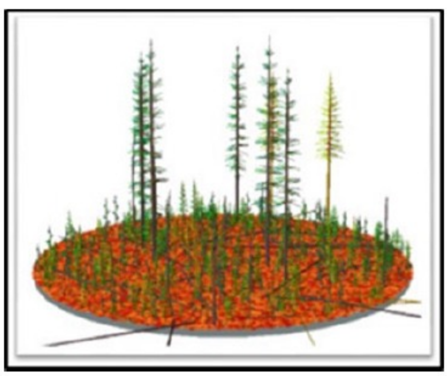

Figure 5. Simulation of a clearcut with reserves

And the pizza diagram of "Improvement Cut" isn't much different than that of Shelterwood:

Figure 1. Simulation of an Improvement Cut

At best these diagrams represent the logged areas a number of years after cutting since they don't show the slash, burned vegetation, damage to leave trees and raw earth from machine impacts—

and this assumes overcoming regeneration challenges that increase every year due to climate change. To provide a clearer perspective, below are post-monitoring photographs of shelterwood cuts implemented for the Orogrande Community Protection Project in the Nez Perce-Clearwater National Forest:


The conditions shown immediately above better represent the lack of cover grizzly bears would face for at least 4 square miles than do the EA diagrams. And this doesn't even include the 1,262 acres of "Improvement Cuts" with poorly specified retention criteria.

In the CYE, the population size is far below the recovery goal of 100 bears (Kendall et al. 2016), with human-caused mortality being the primary factor keeping the population in peril. Any conclusion that the CYE population is stable or increasing is not based in good science.

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

The EA doesn't adequately analyze and disclose cumulative impacts on land of other ownerships due to their unknown duration, location, and intensity.

The FS still has not provided solid scientific basis for its assumption that an isolated small core habitat of a few acres are considered just as useful to grizzly bears as the acres in a 10,000-acre block of core.

The EA inadequately analyzes the effectiveness of road closures, for the purpose of eliminating human access. Again, we refer to AWR's Amended Complaint for case CV-18-67-DWM for the purposes of explaining how roads affect wildlife, how pervasive are ineffective closures on national forest land, and also for forest plan consultation requirements.

Reducing roads and therefore their impacts beyond what the FS seems willing would benefit not only grizzly bears, but most other natural aspects of the ecosystem, as the Access Amendment Draft SEIS states:

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

- Alternative D Modified would provide a higher degree of habitat security (for **gray wolves**) than Alternative E Updated... (P. 74.)

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

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

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

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

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

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

- Alternative E Updated would provide some security and reduced vulnerability (for **moose**), but not as much as Alternative D Modified. (P. 104.)

- Although Alternative D Modified and Alternative E Updated would benefit **mountain goats**, Alternative D Modified would improve security and reduce the risk of displacement more than Alternative E Updated. (P. 109.)

- Alternative D Modified would improve security (for **pine marten**) more than Alternative E Updated. (P. 110.)
  Great Bear Foundation et al., 2009 discusses in great detail how the Access Amendment Alternative eventually selected leads to a significant deterioration in an already unacceptable baseline condition for grizzly bears. The scientific discussions in Great Bear Foundation et al. 2009, as well as AWR comments on the Access Amendment DSEIS refute the FS's claim to be utilizing the best available science for the grizzly bear.
  The FS fails to recognize that Bear Management Units (BMUs) do not protect enough habitat to satisfy most individual grizzly bears' needs in the CYE.
  "Our analysis shows that grizzly bears have little or no opportunity to select home ranges with lower road density or higher percentages of core... Because grizzly bears could not have selected home ranges having more core area and lower road densities, and there has been no growth in the population, there is no basis to conclude the proposed access standards are sufficient to insure the recovery of the Cabinet-Yaak and Selkirk grizzly bear populations" (Merrill 2003).
  The FS has no plan to provide scientifically defensible habitat protections outside the CYE that would allow for a larger protected zone and/or natural augmentation from outside the CYE. The FS has no cogent methodology that provides scientifically defensible habitat protections inside the CYE that would facilitate functional connectivity between and among BMUs. The Forest Plan fails to provide any scientific basis

> that baseline road densities outside the CYE can support grizzly bear population natural augmentation or recovery. Schwartz et al. (2010) noted that management for grizzly bears requires not only the provision of security area, but control of open road densities between security areas. Otherwise, grizzly bear mortality risks will be high as bears attempt to move across highly roaded landscapes to another security area. The forest plan lacks direction regarding road densities located outside of and between security areas. The Forest Plan is not consistent with best available science on road density in grizzly bear habitat outside of Bear Management Units.

Because the FS fails to use the best available science and for the reasons stated above, the FS is unable to demonstrate it is managing consistent with Forest Plan standards FW-STD-WL-02 and FW-STD-WL-03, guidelines FW-GDL-WL-01 and FW-GDL-WL-15, the National Environmental Policy Act (NEPA) and the Endangered Species Act.

Remedy: Select the No Action alternative, or prepare an EIS that remedies the deficiencies of analyses and habitat protections identified in this section.

WOL VERINE

We wrote in our comments:

The EA doesn't mention wolverine, even though the Wildlife Report cites the USFWS who indicate they may be present in the project area. The Wildlife Report fails to justify its "no effects" conclusion.Please disclose the FS's

strategy and best available science for insuring viable populations of the wolverine.There has been no project formal or informal consultation regarding the wolverine. The FS didn't include its Biological Assessment (the document submitted to the U.S. Fish & Wildlife Service in consultation or concurrence stages) on the project website. The project is in violation of the Endangered Species Act.

The Forest Service response:

As the North American wolverine is a "proposed" or "candidate" species, there is no ESA requirement for the USFWS to concur with the jeopardy call for this species (50 C.F.R. § 402.10) or for the IPNF to conference. The wolverine analysis can be found in the wolverine Biological Assessment, found in the Wildlife Project file

The wolverine is proposed for listing as a threatened species under the ESA. The proposed rule was issued in 2013. 78 Fed. Reg. 7864 (February 4, 2013). FWS withdrew the rule on August 13, 2014, and the withdrawal of the rule was deemed unlawful and vacated in 2016. Defenders of Wildlife v. Jewell, 176 F.Supp.3d 975 (D. Mont. 2016). Thus, the wolverine is currently proposed for listing under the ESA.1 81 Fed. Reg. 71670 (October 18, 2016). The FS must undergo formal consultation with the U.S. Fish & Wildlife Service.

Logging and road activities may affect wolverines; published, peer-reviewed research finds: "Roaded and recently logged areas were negatively associated with female wolverines in summer." Fisher et al., 2013. The "analysis suggests wolverines were negatively responding to human disturbance within occupied habitat. The population consequences of these functional habitat relationships will require additional focused research." Id.

There has been no project formal or informal consultation regarding the wolverine. The FS didn't include its Biological Assessment (the document submitted to the U.S. Fish & Wildlife Service in consultation or concurrence stages) on the project website. The project is in violation of the Endangered Species Act.

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

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

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

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

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

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

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."

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

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

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

Wisdom et al. (2000) state:
Carnivorous mammals such as marten, fisher, lynx, and wolverine are vulnerable to over- trapping (Bailey and others 1986, Banci 1994, Coulter 1966, Fortin and Cantin 1994, Hodgman and others 1994, Hornocker and Hash 1981, Jones 1991, Parker and others 1983, Thompson 1994, Witmer and others 1998), and over-trapping can be facilitated by road access (Bailey and others 1986, Hodgman and others 1994, Terra-Berns and others 1997, Witmer and others 1998).

...Snow-tracking and radio telemetry in Montana indicated that wolverines avoided recent clearcuts and burns (Hornocker and Hash 1981).

Copeland (1996) found that human disturbance near natal denning habitat resulted in immediate den abandonment but not kit abandonment. Disturbances that could affect

wolverine are heli-skiing, snowmobiles, backcountry skiing, logging, hunting, and summer recreation (Copeland 1996, Hornocker and Hash 1981, ICBEMP1996f).

Carroll et al. (2001b) state:
The combination of large area requirements and low reproductive rate make the wolverine vulnerable to human-induced mortality and habitat alteration. Populations probably cannot sustain rates of human-induced mortality greater than 7–8%, lower than that documented in most studies of trapping mortality (Banci 1994, Weaver et al. 1996).

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

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

- Provide large areas with low road density and minimal human disturbance for wolverine
  and lynx, especially where populations are known to occur. Manage human activities and
  road access to minimize human disturbance in areas of

known populations.

- Manage wolverine and lynx in a metapopulation context, and provide adequate links among existing populations.

- Reduce human disturbances, particularly in areas with known or high potential for wolverine natal den sites (subalpine talus cirques).

The Forest Plan includes no coherent viability strategy for wolverine protection. Forest Plan protections for the wolverine revolve entirely around the rather random likelihood of a wolverine den site being detected, so that measures might be taken: "Management activities on NFS lands should avoid/minimize disturbance at known active nesting or denning sites for other sensitive, threatened, or endangered species not covered under other forestwide guidelines." (FW-GDL-WL-25.) The Forest Plan provides no further direction on how motorized activities would be avoided or minimized other than vaguely stating, "Use the best available information to set a timeframe and a distance buffer around active nests or dens." (Id.) What is this best available science?

The Forest Plan/FEIS fail to describe the quantity and quality of habitat that is necessary to sustain the viability of the wolverine.

The Analysis of the Management Situation Technical Report for Revision of the Kootenai and Idaho Pan-

> handle 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.

In regards to the 2013 memo from the Regional Office (2013_0305_USDAWolverine Guidance), clearly the district-level wildlife specialists are prohibited from arriving at effects conclusions based upon their own expertise and judgment.

Remedy: Select the No Action alternative. Alternatively, prepare an EIS that addresses the analytical and scientific issues identified above and Consult with the FWS in the impact of this project.

Submitted sincerely, /s/

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