September 9, 2025

Crystal Stonesifer,

Missoula District Ranger

Missoula Ranger District

24 Fort Missoula Road Missoula, MT 59804

Dear Ranger Stonesifer,

Please accept these comments from me on behalf of the Alliance for the Wild Rockies, Native Ecosystems Council, the Council on Wildlife and Fish and the Center for Biological Diversity (herein after Alliance) on the draft EA and FONSI for theTyler's Kitchen Rules Reduction Project.

We still believe because of the size of the project and the cumulative effects of past current and future logging by the Forest Service and private logging in the area the Forest Service must complete a full environmental impact statement (EIS) for this Project in stead of an EA that you are proposing.

Page 49 of the wildlife report states:

ESA Cumulative Effects
Under ESA, cumulative effects are the additive effect of "reasonably certain to occur" future state, private and tribal activities. Cumulative effects involve only future non-federal actions. The action area includes federal property, state lands, and neighboring private property. At the time of this BA, the Forest Service is not aware of any large-scale activities, such as large developments or infrastructure improvements that are reasonably certain to occur on non-federal property.

This is incorrect. The U.S. Forest Service's (USFS) implementation of the cumulative effects analysis (CEA) requirement under the National Environmental Policy\ Act (NEPA). The CEA regulation requires federal agencies to provide an analysis of environmental effects, with consideration of past, present, and foreseeable future actions by both public and private parties, often on broad geographic scales. Please see the attached dissertation by Courtney Allison Schultz 2009 and Shultz 2011.

Schults 2012 states:
NEPA regulations define a cumulative effect as: "The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 C.F.R. §1508.7 [2008]). The requirement asks federal agencies to look at the big picture and place the effects of a single project into a broader geographic and temporal context.

There is no analysis of the cumulative impacts of the project and the Lolo N.F.'S Missoula Ranger District's Rock Creek Ecosystem Maintenance Burning Project which borders the Tyler's Kitchen project on the west and the BLM's Clark Fork Face logging and burning project which border's the Taylor's Kitchen project to the north of the project area in violation of NEPA, NFMA, and the APA.

Alliance has reviewed the statutory and regulatory requirements governing National Forest Management projects, as well as the relevant case law, and compiled a checklist of issues that must be included in the EIS for the Project in order for the Forest Service's analysis to comply with the law.

Following the list of necessary elements, Alliance has also included a general narrative discussion on possible impacts of the Project, with accompanying citations to the relevant scientific literature. These references should be disclosed and discussed in the EIS for the Project or in the EA if you refuse to write an EIS.

Please include the following information.

I. NECESSARY ELEMENTS FOR NEPA document:

A. Disclose all Lolo National Forest Plan requirements for logging/burning projects and explain how the Project complies with them;

B. Will this project comply with forest plan big game hiding cover standards and the eastside assessment?

C. Disclose the acreages of past, current, and reasonably foreseeable logging, grazing, mining, and road building activities within the Project area;

D. Solicit and disclose comments from the Montana Department of Fish, Wildlife, and Parks regarding the impact of the Project on wildlife habitat;

E. Solicit and disclose comments from the Montana Department of Environmental Quality regarding the impact of the Project on water quality;

F. Disclose the biological assessment for the candidate, threatened, or endangered species with potential and/or actual habitat in the Project area;

G. Disclose the biological evaluation for the sensitive and management indicator species with potential and/or actual habitat in the Project area;

H. Disclose the snag densities in the Project area, and the method used to determine those densities;

I. Disclose the current, during-project, and post-project road densities in the Project area;

J. Disclose the Lolo National Forest's record of compliance with state best management practices regarding stream sedimentation from ground-disturbing management activities;

K. Disclose the Lolo National Forest's record of compliance with its monitoring requirements as set forth in its Forest Plan;

L. Disclose the Lolo National Forest's record of compliance with the additional monitoring requirements set forth in previous DN/FONSIs and RODs on the Lolo National Forest;

M. Disclose the results of the field surveys for threatened, endangered, sensitive, and rare plants in each of the proposed units;

N. Please formally consult with the US FWS on the impacts of this project on candidate, threatened, or endangered species and plants;

O. Please formally consult with the US FWS on the impacts of this project on grizzly bears, whitebark pine, monarch butterflies, wolverines, lynx and bull trout, and bull trout critical habitat;

P. Will this project exacerbate existing noxious weed infestations and start new infestations?

Q. Do unlogged old growth forest store more carbon than the wood products that would be removed from the same forest in a logging operation?

R. What is the cumulative effect of National Forest logging on U.S. carbon stores? How many acres of National Forest lands are logged every year? How much carbon is lost by that logging?

S. Is this Project consistent with "research recommendations (Krankina and Harmon 2006) for protecting carbon gains against the potential impacts of future climate change? That study recommends "[i]ncreasing or maintaining the forest area by avoiding deforestation," and states that "protecting forest from logging or clearing offer immediate benefits via prevented emissions." That study also states that, "[w]hen the initial condition of land is a productive old-growth forest, the conversion to forest plantations with a short harvest rotation can have the opposite effect lasting for many decades . . . ." The study does state that thinning may have a beneficial effect to stabilize the forest and avoid stand- replacing wildfire, but the study never defines thinning. In this Project, where much of the logging is clear-cutting and includes removing large trees without any diameter limit, and where the removal of small diameter surface and ladder fuels is an unfunded mandate to the tune of over $3 million dollars, it is dubious whether the prescriptions are the same type of "thinning" envisioned in Krankina and Harmon (2006).

T. Please list each visual quality standard that applies to each unit and disclose whether each unit meets its respective visual quality standard. A failure to comply with visual quality Forest Plan standards violates NFMA.

U. For the visual quality standard analysis please define "ground vegetation," i.e. what age are the trees, "reestablishes," "short term," "longer term," and "revegetate."

V. Please disclose whether you have conducted surveys in the Project area for this Project for wolverines, bull trout, pine martins, northern goshawk and lynx as required by the Forest Plan.

W. Please disclose how often the Project area has been surveyed for wolverines, pine martins, bull trout, northern goshawks, monarch butterflies, grizzly bears, whitebark pine and lynx.

X. Is it impossible for a wolverines, bull trout, pine martins, monarch butterflies, northern goshawks, grizzly bears, white-bark pine and lynx to inhabit the Project area?

Y. Would the habitat be better for wolverines, bull trout, monarch butterflies, pine martins, northern goshawks, grizzly bears, whitebark pine and lynx if roads were removed in the Project area?

Z. What is the U.S. FWS position on the impacts of this Project on wolverines, pine martins, bull trout, monarch butterflies, northern goshawks, grizzly bears, whitebark pine and lynx? Have you conducted ESA consultation?

AA. Please provide us with the full BA for the wolverines, monarch butterflies, pine martins, bull trout, northern goshawks, grizzly bears, whitebark pine and lynx.

BB. What is wrong with uniform forest conditions?

CC. Has the beetle kill contributed to a diverse landscape?

DD. Why are you trying to exclude stand replacement fires when these fires help aspen and whitebark pine?

EE. Please disclose what is the best available science for restoration of whitebark pine and lynx critical habitat;

FF. Disclose the level of current noxious weed infestations in the Project area and the cause of those infestations;

GG. Disclose the impact of the Project on noxious weed infestations and native plant communities;

HH. Disclose the amount of detrimental soil disturbance that currently exists in each proposed unit from previous logging and grazing activities;

II. Disclose the expected amount of detrimental soil disturbance in each unit after ground disturbance and prior to any proposed mitigation/remediation;

JJ. Disclose the expected amount of detrimental soil disturbance in each unit after proposed mitigation/remediation;

KK. Disclose the analytical data that supports proposed soil mitigation/ remediation measures;

LL. Disclose the timeline for implementation;

MM. Disclose the funding source for non- commercial activities proposed;

NN. Disclose the current level of old growth forest in each third order drainage in the Project area;

OO. Disclose the method used to quantify old growth forest acreages and its rate of error based upon field review of its predictions;

PP. Disclose the historic levels of mature and old growth forest in the Project area based on the Forest Plan definition of old growth;

QQ. Disclose the level of mature and old growth forest necessary to sustain viable populations of dependent wildlife species in the area;

RR. Disclose the amount of mature and old growth forest that will remain after implementation;

SS. Disclose the amount of current habitat for old growth and mature forest dependent species in the Project area;

TT. Disclose the amount of habitat for old growth and mature forest dependent species that will remain after Project implementation;

UU. Disclose the method used to model old growth and mature forest dependent wildlife habitat acreages and its rate of error based upon field review of its predictions;

VV. Disclose the amount of big game (moose and elk) hiding cover, winter range, and security currently available in the area;

WW. Disclose the amount of big game (moose and elk) hiding cover, winter range, and security during Project implementation;

XX. Disclose the amount of big game (moose and elk) hiding cover, winter range, and security after implementation;

YY. Disclose the method used to determine big game hiding cover, winter range, and security, and its rate of error as determined by field review;

ZZ. Disclose and address the concerns expressed by the ID Team in the draft Five-Year Review of the Forest Plan regarding the failure to monitor population trends of MIS, the inadequacy of the Forest Plan old growth standard, and the failure to compile data to establish a reliable inventory of sensitive species on the Forest;

AAA. Disclose the actions being taken to reduce fuels on private lands adjacent to the Project area and how those activities/ or lack thereof will impact the efficacy of the activities proposed for this Project;

BBB. Disclose the efficacy of the proposed activities at reducing wildfire risk and severity in the Project area in the future, including a two-year, five-year, ten-year, and 20-year projection;

CCC. Disclose when and how the Lolo National Forest made the decision to suppress natural wildfire in the Project area and replace natural fire with logging and prescribed burning;

DDD. Disclose the cumulative impacts on the Forest-wide level of the Lolo National Forest's policy decision to replace natural fire with logging and prescribed burning;

EEE. Disclose how Project complies with the Eastside Assessment recommendations;

FFF. Disclose the impact of climate change on the efficacy of the proposed treatments;

GGG. Disclose the impact of the proposed project on the carbon storage potential of the area;

HHH. Disclose the baseline condition, and expected sedimentation during and after activities, for all streams in the area;

III. Disclose maps of the area that show the following elements:

1. Past, current, and reasonably foreseeable logging units in the Project area;

2. Past, current, and reasonably foreseeable grazing allotments in the Project area;

3. Density of human residences within 1.5 miles from the Project unit boundaries;

4. Hiding cover in the Project area according to the Forest Plan definition;

5. Old growth forest in the Project area;

6. Big game security areas;

7. Moose winter range;

The best available science, Christensen et al (1993),recommends elk habitat effectiveness of 70% in summer range and at least 50% in all other areas where elk are one of the prima- ry re- source considerations. According to Figure 1 in Christensen et al (1993), this equates to a maximum road density of approximate- ly 0.7 mi/sq mi. in sum- mer range and approximately 1.7 mi/sq mi. in all other areas.

Do any of the 6th Code watersheds in the Project area meet ei- ther of these road density thresholds? It appears the Project area as a whole also far exceeds these thresholds. Please disclose this type of Project level or watershed analysis on road density.

Are all of the roads that the Travel Plan closed actually closed?

How many road closure violations have there been in the Missoula Ranger District is the last 5 years?

It appears that the project violates the roadless rule. Please demonstrate that the project complies with the roadless rule.

Page 4 of the Roadless Report states:

The Northern Rockies Ecosystem Protection Act is a bill that has been introduced before Congress numerous times over the years but has never passed. The latest submittal was as H.R. 1755, introduced on March 10, 2021, and S. 1276, introduced on April 21, 2021. This bill proposes to designate the Silver King IRA (12,774 acres), and essentially all inventoried roadless areas in Montana, Idaho, Oregon, Washington, and Wyoming as wilderness. To date, this bill has not passed Congress and has not been signed into law.

This is incorrect. NREPA was introduce in the Senate (S. 1198) and in the House as H.R. 2420 on 3/7/25. NREPA recognizes this areas as an important wildlife corridor because of their importance as habitat for grizzly bears and lynx and connecting corridors for native species. Please do a better analysis for the area for its wilderness potential.

Page 5 of the Roadless Report states:

Consistent with this direction and as documented in this report, the Forest Service conducted a site-specific evaluation of the IRA as part of the Tylers Kitchen project and determined that past timber harvest and construction of classified roads (displayed in Table 3 and Appendix A) have substantially altered roadless characteristics within the northwest, northcentral, and southwest portions of the IRA, both inside and outside the footprint of this development. The extent and location of classified roads, particularly near the core of the IRA have compromised the Agency's ability to manage a large portion of the area for roadless values. Several roadless characteristics (e.g. 'habitat for threatened, endangered, proposed, candidate, and sensitive species'; 'primitive, semi-primitive non-motorized, and semi-primitive motorized classes of dispersed recreation'; 'reference landscapes'; and 'naturally appearing landscapes with high scenic quality') have been substantially altered beyond the edge of the road prisms such that the purpose of protecting them cannot be achieved.

For example, the recreation opportunity spectrum (ROS) remoteness criteria uses ½ mile as a minimum distance from classified roads to delineate semi-primitive motorized and non-motorized dispersed recreation opportunities, one of the roadless characteristics. The criteria for delineating primitive dispersed recreation opportunities is a minimum of 3 miles from roads (USDA FS 1979; and displayed in USDA FS 2000 [Forest Service Roadless Area Conservation Rule FEIS]). The ROS also uses area size "as an indicator of the opportunity to experience self-sufficiency as related to the sense of vastness of a relatively undeveloped area" to determine primitive and semi-primitive dispersed recreation opportunities. Twenty-five hundred acres is identified as the minimum size to delineate semi-primitive dispersed recreation opportunities and 5000 acres is identified as the minimum size to delineate primitive dispersed recreation opportunities (USDA FS 1979). Using these criteria, the existing development within the IRA precludes the roadless characteristic of 'primitive, semi-primitive non-motorized, and semi-primitive motorized classes of dispersed recreation' from more than half (northeast and south-central portions) of the Silver King IRA.

As another example, existing classified roads within the Silver King IRA have markedly diminished the capability of the IRA to provide for grizzly bear secure habitat, which is described as being 500 meters (1640 feet or 0.3 miles) from an open motorized route or a road closed yearlong by a gate (see Tylers Kitchen Wildlife report). The majority of classified roads within the IRA are closed yearlong by gates. These classified roads preclude grizzly bear secure habitat6 (which fits under the roadless characteristic of 'habitat for threatened, endangered, proposed, candidate, and sensitive species') within about a third (northeast and south-central portions) of the Silver King IRA.

What is the condition of the roads? The Roadless Report states: "The majority of classified roads within the IRA are closed yearlong by gates." If they are closed year round by gates they are most likely not passable by a motorized vehicle. The Forest Service doesn't count non -passable roads as roads when they count road density in grizzly habitat.

By the Forest Service's logic, they could log the entire roadless area since there were roads at one time in the roadless areas. The project clearly violates the Roadless Rule, NEPA, NFMA and the Forest Plan.

Christensen et al (1993) state that if an area is not meeting the 50% effectiveness threshold of 1.7 mi/sq mi, the agency should admit that the area is not being man- aged for elk: "Areas where habitat effective-ness is retained at lower than 50 percent must be recognized as making only minor contributions to elk management goals. If habitat effectiveness is not important, don't fake it. Just admit up front that elk are not a consideration." Please address this in the EIS or EA.

The Forest Service should provide an analysis of how much of the Project area, Project area watersheds, affected land- scape areas, or affected Hunting Districts provide "elk security area[s]" as defined by the best available science, The Eastside assessment, Christensen et al (1993) and Hillis et al (1991), to be comprised of contiguous 250 acre blocks of forested habitat 0.5 miles or more from open roads with these blocks encompassing 30% or more of the area.

Please provide a rational justification for the deviation from the Hillis security definition and numeric threshold that represent the best available science on elk security areas.

Page one of the Roadless Report states:

The project is consistent with the 2001 Roadless Area Conservation Rule [Roadless Rule] (36 CFR Part 294, Subpart B (2001)) (described below). No road construction, or road reconstruction would occur within the IRA. There would be some treatments within the IRA that include timber harvest (244 acres), non-commercial small tree thinning (132 acres), and prescribed burning (1,970 acres). The objective of treatments within the IRA is to restore ecosystem composition, resiliency to disturbance, and reduce the risk of uncharacteristic wildfire.

The Roadless Report continues on page 1:

The following Roadless Rule exceptions would be applied:

• 36 CFR 294.13(b)(1)(ii): To maintain or restore the characteristics of ecosystem composition and structure, such as to reduce the risk of uncharacteristic wildfire effects, within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period.

• 36 CFR 294.13(b)(2): the cutting, sale, or removal of timber is incidental to the implementation of a management activity not otherwise prohibited by the Rule

• 36 CFR 294.13(b)(4:): Roadless characteristics have been substantially altered in a portion of an inventoried roadless area due to the construction of a classified road and subsequent timber harvest. Both the road construction and subsequent timber harvest must have occurred after the area was designated an inventoried roadless area and prior to January 12, 2001. Timber may be cut, sold, or removed only in the substantially altered portion of the inventoried roadless area.

This report discloses the existing condition of and the project's potential effects to the nine roadless characteristics identified in the 2001 Roadless Rule, which are listed below.

The scoping notice for the Tyler's Kitchen Fuels Reduction

Project, states on pages 15-16:

Logging is prohibited in IRAs; however, there are several exceptions to this restriction that may be pursued provided the management activity meets very specific conditions and approval is granted. In order to meet the project's purpose and need across the project area, vegetation treatments including timber harvest is proposed within the Silver King IRA (see Table 4 below). No road construction or reconstruction is proposed within the IRA (Table 5). The proposed action would be consistent with the 2001 Roadless Area Conservation Rule with application of the following exceptions:

- ***36 CFR 294.13(b)(1) - the cutting of generally small diameter timber is needed to maintain or restore the charac-***

teristics of ecosystem composition and structure,

- ***36 CFR 294.13(b)(2) - the cutting of generally small diameter timber is incidental to the implementation of a management activity not otherwise prohibited, and***

- ***36 CFR 294.13(b)(4) Roadless characteristics have been substantially altered. About 14 miles of road construction and about 377 acres of subsequent timber harvest in the IRA occurred within the 1980's and 1990's. As such, effects of these activities have substantially altered roadless characteristics within the portion of the IRA were these past activities occurred.***
  Table 5. Vegetation management activities proposed in Silver King Inventoried Roadless Area

NEPA Unit	Treatment	Acres in IRA	Applicable IRA Exception

98, 99, 112

503, 516,518,519,524, 525, 526, 527,528,529

Regeneration Cut (Pine Beetle dead/dying Lodgepole)

Underburn (Restore natural fire regime)

97 (Substantially Altered) 36 CFR 294.13(b)(4)

1970 (Incidental Cutting) 36 CFR 294.13(b)(2)

	Intermediate Cut		
58, 59, 77, 87A, 88, 89, 97	(Douglas fir Beetle, overstocking, reduce competition,	147	(Ecosystem Composition) 36 CFR 294.13(b)(1)(ii)

NEPA Unit	Treatment	Acres	Applicable IRA Exception
609, 614, 920, 937, 938, 939	**Non-commercial treatments (Acquired Land Treatment** and **Small Tree Thinning)** (Douglas fir	132	(Ecosystem Composition) 36 CFR 294.13(b)(1)(ii)

Pages 4-5 of the EA states:

Approximately 378 acres of past timber harvest and 11.5 miles of classified1 roads are located within the project area portion of the IRA (see maps in Appendix A). Classified road construction and timber harvest occurred within the IRA during the late 1980s to mid-1990s. Most development is concentrated in the Eastern and Central project portion of the IRA. The past treatments, roads, and BPA transmission line overlap or are adjacent to all proposed treatments.

All of this development occurred prior to the promulgation of the 2001 Roadless Rule during the 1980's and 1990's. As such, effects of these past activities have substantially altered roadless characteristics (Habitat for threatened and endangered species, reference landscapes, naturally 1 A classified road is

defined in the Roadless Rule as a road wholly or partially within or adjacent to NFS lands that is determined to be needed for long-term motor vehicle access, including State roads, county roads, privately owned roads, NFS roads, and other roads authorized by the Forest Service.5appearing landscapes, and primitive, semi-primitive dispersed recreation) within the portion of the IRA where they occurred.

The Roadless Rule allows timber to be cut, sold, or removed in IRAs where roadless characteristics have been substantially altered in a portion of an inventoried roadless area due to the construction of a classified road and subsequent timber harvest. Both the road construction and subsequent timber harvest must have occurred after the area was designated an inventoried roadless area and prior to January 12, 2001. Road construction and subsequent timber harvest within the Silver King IRA occurred in the late 1980s to mid-1990s, after the area was designated an inventoried roadless area in 1979 under RARE II and before promulgation of the Roadless Rule in 2001 (see Table 3 and Appendix A). The proposed action includes timber harvest within the portion of the IRA where roadless characteristics have been substantially altered.

Unfortunately you are again knowingly giving the public false information about the exceptions to prohibiting logging and removal of trees in roadless areas since you did not state 36 CFR 294.13(b)(4) correctly.

The Roadless Report states on page 4-5: ***Both the road construction and subsequent timber harvest must have occurred***

after the area was designated an inventoried roadless area and prior to January 12, 2001.

As the Forest Service stated in the scoping notice and the EA:

- ***About 14 miles of road construction and about 377 acres of subsequent timber harvest in the IRA occurred within the 1980's and 1990's.***

The Roadless Rule

Following is the full text
of 36 CFR 294.13(b)(4) from the Roadless Area Conservation Rule:

(4) Roadless characteristics have been substantially altered in a portion of an inventoried roadless area due to the construction of a classified road and subsequent timber harvest. Both the road construction and subsequent timber harvest must have occurred after the area was designated an inventoried roadless area and prior to January 12, 2001. Timber may be cut, sold, or removed only in the substantially altered portion of the inventoried roadless area.

The scoping notice offer no evidence that the road construction and subsequent timber harvest occurred after the area was designated an inventoried roadless area and prior to January 12, 2001.

In fact the scoping notice states that on page 15: "About 14 miles of road construction and about 377 acres of subsequent timber harvest in the IRA occurred within the 1980’s and 1990’s.”

Page 1 of the EA states:

Approximately 5,900 acres within the project area (18%) are former private timber industry lands acquired by the Forest Service over the past two decades. In February of 2023, the Lolo National Forest administratively changed Section III (Management Areas) of the 1986 Lolo Forest Plan to allocate management area direction to these acquired parcels.

The roadless area in question was private land that the Forest Service bought in 2023. Since it was not designated roadless before 2001 because the Forest Service didn’t own the land the following provision does not apply:

(4) Roadless characteristics have been substantially altered in a portion of an inventoried roadless area due to the construction of a classified road and subsequent timber harvest. Both the road construction and subsequent timber harvest must have occurred after the area was designated an inventoried roadless area and prior to January 12, 2001.

It wasn’t designated roadless until 2023 when the Forest Service bought it. Therefore the project is in violation of NEPA, NFMA, the Roadless Rule and the APA.

Reg. 3244 (Jan. 12, 2001). The Roadless Rule prohibits road construction and tree cutting in designated “Inventoried Roadless Areas” subject to limited exceptions. See Alaska, 273 F.-Supp.3d at 108.

For over 15 years, the Roadless Rule was the subject of litigation. See, e.g., Kootenai Tribe of Idaho v. Veneman, 313 F.3d 1094, 1126 (9th Cir. 2002); California ex rel. Lockyer v. USDA., 575 F.3d 999, 1007 (9th Cir. 2009); Wyoming v. USDA, 661 F.3d 1209, 1272 (10th Cir. 2011); Organized Vill. of Kake v. USDA, 795 F.3d 956, 962 (9th Cir. 2015) (en banc); Alaska, 273 F.Supp.3d at 108–12. The Roadless Rule withstood these legal challenges. In relevant part, regarding the prohibition on tree cutting, the Roadless Rule mandates:

Prohibition on timber cutting, sale, or removal in inventoried roadless areas.

(a) Timber may not be cut, sold, or removed in inventoried roadless areas of the National Forest System, except as provided in paragraph (b) of this section.

(b) Notwithstanding the prohibition in paragraph (a) of this section, timber may be cut, sold, or removed in inventoried roadless areas if the Responsible Official determines that one of the following circumstances exists. The cutting, sale, or removal of timber in these areas is expected to be infrequent.

(1) The cutting, sale, or removal of generally small diameter timber is needed for one of the following purposes and will maintain or improve one or more of the roadless area characteristics as defined in § 294.11.

(i) To improve threatened, endangered, proposed, or sensitive species habitat; or

(ii) To maintain or restore the characteristics of ecosystem composition and structure, such as to reduce the risk of uncharacteristic wildfire effects, within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period;

(2) The cutting, sale, or removal of timber is incidental to the implementation of a management activity not otherwise prohibited by this subpart;

... .
36 C.F.R. §294.13 (2005)(emphases added).

The Roadless Rule further explains the meaning of the phrase "incidental to" in subsection (b)(2) above as follows:

Paragraph (b)(2) allows timber cutting, sale, or removal in inventoried roadless areas when incidental to implementation of a management activity not otherwise prohibited by this rule. Examples of these activities include, but are not limited to trail construction or maintenance; removal of hazard trees adjacent to classified road for public health and safety reasons; fire line construction for wildland fire suppression or control of prescribed fire; survey and maintenance of property boundaries; other authorized activities such as ski runs and utility corridors; or for road construction and reconstruction where allowed by this rule.

66 Fed. Reg. 3258.
In this project, the Project area includes in Inventoried Roadless Area. The Project allows tree-cutting in this Inventoried Roadless Areas across the forest.

It is unclear whether the Forest Service will be reconstructing old roads, using illegal user-created roads, or using roads already closed by the Travel Plan in the Inventoried Roadless Area in order to conduct these activities; the Project EA only states that, "No roads would be constructed in roadless areas."

The scoping notice states: "The Forest Service is considering options to use timber harvest and prescribed burning to address forest health and fuel concerns."

The cutting, sale, or removal of timber is not incidental to the implementation of a management activity, it is the purpose Removing fuel is not a valid exception to the Roadless Rule.

Please see the following article by George Wuerthner.

Opinion: What constitutes a healthy forest?

- ***GEORGE WUERTHNER | Guest columnist***

https://www.postregister.com/opinion/guest_column/opinion-what-constitutes-a-healthy-forest/article_a1a1674e-43a0-11ef-918d-6f8eebf62f8e.html

The Forest Service often asserts that logging reduces wildfires by "fortifying forest resilience against insects and disease."

We continuously hear from the Forest Service and others that logging creates a healthy forest. The main parameters defining a "healthy" forest are low mortality from natural agents like drought, insects and disease, high-severity blazes and rapid tree growth.

Of course, foresters define what constitutes a healthy forest, and by happy coincidence, the Industrial Forest Industry supports all the above criteria.

Such a definition demonstrates that most foresters and agency personnel fail to see the forest through the trees. They want green trees that grow fast because that is what the timber industry demands. But that is not what constitutes a healthy forest ecosystem.

The distinction between a "healthy forest" and a healthy forest ecosystem lies in the realization that an ecosystem is more than just green trees. Tree mortality and occasional episodic forest death are crucial components.

Dead trees serve as homes, food and shelter for a myriad of species, from bacteria and fungi to insects and amphibians, for birds and even for the largest mammals like bears. This understanding not only enlightens us about the complexity of forest health but also empowers us with a more holistic perspective.

However, when loggers cut down trees it disrupts the forest's natural balance and significantly reduces carbon storage.

When they suggest that this is protecting the trees from fire or other calamities, they never count the trees they have killed by *thinning as a loss. This should be a cause for concern, as it directly impacts on our fight against climate change.*

Logging is not a benign activity. Logging often requires roads, a major vector for spreading exotic weeds like cheatgrass. Logging roads are a chronic source of sedimentation in streams. Logging activities can disturb sensitive wildlife, forcing them into other areas where they may not have good habitat. Logging roads provide access to the forest for hunters, recreationalists and other humans that can further disrupt or disturb wildlife. Logging removes the physical biomass of tree boles, thus reducing the potential habitat for hundreds of species that may depend on dead wood or snags. Removing trees can even influence fisheries since logs falling into a stream provide a significant aquatic habitat for finny residents. But it can also impact more than fish and aquatic insects. Studies have shown that more logs in a stream provide more habitat for aquatic insects, providing greater insect activity in the air above streams that birds and bats exploit.

Logging removal of a significant portion of the trees may influence the forest's genetic adaptations by removing individual trees with specific alleles that may provide long-term survival to the forest stand.

For instance, some trees may have a greater resistance to some mortality factors like insects, drought, cold, wildfire and disease. These adaptations may only manifest if the stand experiences one of these agents. Since one can't tell which trees have

any particular genetic adaptation, logging may reduce the "resilience" of the forest.

Rajora et al. (2000) compared genetic diversity between pre-harvest pristine and post-harvest residual gene pools of two adjacent, old-growth stands of eastern white pine in Ontario. The conclusion was that logging reduced genetic diversity in the post-harvest residual gene pools of the two old-growth stands. Also, all of the genetic losses were low-frequency or rare alleles, which may compromise the integrity of locally adapted gene pools and the ability of eastern white pine to respond to changing environmental conditions.

Such losses are seldom considered those advocating logging to promote forest "resistance." Logging reduces the ability of a forest stand to survive.

Logging sanitizes a forest. Rather than creating a "healthy forest ecosystem," it creates a degraded one.

George Wuerthner has written a number of books on ecological and environmental issues, in particular "Wildfire: A Century of Failed Forest Policy."

Page VI-34 of the Lolo National Forest Forest Plan states:

The wilderness, roadless areas, and noncommercial forest lands located adjacent to lands intensively managed for the

benefit of the grizzly bear provide additional, undisturbed area for the bear. Habitat effectiveness, for most wildlife species, requires low disturbance levels, and to attain a high effectiveness some roads need to be closed yearlong or seasonally.

The project violates the Forest Plan by proposing to log roadless areas that provide undisturbed areas for grizzlies.

We believe that best available science shows that Commercial Logging does not reduce the threat of Forest Fires. What best available science supports the action alternative?

Please see the attached paper by Della-Sala 2022.

Please see the attached paper by Baker et al 2023.

Please see the column below by Dr. Chad Hanson.

https://thehill.com/blogs/congress-blog/energy-environment/590415-logging-makes-forests-and-homes-more-vulnerable-to

Logging makes forests and homes more vulnerable to wildfires

The West has seen some really big forest fires recently, particularly in California's Sierra Nevada and the Cascade Mountains of Oregon. Naturally, everyone is concerned and elected officials are eager to be seen as advancing solutions. The U.S. Senate is negotiating over the Build Back Better bill, which currently contains nearly $20 billion in logging subsidies for "hazardous fuel reduction" in forests. This term contains no clear definition but is typically employed as a euphemism for "thinning", which usually includes commercial logging of mature and old-growth trees on public lands. It often includes

clearcut logging that harms forests and streams and intensifies wildfires.

Logging interests stand poised to profit, as they tell the public and Congress that our forests are overgrown from years of neglect. Chainsaws and bulldozers are their remedy. Among these interests are agencies like the U.S. Forest Service that financially benefits from selling public timber to private logging companies.

In this fraught context, filled with a swirling admixture of panic, confusion, and opportunism, the truth and scientific evidence are all too often casualties. This, unfortunately, can lead to regressive policies that will only exacerbate the climate crisis and increase threats to communities from wildfire. We can no longer afford either outcome.

Many of the nation's top climate scientists and ecologists recently urged Congress to remove the logging subsidies from the Build Back Better bill. Scientists noted that logging now emits about as much carbon dioxide each year as does burning coal. They also noted that logging conducted under the guise of "forest thinning" does not stop large wildfires that are driven mainly by extreme fire-weather caused primarily by climate change. In fact, it can often make fires burn faster and more intensely toward vulnerable homes. Unprepared towns like Paradise and Grizzly Flats, Calif., unfortunately burned to the ground as fires raced through heavily logged surroundings.

Nature prepares older forests and large trees for wildfires. As trees age, they develop thick impenetrable bark and drop their lower limbs, making it difficult for fire to climb into the tree crowns. Older, dense forests used by the imperiled spotted owl burn in mixed intensities that is good for the owl and hundreds of species that depend on these forests for survival. Our national parks and wilderness areas also burn in lower fire intensities compared to heavily logged areas.

Occasionally even some of the largest trees will succumb to a severe fire but their progeny are born again to rapidly colonize the largest and most severe burn patches. Dozens of cavity-nesting birds and small mammals make their homes in the fire-killed trees. Soon after fire in these forests, nature regenerates, reminiscent of the mythical phoenix, aided by scores of pollinating insects and seed carrying birds and mammals.

Wildfires are highly variable, often depending on what a gust of wind does at a given moment, and even the biggest fires are primarily comprised of lightly and moderately-burned areas where most mature trees survive. By chance, in any large fire there will always be some areas that were thinned by loggers that burned less intense compared to unthinned areas. Before the smoke fully clears, logging interests find those locations and take journalists and politicians to promote their agenda. What they fail to disclose are the many examples where managed forests burned hotter while older, unmanaged forests did the opposite.

This sort of self-serving show boating occurred after the 2020 Creek Fire in the Sierra National Forest in California, as news

stories echoed the logging industry's "overgrown forests" narrative based on a single low-intensity burn area. When all of the data across the entire fire were analyzed, it turned out that logged forests, including commercial "thinning" areas, actually burned the most intensely.

In Oregon, The Nature Conservancy has been conducting intensive commercial thinning on its Sycan Marsh Preserve. Based on satellite imagery, the northern portion of the 414,000-acre Bootleg Fire of 2021 swept through these lands. Within days, TNC began promoting its logging program, focusing on a single location around Coyote Creek, where a "thinned" unit burned lightly. They failed to mention that nearly all of the dense, unmanaged forests burned lightly too in that area. Well-intentioned environmental reporters were misled by a carefully picked example.

Billions of dollars are being wasted to further this false logging industry narrative—funds that instead should be used to prepare communities for more climate-driven wildfires. Congress can instead redirect much needed support to damaged communities so they can build back better and adopt proven fire safety measures that harden homes and clear flammable vegetation nearest structures.

The path forward is simple, with two proven remedies that work. Protect forests from logging so they can absorb more carbon dioxide from the atmosphere and moderate fire behavior, and adapt communities to the new climate-driven wildfire era.

Chad Hanson, Ph.D., is a research ecologist with the John Muir Project and is the author of the 2021 book, “Smokescreen: Debunking Wildfire Myths to Save Our Forests and Our Climate.” Dominick DellaSala, Ph.D., is chief scientist with Wild Heritage and the author of Conservation Science and Advocacy for a Planet in Peril: Speaking Truth to Power.

Please see the following letter from over 200 top U.S. climate and forest scientists asking Congressional leaders to avoid using the pandemic emergency as a means for stripping away forest protections and promoting logging. In a historic and unprecedented letter sent to Congress today, the scientists conclude that, in order to avoid the worst impacts of the climate crisis, moving beyond fossil fuel consumption is not enough, and we must also increase forest protections and shift away from energy-intensive and greenhouse-gas polluting wood consumption.

The scientists note that annual carbon emissions from logging in U.S. forests are comparable to emissions from the residential and commercial sectors combined. They ask legislators to reject false climate solutions that promote forest biomass logging (removal and incineration of trees for energy production) under the guise of “climate-friendly” or “carbon neutral” energy or logging for cross-laminated timber (CLT) and other wood products under the guise of carbon storage. Most of the carbon in trees is removed from forests when they are logged and quickly ends up in the atmosphere or in landfills, they caution. The scientists also note that logging, including commercial “thinning,” can often increase fire intensity in forests, while damaging soils and removing vital nutrients, which undermines the carbon sequestration and storage capacity of forests.

“Forests are our only means for removing atmospheric carbon dioxide and storing the carbon long term at the needed scale. Burning wood in place of coal is accelerating global warming and decreasing the capacity of forests to counter the buildup of heat-trapping carbon dioxide,” said Dr. William Moomaw of Tufts University. Dr. Chad Hanson, a forest ecologist with the John Muir Project, observed, “The dangerous excess CO2 that we’ve put into the atmosphere with fossil fuel consumption and logging will stay there for far too long if we don’t take serious steps to bring it down, and forest protection is our best and most effective way to do that.” Dr. Dominick DellaSala, Chief Scientist with the Geos Institute, added, “The vast majority of scientists warn that in order to avoid catastrophic climate impacts in the decades ahead, including new pandemics potentially linked to deforestation, we need to keep dinosaur-carbon in the ground and store atmospheric carbon in forests.”

Rep. Kathy Castor, Chair, House Select Committee on the Climate Crisis Rep. Frank Pallone, Chair, House Energy and Commerce Committee Rep. Raúl Grijalva, Chair, House Natural Resources Committee

Rep. Collin Peterson, Chair, House Agriculture Committee

Sen. Lisa Murkowski, Chair, Senate Committee on Energy and Natural Resources Sen. John Barrasso, Chair, Senate Committee on Environment and Public Works Scientists concerned about climate and biodiversity impact of logging

13 May 2020

Dear Members of Congress,

As forest and climate change scientists and experts, we are writing to urge you to oppose legislative proposals that would promote logging and wood consumption, ostensibly as a natural climate change solution, based on claims that these represent an effective carbon storage approach, or claims that biomass logging, and incinerating trees for energy, represents renewable, carbon-neutral energy.

We find no scientific evidence to support increased logging to store more carbon in wood products, such as dimensional lumber or cross-laminated timber (CLT) for tall buildings, as a natural climate solution. The growing consensus of scientific findings is that, to effectively mitigate the worst impacts of climate change, we must not only move beyond fossil fuel consumption but must also substantially increase protection of our native forests in order to absorb more CO2 from the atmosphere and store more, not less, carbon in our forests (Depro et al. 2008, Harris et al. 2016, Woodwell 2016, Erb et al. 2018, IPCC 2018, Law et al. 2018, Harmon 2019, Moomaw et al. 2019).

Furthermore, the scientific evidence does not support the burning of wood in place of fossil fuels as a climate solution. Current science finds that burning trees for energy produces even more CO2 than burning coal, for equal electricity produced (Sterman et al. 2018), and the considerable accumulated carbon debt from the delay in growing a replacement forest is *not made up by planting trees or wood substitution (noted below). We need to increase growing forests to more rapidly close the gap between emissions and removal of CO2 by forests, while we simultaneously lower emissions from our energy, industrial and agricultural sectors.*

In your deliberations on this serious climate change issue, we encourage you to consider the following:

§ The logging and wood products industries suggest that most of the carbon in trees that are logged and removed from forests will simply be stored in CLT and other wood products for buildings instead of being stored in forest ecosystems. However, this is clearly incorrect. Up to 40% of the harvested material does not become forest products and is burned or decomposes quickly, and a majority of manufacturing waste is burned for heat. One study found that 65% of the carbon from Oregon forests logged over the past 115 years remains in the atmosphere, and just 19% is stored in long-lived products. The remainder is in landfills (Hudiburg et al. 2019).

§ Logging in U.S. forests emits 617 million tons of CO2 annually (Harris et al. 2016). Further, logging involves transportation of trucks and machinery across long distances between the forest and the mill. For every ton of carbon emitted from logging, an additional 17.2% (106 million tons of CO2) is emitted from fossil fuel consumption to support transportation, extraction, and processing of wood (Ingerson 2007). In fact, annual CO2 emissions from logging in U.S. forests are comparable to yearly U.S. emissions from the residential and com-

mercial sectors combined (https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks).

The cumulative climate change impact of logging in the U.S. is even higher, since logging causes substantial reductions in carbon sequestration and storage potential in forests due to soil compaction and nutrient removal, and these combined impacts can often reduce forest carbon storage potential by 30% or more (e.g., Elliott et al. 1996, Walmsley et al. 2009).

§ The wood products industry claims that substituting wood for concrete and steel reduces the overall carbon footprint of buildings. However, this claim has been refuted by more recent analyses that reveal forest industries have been using unrealistic and erroneous assumptions in their models, overestimating the long-term mitigation benefits of substitution by 2 to 100-fold (Law et al. 2018, Harmon 2019). The climate impact of wood is even worse if the reduced forest carbon sequestration and storage caused by nutrient loss and soil compaction from logging is included, as discussed above.

In countless public communications, and at numerous Congressional hearings, industry representatives have advocated for increased logging in the context of reducing wildland fire and related emissions. While small-tree thinning can reduce fire intensity when coupled with burning of slash debris (e.g., Perry et al. 2004, Strom and Fulé 2007) under very limited conditions, recent evidence shows intensive forest management characterized by young trees and homogenized fuels burn at higher severity (Zald & Dunn 2018). Further, the extremely low probability (less than1%, Schoennagel et al. 2017) of *thinned sites encountering a fire where thinning has occurred limits the effectiveness of such activities to forested areas near homes. Troublingly, to make thinning operations economically attractive to logging companies, commercial logging of larger, more fire-resistant trees often occurs across large areas.*

Importantly, mechanical thinning results in a substantial net loss of forest carbon storage, and a net increase in carbon emissions that can substantially exceed those of wildfire emissions (Hudiburg et al. 2013, Campbell et al. 2012). Reduced forest protections and increased logging tend to make wildland fires burn more intensely (Bradley et al. 2016). This can also occur with commercial thinning, where mature trees are removed (Cruz et al. 2008, Cruz et al. 2014). As an example, logging in U.S. forests emits 10 times more carbon than fire and native insects combined (Harris et al. 2016). And, unlike logging, fire cycles nutrients and helps increase new forest growth.

We believe having a dialogue now would be productive, and we could help members of your Committees to

Sincerely,

Lead Signatories

** Affiliations listed for identification purposes only*

We are hopeful that a new and more scientifically sound direction will be considered by Members that *emphasizes increased forest protections, and a shift away from consumption of wood products and forest*

biomass energy, to help mitigate the climate crisis.

be more effective in achieving the

conservation and climate change goals that we share. We look forward to hearing from you and are

available to provide additional scientific sources and serve as a resource for your Committees as you

consider policy proposals on the climate crisis.

William R. Moomaw, Ph.D.

Emeritus Professor

The Fletcher School and Co-director Global Development and Environment Institute Tufts University

Medford, MA, USA

Chad T. Hanson, Ph.D. Forest Ecologist

Earth Island Institute Berkeley, CA, USA

Dominick A. DellaSala, Ph.D. Chief Scientist

Geos Institute

Ashland, OR, USA

George M. Woodwell, Ph.D., Founder Woods Hole Research Center Falmouth, MA

James E. Hansen, Ph.D.

Director, Program in Climate Science, Awareness and Solutions

Earth Institute, Columbia University New York, NY

William H. Schlesinger, Ph.D.

James B. Duke Professor of Biogeochemistry Dean (Em.) the School of the Env., Duke Univ. President (Em.), the Cary Inst. of Eco. Studies Millbrook, NY

Michael E. Mann, Ph.D.

Distinguished Professor

Director, Earth System Science Center (ESSC) The Pennsylvania State University

University Park, Pennsylvania

Peter H. Raven, Ph.D.

President Emeritus, Missouri Botanical Garden George Engelmann Professor of Botany Emeritus, Washington University in St. Louis

St. Louis, MO

Thomas Lovejoy, Ph.D.

Professor, Environmental Science and Policy George Mason University

Fairfax City, VA

Senior Fellow, United Nations Foundation

Anne H. Ehrlich, Ph.D.

Center for Conservation Biology Stanford University

Palo Alto, CA

Paul R. Ehrlich, Ph.D., Professor Emeritus, Biology Stanford University

President, Center for Conservation Biology

Palo Alto, CA

William Ripple, Ph.D. Distinguished Professor of Ecology Oregon State University

Corvallis, OR

Beverly Law, Ph.D., Professor Emeritus, Global Change Bio. and Terrestrial Systems Science Department of Forest Ecosystems & Society Oregon State University

Corvallis, OR

Tara Hudiburg, Ph.D., Associate Professor Dept. of Forest, Rangeland, and Fire Sciences University of Idaho

Moscow, ID

Scott Goetz, Ph.D., Professor, Carbon Cycle Science Northern Arizona University

Science Lead, NASA Arctic Boreal

Vulnerability Experiment

Flagstaff, AZ

Michael Dorsey, Ph.D., M.F.S., M.A.

M.F.S., Yale University, School of Forestry M.A., The Johns Hopkins Univ., Anthropology Ph.D., University of Michigan, School for Environment and Sustainability

Philip B. Duffy, Ph.D.

President and Executive Director Woods Hole Research Center Falmouth, MA

Jennifer R. Marlon, Ph.D.

Research Scientist & Lecturer

Yale Program on Climate Change Communication Yale School of Forestry & Environmental Studies New Haven, CT

Mark E. Harmon, Ph.D., Professor Emeritus

Department of Forest Ecosystems & Society

Oregon State University

Corvallis, OR

Richard A. Birdsey, Ph.D.

Senior Scientist, Woods Hole Research Center Falmouth, MA

Volunteer, U.S. Forest Service

Reed Noss, Ph.D.

President and Chief Scientist

Wayne S. Walker, Ph.D. Carbon Program Director Woods Hole Research Center Falmouth, MA

Richard A. Houghton, Ph.D.

Senior Scientist, George M. Woodwell Chair for Global Ecology at Woods Hole Research Center Falmouth, MA

Susan M. Natali, Ph.D. Arctic Program Director Woods Hole Research Center Falmouth, MA

Jennifer Francis, Ph.D. Senior Scientist

Woods Hole Research Center Falmouth, MA

Susan A. Masino, Ph.D.

Vernon Roosa Professor of Applied Science Trinity College

Charles Bullard Fellow (2018-2019) Hartford, CT

Mary S. Booth, Ph.D.,

Stuart Pimm, Ph.D.

Doris Duke Chair of Conservation Duke University

Durham, NC

Juliette N. Rooney-Varga, Ph.D. Director, Climate Change Initiative Assoc. Prof., Environmental Science University of Massachusetts

Lowell, MA

Barry R. Noon, Ph.D. Emeritus Professor Colorado State University Fort Collins, CO

Scott Denning, Ph.D.

Monfort Professor of Atmospheric Science Colorado State University

Fort Collins, CO

John Sterman, Ph.D.

Professor and Director

MIT Systems Dynamics Group

Sloan School of Management Massachusetts Institute of Technology Cambridge, MA

Lori S. Siegel, Ph.D. P.E., Senior Modeler Climate Interactive Upper Valley, NH

Margaret (Meg) Lowman, Ph.D.

Director, TREE Foundation

National Geographic Explorer

Adjunct Professor, Arizona State University Research Professor, Universiti Sains Malaysia

James N. Galloway, Ph.D. Sidman P. Poole Professor Environmental Sciences University of Virginia Charlottesville, Virginia

William L. Baker, Ph.D.

Program in Ecology/Department of Geography University of Wyoming

Laramie, WY

Eric Chivian, M.D.

Founder and Former Director, Center for Health and the Global Environment

Harvard Medical School

Boston, Massachusetts

Cathy Whitlock, Ph.D.

Regents Professor in Earth Sciences &

Fellow of the Montana Institute on Ecosystems Montana State University

Bozeman, MT

Florida Institute for Conservation Science

Chuluota, Florida

Partnership for Policy Integrity

Director

Pelham, MA

Derek E. Lee, Ph.D. Associate Research Professor Penn State University University Park, PA

Monica Bond, Ph.D. Principal Scientist Wild Nature Institute Concord, NH

Ernie Niemi, President Natural Resource Economics Eugene, OR

Additional Signers

Nektaria Adaktilou-Landenberger, Ph.D. Science & Management Specialist, WVLT, and Service Assistant Professor

West Virginia Univ. / West Virginia Land Trust Morgantown, West Virginia

Ileene Anderson, M.S.

Senior Scientist

Center for Biological Diversity Los Angeles, California

William Anderson, Ph.D. Professor Emeritus

Grice Marine Biological laboratory Charleston, South Carolina

Warren Aney, M.S.

Senior Wildlife Ecologist

Oregon Chapter The Wildlife Society Portland, Oregon

Gregory H. Aplet, Ph.D. Senior Science Director The Wilderness Society Denver, Colorado

Dennis C. Odion, Ph.D. (posthumous) Vegetation Ecologist

Earth Research Institute

University of California, Santa Barbara

Rosemary Sherriff, Ph.D., Professor Geography, Environment & Spatial Analysis Faculty, Environmental Studies Program Faculty, Forest & Wildland Sciences Graduate Program

Humboldt State University, Arcata, CA

A. Z. Andis Arietta, M.S. Ph.D. Candidate

Yale University

New Haven, Connecticut

William Armbruster, Ph.D. Senior Research Scientist University of Alaska Fairbanks, Alaska

Henry Art, Ph.D.

Emeritus Professor of Biology

Director Center for Environmental Studies Williams College

Williamstown, Massachusetts

Peter Bahls, M.S.

Executive Director/Conservation Biologist Northwest Watershed Institute

Port Townsend, Washington

Bryant Baker, M.S. Conservation Director Los Padres ForestWatch Santa Barbara, CA

Jesse Barber, Ph.D. Associate Professor Boise State University Boise, Idaho

John Talberth, Ph.D.

President and Senior Economist

Center for Sustainable Economy

Portland, OR

R.W. Abrams, Ph.D.

Principal Ecologist

Dru Associates, Inc.

Glen Cove, New York

Constance Dustin Becker, Ph.D. Co-Director

Life Net Nature

Willcox, Arizona

Craig Benkman, Ph.D., Professor

University of Wyoming

Laramie, Wyoming

Robert L. Beschta, Ph.D., Professor Emeritus Forest Ecosystems and Society

Oregon State University Corvallis, Oregon

Leslie Bishop, Ph.D.

Emerita Professor of Biology Earlham College

Nashville, Indiana

Scott Black, M.S.

Executive Director

Xerces Society for Invertebrate Conservation Portland, Oregon

Brian Bodenbender, Ph.D.

Professor of Geological and Env.Science Hope College

Holland, Michigan

Elizabeth Borer, Ph.D. Professor

University of Minnesota Saint Paul, Minnesota

John Bowman, Ph.D. Professor

Monash University Melbourne, Australia

Buma Buma, Ph.D.

Assistant Professor

University of Colorado, Denver Denver, Colorado

Philip Cafaro, Ph.D.

Professor of Environmental Ethics Colorado State University

Fort Collins, Colorado

Ken Carloni, Ph.D.

Professor Emeritus

Umpqua Community College Roseburg, Oregon

Kai Chan, Ph.D.

Professor

University of British Columbia Vancouver, British Columbia

Donald Charles, Ph.D.

Senior Scientist

Academy of Natural Sciences of Drexel Univ. Philadelphia, Pennsylvania

Tonja Chi, M.S. Wildlife Ecologist Campbell, California

Joseph Cook, Ph.D.

Regents Prof. of Biology, Curator of Mammals University of New Mexico

Albuquerque, New Mexico

Patrick Crist, Ph.D. Principal

PlanIt Forward Broomfield, Colorado

Sam Davis, Ph.D. Conservation Scientist Dogwood Alliance Asheville, North Carolina

John M. DeCicco, Ph.D.

Research Professor

University of Michigan Energy Institute Ann Arbor, Michigan

Alan Dickman, Ph.D. Professor Emeritus University of Oregon Eugene, Oregon

Craig Downer, Ph.D. Wildlife Ecologist Andean Tapir Fund Minden, Nevada

Tom Dudley, Ph.D. Research Biologist University of California Santa Barbara, California

Mary Edwards, Ph.D. Professor

University of Southampton Southampton, United Kingdom

Jerry Estberg, Ph.D. Professor Emeritus University of San Diego Port Angeles, Washington

Jonathan Evans, Ph.D. Professor of Biology University of the South Sewanee, Tennessee

Daniel Fisher, Ph.D., Professor University of Michigan

Ann Arbor, Michigan

Johannes Foufopoulos, Ph.D. Associate Professor University of Michigan

Ann Arbor, Michigan

Janet Franklin, Ph.D. Distinguished Professor University of California Riverside, California

Jerry Freilich, Ph.D., Chief of Research Olympic National Park (retired)

Bend, Oregon

Lee Frelich, Ph.D.

Director, Center for Forest Ecology University of Minnesota

St. Paul, Minnesota

Christopher Frissell, Ph.D.

Principal Scientist

Frissell & Raven Hydrobiological and Landscape Sci.

Polson, Montana

Evan Frost, M.S. Terrestrial Ecologist Wildwood Consulting LLC Ashland, Oregon

Dana Furgerson, M.S. Retired teacher Eugene, Oregon

Carol Garrett, Ph.D.

Retired, Conservation Ecologist The Nature Conservancy Yreka, California

Daniel Gavin, Ph.D. Professor

University of Oregon Eugene, Oregon

Janet Gehring, Ph.D. Associate Professor Bradley University Peoria, Illinois

Robert Good, D.V.M., M.S. Epidemiologist

USDA

Wellsville, Kansas

Steven Green, Ph.D. Emeritus Professor University of Miami Coral Gables, Florida

Gregory F. Grether, Ph.D.

Professor

University of California Los Angeles Los Angeles, California

Simon Gunner, M.S. Botanist

Olofson Environmental, Inc. Berkeley, California

James G. Hallett, Ph.D.

Chair, Society for Ecological Restoration Washington, District of Columbia

Richard W. Halsey, M.S.

The California Chaparral Institute Escondido, California

Debora Hammond, Ph.D.

Professor Emerita, Environmental Studies Sonoma State University

Cotati, California

John Harte, Ph.D.

Professor of Ecosystem Sciences UC Berkeley

Berkeley, California

Susanna Hecht, Ph.D., Professor University of California

Los Angeles, California

Betsy Herbert, Ph.D.

Environmental scientist & freelance writer Betsyherbert.com

Corvallis, Oregon

Karen Holl, Ph.D.

Professor of Environmental Studies University of California Santa Cruz Santa Cruz, California

Richard T. Holmes, Ph.D. Emeritus Professor of Biology Dartmouth College

Hanover, New Hampshire

Elizabeth Horvath, M.S. Associate Professor, Biology Westmont College

Santa Barbara, California

Malcolm Hunter, Ph.D., Professor University of Maine

Orono, Maine

Mark Hunter, Ph.D.

Earl E. Werner Distinguished Univ. Professor Henry A. Gleason Collegiate Professor University of Michigan

Ann Arbor, Michigan

Richard Hutto, Ph.D., Professor Emeritus, Biology and Wildlife Biology

Division of Biological Sciences

University of Montana

Missoula, Montana

Inés Ibáñez, Ph.D.

Associate Professor

School for Environment and Sustainability University of Michigan

Ann Arbor, Michigan

Marc Imlay, Ph.D.

Natural Places Chair, Sierra Club Bryans Road, Maryland

Alice Imlay, Ph.D.

Natural Places Chair, Sierra Club Bryans Road, Maryland

Timothy Ingalsbee, Ph.D., Executive Director Firefighters United for Safety, Ethics, and Ecology (FUSEE)

Eugene, Oregon

Anne Jacopetti, M.A.

Retired Educator/Teacher 350Sonoma Steering Committee Santa Rosa, California

Karl Jarvis, Ph.D., Lecturer Southern Utah University Cedar City, Utah

Mitchell Johns, Ph.D.

Professor of Crop and Soild Science California State University

Chico, California

Jacob Kann, Ph.D.

Aquatic Ecologist

Aquatic Ecosystem Sciences LLC Ashland, Oregon

David Kanter, Ph.D.

Assistant Professor of Environmental Studies New York University

Vice-Chair International Nitrogen Initiative New York, New York

James Karr, Ph.D. Professor Emeritus University of Washington Sequim, Washington

Maya Khosla, M.S. Wildlife Biologist Rohnert Park, CA

Bruce Kirchoff, Ph.D.

Professor

University of North Carolina at Greensboro Greensboro, North Carolina

Rick Landenberger, Ph.D.

Science & Management Specialist & Asst.Prof. West Virginia Univ. / West Virginia Land Trust Morgantown, West Virginia

Marc Lapin, Ph.D.

Assoc. Lab Prof. & College Lands Ecologist Middlebury College

Middlebury, Vermont

Prggy Lemaux, Ph.D. Faculty

UC Berkeley Berkeley, California

Alan Levine, Director Coast Action Group Santa Rosa, California

Gene E. Likens, Ph.D.

President and Dist. Senior Scientist, Emeritus Cary Institute of Ecosystem Studies Millbrook, New York

Jay Lininger, M.S. Principal Scientist Pyrolysis LLC Talent, Oregon

Frank Logiudice, M.S. Senior Instructor

University of Central Florida Orlando, Florida

Chris Maser, M.S. Social-environmental Sustainability Corvallis, Oregon

Carl McDaniel, Ph.D.

Professor Emeritas (Rensselaer) Visiting Professor Oberlin Rensselaer and Oberlin College Oberlin, Ohio

John McLaughlin, Ph.D. Associate Professor

Western Washington University Bellingham, Washington

Fergus Mclean, B.S. Retired forester Dexter, Oregon

Gary Meffe, Ph.D. Conservation Biologist, retired University of Florida Gainesville, Florida

Douglas Meikle, Ph.D., Professor of Biology Miami University

Oxford, Ohio

Vicky Meretsky, Ph.D.

Prof., O'Neill School of Public & Env. Affairs Indiana University

Bloomington, Indiana

Amy Moas, Ph.D. Greenpeace USA Oakland, California

Terri Moon, M.S. Rohnert Park, California

John Morse, Ph.D. Professor Emeritus Clemson University Clemson, South Carolina

Ellen Moyer, Ph.D., P.E., Principal Greenvironment, LLC Montgomery, Massachusetts

Rob Mrowka, M.S. Senior Scientist, Retired Machias, New York

John Mull, Ph.D. Professor of Zoology Weber State University Ogden, Utah

Pete Murphy, Ph.D. Distinguished Professor Emeritus Michigan State University

East Lansing, Michigan

Dennis Murphy, Ph.D. Emeritus Rearch Professor University of Nevada Reno, Nevada

K. Greg Murray, Ph.D.

T. Elliot Weier Professor of Plant Science Hope College

Holland, Michigan

James Murray, Ph.D.

Retired Ecological Geneticist University of Virginia Charlottesville, Virginia

Phil Myers, Ph.D. Professor Emeritus University of Michigan Ann Arbor, Michigan

Knute Nadelhoffer, Ph.D.

Professor, Dept. of Ecology & Evolutionary Biology and Director, UM Biological Statio

University of Michigan

Ann Arbor, Michigan

Charles R. Neal, B.S. Ecologist

USDA (retired) Cody, Wyoming

Robert Norman, Ph.D. Lebanon, New Hampshire

Richard Nyhof, Ph.D. Professor Emeritus Calvin University Grand Rapids, Michigan

Gordon Orians, Ph.D. Professor Emeritus Univxersity of Washington Seattle, Washington

Gustav Paulay, Ph.D. Curator & Professor University of Florida Gainesville, Florida

Timothy Pearce, Ph.D.

Biologist

Carnegie Museum of Natural History Pittsburgh, Pennsylvania

Barbara Peckarsky, Ph.D.

Honorary Fellow and Adjunct Professor University of Wisconsin - Madison Madison, Wisconsin

Michael Pelizzari, Ph.D. Astrophysicist, retired Xero Carbon

Milpitas, California

Esther Peters, Ph.D.

Associate Prof., Env. Science and Policy George Mason University

Fairfax, Virginia

Roger A Powell, Ph.D.

Professor Emeritus, Dept. of Applied Ecology North Carolina State Univ.

Raleigh, North Carolina

Thomas Power, Ph.D. Professor Emeritus Univ. of Montana Missoula, Montana

James Quinn, Ph.D. Professor Emeritus

Rutgers University

New Brunswick, New Jersey

John Ratti, Ph.D.

Professor and Research Scientist, Retired University of Idaho

New Meadows, Idaho

Barbara Reynolds, Ph.D. Professor Emeritus UNCA

Asheville, North Carolina

Fred M. Rhoades, Ph.D.

Research Associate, Biology Department Western Washington University

Bellingham, Washington

Dina Roberts, Ph.D., Professor CIEE Global Institute Vancouver, Washington

Terry Root, Ph.D. Professor Emeritus Stanford University Stanford, California

Daniel Rosenberg, Ph.D. Oregon Wildlife Institute Corvallis, Oregon

Edwin Royce, Ph.D., Research Scientist (Retired) Department of Plant Sciences

University of California at Davis

Davis, California

Matthew Rubino, M.S. Research Scholar

North Carolina State University Raleigh, North Carolina

Will Russell, Ph.D. Professor

San Jose State University San Jose, California

Robin Salter, Ph.D. Professor Emeritus Oberlin College Oberlin, Ohio

Melissa Savage, Ph.D.

Assistant Professor Emeritus University of California Los Angeles Los Angeles, New Mexico

Carol Savonen, M.S. Assistant Professor Emeritus Oregon State University Philomath, Oregon

Paul Schaeffer, Ph.D., Associate Professor Miami University

Oxford, Ohio

Rae Schnapp, Ph.D. Conservation Director Indiana Forest Alliance Indianapolis, Indiana

John Schoen, Ph.D. Wildlife Ecologist Anchorage, Alaska

Tania Schoennagel, Ph.D. Research Scientist University of Colorado Boulder, Colorado

Kathy Schwager, M.S., Ecologist Yaphank, New York

Dave Seaborg, M.S., President World Rainforest Fund Walnut Creek, California

Mark Shapley, Ph.D.

Research Associate

National Lacustrine Core Facility Minneapolis, Minnesota

Steve Sheffield, Ph.D. Professor of Biology Bowie State University Bowie, Maryland

Diana Six, Ph.D.

Professor, Forest Entomology and Ecology University of Montana

Missoula, Montana

Ann Sloat, Ph.D. University of Hawaii Oahu, Hawaii

Winston Smith, Ph.D.

Principal Research Scientist

Institute of Arctic Biology, University of Alaska Juneau, Alaska

Copley Smoak, M.S. Volunteer

Conservancy of SW Florida Naples, Florida

Stefan Sommer, Ph.D.

Director of Education

MPCER, Northern Arizona University Flagstaff, Arizona

Michael Soule, Ph.D. Professor Emeritus Universitiy of California Paonia, Colorado

Wayne Spencer, Ph.D.

Chief Scientist

Conservation Biology Institute San Diego, California

Trygve Steen, Ph.D.

Professor, Env. Science and Management Portland State University

Portland, Oregon

Richard Steiner, M.S. Conservation Biologist Oasis Earth Anchorage, Alaska

James Strittholt, Ph.D., President Conservation Biology Institute Corvallis, Oregon

Michael Swift, Ph.D. Assistant Professor Emeritus St. Olaf College

Northfield, Minnesota

Alexandra Syphard, Ph.D.

Chief scientist, Sage Insurance Conservation Biology Institute

San Diego State University

San Diego, California

John Terborgh, Ph.D. Professor Emeritus Duke University Durham, North Carolina

Stephen Tettelbach, Ph.D. Professor Emeritus of Biology Long Island University Brookville, New York

Pepper Trail, Ph.D., Ornithologist Ashland, Oregon

Vicki Tripoli, Ph.D., Retired Moorpark, California

Walter Tschinkel, Ph.D. Professor Emeritus Florida State University Tallahassee, Florida

Anna Tyler, Ph.D. Research Scientist

The Jackson Laboratory Bar Harbor, Maine

Rick Van de Poll, Ph.D., Principal Ecosystem Management Consultants Center Sandwich, New Hampshire

John Vickery, M.S. Natural Areas Specialist Denver, Colorado

References

David Wake, Ph.D.

Prof. of the Grad. School in Integrative Biology University of California

Berkeley, California

Don Waller, Ph.D.

J.T. Curtis Professor of Botany, retired Univ. of Wisconsin - Madison Madison, Wisconsin

David Whitacre, Ph.D.

Instructor, Biology and Statistics Treasure Valley Math and Science Center Boise, Idaho

Norris Williams, Ph.D., Curator Emeritus Florida Museum of Natural History Gainesville, Florida

Shaye Wolf, Ph.D.

Climate Science Director Center for Biological Diversity Oakland, California

David Wood, Ph.D.

Professor of the Grasuate School UC Berkeley

Berkeley, California

George Wuerthner, M.S. Researcher/writer Public Lands Media Bend, Oregon

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Moomaw W.R, Masino S.A. and Faison E.K..2019. Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good. Frontiers in Forests and Global Change 2: Article 27.

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https://johnmuirproject.org/wp-content/uploads/2020/05/200-TopClimateScientistCongressProtectForestsForClimate-Change13May20.pdf

The federal district court of Montana recently ruled against the Kootenai National Forest on the same boiler plate analysis, writing: Ultimately, greenhouse gas reduction must happen quickly, and removing carbon from forests in the form of logging, even if trees are going to grow back, will take decades to centuries to re-sequester. Put more simply, logging causes immediate carbon losses, while re-sequestration happens slowly over time, time that the planet may not have.

Please find the court's order attached.

Please follow NEPA and take a hard look at the impact of the project on climate change.

W.R. Moomaw et al. 2019 titled, "Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good."

Thet found:

Climate change and loss of biodiversity are widely recognized as the foremost environmental challenges of our time. Forests annually sequester large quantities of atmospheric carbon dioxide (CO_2), and store carbon above and below ground for long periods of time. Intact forests—largely free from human intervention except primarily for trails and hazard removals—are the most carbon-dense and biodiverse terrestrial ecosystems, with additional benefits to society and the economy. Internationally, focus has been on preventing loss of tropical forests, yet U.S. temperate and boreal forests remove sufficient atmospheric CO_2 to reduce national annual net emissions by 11%. U.S. forests have the potential for much more rapid atmospheric CO_2 removal rates and biological carbon sequestration by intact and/or older forests. The recent 1.5 Degree Warming Report by the Intergovernmental Panel on Climate Change identifies reforestation and afforestation as important strategies to increase negative emissions, but they face signifi-

cant challenges: afforestation requires an enormous amount of additional land, and neither strategy can remove sufficient carbon by growing young trees during the critical next decade(s). In contrast, growing existing forests intact to their ecological potential—termed proforestation—is a more effective, immediate, and low-cost approach that could be mobilized across suitable forests of all types. Proforestation serves the greatest public good by maximizing co-benefits such as nature-based biological carbon sequestration and unparalleled ecosystem services such as biodiversity enhancement, water and air quality, flood and erosion control, public health benefits, low impact recreation, and scenic beauty.

This is the best available science. Why is the project not following it?

Please see the article below about Logging and wildfire by Dr. Chad Hanson.

October 5, 2022

"Fuel Reduction" Logging Increases Wildfire Intensity

A large and growing body of scientific evidence and opinion concludes that commercial thinning and post-fire logging/clearcutting makes wildfires spread faster and/or burn more severely, and this puts nearby communities at greater risk.

Morris, W.G. (U.S. Forest Service). 1940. Fire weather on clearcut, partly cut, and virgin timber areas at Westfir, Oregon. Timberman 42: 20-28.

"This study is concerned with one of these factors - the fire-weather conditions near ground level - on a single operation during the first summer following logging. These conditions were found to be more severe in the clear-cut area than in either the heavy or light partial cutting areas and more severe in the latter areas than in virgin timber."

Countryman, C.M. (U.S. Forest Service). 1956. Old-growth conversion also converts fire climate. Fire Control Notes 17: 15-19.

"Although the general relations between weather factors, fuel moisture, and fire behavior are fairly well known, the importance of these changes following conversion and their combined effect on fire behavior and control is not generally recognized. The term 'fireclimate,' as used here, designates the environmental conditions of weather and fuel moisture that affect fire behavior. It does not consider fuel created by slash because regardless of what forest managers do with slash, they still have to deal with the new fireclimate. In fact, the changes in wind, temperature, humidity, air structure, and fuel moisture may result in greater changes in fire behavior and size of control job than does the addition of more fuel in the form of slash."

"Conversion which opens up the canopy by removal of trees permits freer air movement and more sunlight to reach the ground. The increased solar radiation in turn results in higher temperatures, lower humidity, and lower fuel moisture. The magnitude of these changes can be illustrated by comparing the fireclimate in the open with that in a dense stand."

"A mature, closed stand has a fireclimate strikingly different from that in the open. Here nearly all of the solar radiation is intercepted by the crowns. Some is reflected back to space and the rest is converted to heat and distributed in depth through the crowns. Air within the stand is warmed by contact with the crowns, and the ground fuels are in turn warmed only by contact with the air. The temperature of fuels on the ground thus usually approximates air temperature within the stand."

"Temperature profiles in a dense, mixed conifer stand illustrate this process (fig. 2). By 8 o'clock in the morning, air within the crowns had warmed to 68° F. Air temperature near the ground was only 50°. By 10 o'clock temperatures within the crowns had reached 82° and, although the heat had penetrated to lower levels, air near the surface at 77° was still cooler than at any other level. At 2:00 p.m., air temperature within the stand had become virtually uniform at 87°. In the open less than one-half mile away, however, the temperature at the surface of pine litter reached 153° at 2:00 p.m."

"Because of the lower temperature and higher humidity, fuels within the closed stand are more moist than those in the open under ordinary weather conditions. Typically, when moisture content is 3 percent in the open, 8 percent can be expected in the stand."

"Moisture and temperature differences between open and closed stands have a great effect on both the inception and the behavior of fire. For example, fine fuel at 8-percent moisture content will require nearly one-third more heat for ignition than will the same fuel at 3-percent moisture content. Thus,

firebrands that do not contain enough heat to start a fire in a closed stand may readily start one in the open."

"When a standard fire weather station in the open indicates a temperature of 85° F., fuel moisture of 4 percent, and a wind velocity of 15 m.p.h.--not unusual burning conditions in the West--a fire starting on a moderate slope will spread 4.5 times as fast in the open as in a closed stand. The size of the suppression job, however, increases even more drastically."

"Greater rate of spread and intensity of burning require control lines farther from the actual fire, increasing the length of fireline. Line width also must be increased to contain the hotter fire. Less production per man and delays in getting additional crews complicate the control problem on a fast-moving fire. It has been estimated that the size of the suppression job increases nearly as the square of the rate of forward spread. Thus, fire in the open will require 20 times more suppression effort. In other words, for each man required to control a surface fire in a mature stand burning under these conditions, 20 men will be required if the area is clear cut."

"Methods other than clear cutting, of course, may bring a less drastic change in fireclimate. Nevertheless, the change resulting from partial cutting can have important effects on fire. The moderating effect that a dense stand has on the fireclimate usually results in slow-burning fires. Ordinarily, in dense timber only a few days a year have the extreme burning conditions under which surface fires produce heat rapidly enough to carry the fire into the crowns. Partial cutting can increase the

severity of the fireclimate enough to materially increase the number of days when disastrous crown fires can occur.”

SNEP (co-authored by U.S. Forest Service). 1996. Sierra Nevada Ecosystem Project, Final Report to Congress: Status of the Sierra Nevada. Vol. I: Assessment summaries and management strategies. Davis, CA: University of California, Davis, Center for Water and Wildland Resources.

“Timber harvest, through its effects on forest structure, local microclimate, and fuel accumulation, has increased fire severity more than any other recent human activity.”

“[I]n areas where the larger trees (greater than 12 inches in diameter breast height) have been removed, stand-replacing fires are more likely to occur.”

Beschta, R.L.; Frissell, C.A.; Gresswell, R.; Hauer, R.; Karr, J.R.; Minshall, G.W.; Perry, D.A.; Rhodes, J.J. 1995. Wildfire and salvage logging. Eugene, OR: Pacific Rivers Council.

“We also need to accept that in many drier forest types throughout the region, forest management may have set the stage for fires larger and more intense than have occurred in at least the last few hundred years.”

“With respect to the need for management treatments after fires, there is generally no need for urgency, nor is there a universal, ecologically-based need to act at all. By acting quickly, we run the risk of creating new problems before we solve the old ones.”

"[S]ome argue that salvage logging is needed because of the perceived increased likelihood that an area may reburn. It is the fine fuels that carry fire, not the large dead woody material. We are aware of no evidence supporting the contention that leaving large dead woody material significantly increases the probability of reburn."

Chen, J., et al. (co-authored by U.S. Forest Service). 1999. Microclimate in forest ecosystem and landscape ecology: Variations in local climate can be used to monitor and compare the effects of different management regimes. BioScience 49: 288–297.

When moving from open forest areas, resulting from logging, and into dense forests with high canopy cover, "there is generally a decrease in daytime summer temperatures but an increase in humidity..."

The authors reported a 5? C difference in ambient air temperature between a closed- canopy mature forest and a forest with partial cutting, like a commercial thinning unit (Fig. 4b), and noted that such differences are even greater than the increases in temperature predicted due to anthropogenic climate change.

Dombeck, M. (U.S. Forest Service Chief). 2001. How Can We Reduce the Fire Danger in the Interior West. Fire Management Today 61: 5-13.

"Some argue that more commercial timber harvest is needed to remove small-diameter trees and brush that are fueling our worst wildlands fires in the interior West. However, small-diameter trees and brush typically have little or no commercial value. To offset losses from their removal, a commercial operator would have to remove large, merchantable trees in the overstory. Overstory removal lets more light reach the forest floor, promoting vigorous forest regeneration. Where the overstory has been entirely removed, regeneration produces thickets of 2,000 to 10,000 small trees per acre, precisely the small-diameter materials that are causing our worst fire problems. In fact, many large fires in 2000 burned in previously logged areas laced with roads. It seems unlikely that commercial timber harvest can solve our forest health problems."

Morrison, P.H. and K.J. Harma. 2002. Analysis of Land Ownership and Prior Land Management Activities Within the Rodeo & Chediski Fires, Arizona. Pacific Biodiversity Institute, Winthrop, WA. 13 pp.

Previous logging was associated with higher fire severity.

Donato DC, Fontaine JB, Campbell JL, Robinson WD, Kauffman JB, Law BE. 2006. Science 311: 352.

"In terms of short-term fire risk, a reburn in [postfire] logged stands would likely exhibit elevated rates of fire spread, fireline intensity, and soil heating impacts...Postfire logging alone was notably incongruent with fuel reduction goals."

Hanson, C.T., Odion, D.C. 2006. Fire Severity in mechanically thinned versus unthinned forests of the Sierra Nevada, California. In: Proceedings of the 3rd International Fire Ecology and Management Congress, November 13-17, 2006, San Diego, CA.

"In all seven sites, combined mortality [thinning and fire] was higher in thinned than in unthinned units. In six of seven sites, fire-induced mortality was higher in thinned than in unthinned units...Mechanical thinning increased fire severity on the sites currently available for study on national forests of the Sierra Nevada."

Platt, R.V., et al. 2006. Are wildfire mitigation and restoration of historic forest structure compatible? A spatial modeling assessment. Annals of the Assoc. Amer. Geographers 96: 455-470.

"Compared with the original conditions, a closed canopy would result in a 10 percent reduction in the area of high or extreme fireline intensity. In contrast, an open canopy [from thinning] has the opposite effect, increasing the area exposed to high or extreme fireline intensity by 36 percent. Though it may appear counterintuitive, when all else is equal open canopies lead to reduced fuel moisture and increased midflame windspeed, which increase potential fireline intensity."

Thompson, J.R., Spies, T.A., Ganio, L.M. (co-authored by U.S. Forest Service). 2007. Reburn severity in managed and unmanaged vegetation in a large wildfire. Proceedings of the Na-

tional Academy of Sciences of the United States of America 104: 10743–10748.

"Areas that were salvage-logged and planted after the initial fire burned more severely than comparable unmanaged areas."

Cruz, M.G, and M.E. Alexander. 2010. Assessing crown fire potential in coniferous forests of western North America: A critique of current approaches and recent simulation studies. Int. J. Wildl. Fire. 19: 377–398.

The fire models used by the U.S. Forest Service falsely predict effective reduction in crown fire potential from thinning:

"Simulation studies that use certain fire modelling systems (i.e. NEXUS, FlamMap, FARSITE, FFE-FVS (Fire and Fuels Extension to the Forest Vegetation Simulator), Fuel Management Analyst (FMAPlus), BehavePlus) based on separate implementations or direct integration of Rothermel's surface and crown rate of fire spread models with Van Wagner's crown fire transition and propagation models are shown to have a significant underprediction bias when used in assessing potential crown fire behaviour in conifer forests of western North America. The principal sources of this underprediction bias are shown to include: (i) incompatible model linkages; (ii) use of surface and crown fire rate of spread models that have an inherent underprediction bias; and (iii) reduction in crown fire rate of spread based on the use of unsubstantiated crown fraction burned functions. The use of uncalibrated custom fuel

models to represent surface fuelbeds is a fourth potential source of bias."

Thompson, J., and T.A. Spies (co-authored by U.S. Forest Service). 2010. Exploring Patterns of Burn Severity in the Biscuit Fire in Southwestern Oregon. Fire Science Brief 88: 1-6.

"Areas that burned with high severity...in a previous wildfire (in 1987, 15 years prior) were more likely to burn with high severity again in the 2002 Biscuit Fire. Areas that were salvage-logged and planted following the 1987 fire burned with somewhat higher fire severity than equivalent areas that had not been logged and planted."

Graham, R., et al. (U.S. Forest Service). 2012. Fourmile Canyon Fire Findings. Gen. Tech. Rep. RMRS-GTR-289. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 110 p.

Thinned forests "were burned more severely than neighboring areas where the fuels were not treated", and 162 homes were destroyed by the Fourmile Canyon Fire (see Figs. 45 and 46).

DellaSala et al. (2013) (letter from over 200 scientists):

"Numerous studies also document the cumulative impacts of post-fire logging on natural ecosystems, including...accumulation of logging slash that can add to future fire risks..."

DellaSala et al. (2015) (letter from over 200 scientists):

"Post-fire logging has been shown to eliminate habitat for many bird species that depend on snags, compact soils, remove biological legacies (snags and downed logs) that are essential in supporting new forest growth, and spread invasive species that outcompete native vegetation and, in some cases, increase the flammability of the new forest. While it is often claimed that such logging is needed to restore conifer growth and lower fuel hazards after a fire, many studies have shown that logging tractors often kill most conifer seedlings and other important re-establishing vegetation and actually increases flammable logging slash left on site. Increased chronic sedimentation to streams due to the extensive road network and runoff from logging on steep slopes degrades aquatic organisms and water quality."

North, M.P., S.L. Stephens, B.M. Collins, J.K. Agee, G. Aplet, J.F. Franklin, and P.Z. Fule (co- authored by U.S. Forest Service). 2015. Reform forest fire management. Science 349: 1280- 1281.

"...fire is usually more efficient, cost-effective, and ecologically beneficial than mechanical treatments."

Bradley, C.M. C.T. Hanson, and D.A. DellaSala. 2016. Does increased forest protection correspond to higher fire severity in frequent-fire forests of the western USA? Ecosphere 7: article e01492.

In the largest study on this subject ever conducted in western North American, the authors found that the more trees that are removed from forests through logging, the higher the fire severity overall:

"We investigated the relationship between protected status and fire severity using the Random Forests algorithm applied to 1500 fires affecting 9.5 million hectares between 1984 and 2014 in pine (Pinus ponderosa, Pinus jeffreyi) and mixed-conifer forests of western United States, accounting for key topographic and climate variables. We found forests with higher levels of protection [from logging] had lower severity values even though they are generally identified as having the highest overall levels of biomass and fuel loading."

Lesmeister, D.B., et al. (co-authored by U.S. Forest Service). 2019. Mixed-severity wildfire and habitat of an old-forest obligate. Ecosphere10: Article e02696.

Denser, older forests with high canopy cover had lower fire severity.

Dunn, C.J., et al. 2020. How does tree regeneration respond to mixed-severity fire in the western Oregon Cascades, USA? Ecosphere 11: Article e03003.

Forests that burned at high-severity had lower, not higher, overall pre-fire tree densities.

Meigs, G.W., et al. (co-authored by U.S. Forest Service). 2020. Influence of topography and fuels on fire refugia probability *under varying fire weather in forests of the US Pacific Northwest. Canadian Journal of Forest Research 50: 636-647.*

Forests with higher pre-fire biomass are more likely to experience low-severity fire.

Moomaw et al. (2020) (letter from over 200 scientists:

https://johnmuirproject.org/2020/05/breaking-news-over-200-top-u-s-climate-and-forest- scientists-urge-congress-protect-forests-to-mitigate-climate-crisis/):

"Troublingly, to make thinning operations economically attractive to logging companies, commercial logging of larger, more fire-resistant trees often occurs across large areas. Importantly, mechanical thinning results in a substantial net loss of forest carbon storage, and a net increase in carbon emissions that can substantially exceed those of wildfire emissions (Hudiburg et al. 2013, Campbell et al. 2012). Reduced forest protections and increased logging tend to make wildland fires burn more intensely (Bradley et al. 2016). This can also occur with commercial thinning, where mature trees are removed (Cruz et al. 2008, Cruz et al. 2014). As an example, logging in U.S. forests emits 10 times more carbon than fire and native insects combined (Harris et al. 2016). And, unlike logging, fire cycles nutrients and helps increase new forest growth."

Moomaw et al. (2021) (letter from over 200 scientists: https://bit.ly/3BFtIAg):

“[C]ommercial logging conducted under the guise of “thinning” and “fuel reduction” typically removes mature, fire-resistant trees that are needed for forest resilience. We have watched as one large wildfire after another has swept through tens of thousands of acres where commercial thinning had previously occurred due to extreme fire weather driven by climate change. Removing trees can alter a forest’s microclimate, and can often increase fire intensity. In contrast, forests protected from logging, and those with high carbon biomass and carbon storage, more often burn at equal or lower intensities when fires do occur.”

Lesmeister, D.B., et al. (co-authored by U.S. Forest Service). 2021. Northern spotted owl nesting forests as fire refugia: a 30-year synthesis of large wildfires. Fire Ecology 17: Article 32.

More open forests with lower biomass had higher fire severity, because the type of open, lower-biomass forests resulting from thinning and other logging activities have “hotter, drier, and windier microclimates, and those conditions decrease dramatically over relatively short distances into the interior of older forests with multi-layer canopies and high tree density...”

Stephens, S.L., et al. (co-authored by U.S. Forest Service). 2021. Forest Restoration and Fuels Reduction: Convergent or Divergent? BioScience 71: 85-101.

While the authors continued to promote commercial thinning, they acknowledged that commercial thinning causes wildfires to move faster and become larger more quickly:

"Interestingly, surface fire rate of spread increased after restoration and fuel treatments [commercial thinning] relative to the untreated stand. This increased fire rate of spread following both treatment types is due to a combination of higher mid-flame wind speeds and a greater proportion of grass fuels, which result from reductions to canopy cover."

Hanson, C.T. 2021. Is "Fuel Reduction" Justified as Fire Management in Spotted Owl Habitat? Birds 2: 395-403.

"Within the forest types inhabited by California Spotted Owls, high-severity fire occurrence was not higher overall in unmanaged forests and was not associated with the density of pre-fire snags from recent drought in the Creek Fire, contrary to expectations under the fuel reduction hypothesis. Moreover, fuel-reduction logging in California Spotted Owl habitats was associated with higher fire severity in most cases. The highest levels of high-severity fire were in the categories with commercial logging (post-fire logging, private commercial timberlands, and commercial thinning), while the three categories with lower levels of high-severity fire were in forests with no recent forest management or wildfire, less intensive noncommercial management, and unmanaged forests with re-burning of mixed-severity wildfire, respectively."

Hanson, C.T. 2022. Cumulative severity of thinned and unthinned forests in a large California wildfire. Land 11: Article 373.

“Using published data regarding the percent basal area mortality for each commercial thinning unit that burned in the Antelope fire, combined with percent basal area mortality due to the fire itself from post-fire satellite imagery, it was found that commercial thinning was associated with significantly higher overall tree mortality levels (cumulative severity).”

Baker, B.C., and C.T. Hanson. 2022. Cumulative tree mortality from commercial thinning and a large wildfire in the Sierra Nevada, California. Land 11: Article 995.

“Similar to the findings of Hanson (2022) in the Antelope Fire of 2021 in northern California, in our investigation of the Caldor Fire of 2021 we found significantly higher cumulative severity in forests with commercial thinning than in unthinned forests, indicating that commercial thinning killed significantly more trees than it prevented from being killed in the Caldor Fire...Despite controversy regarding thinning, there is a body of scientific literature that suggests commercial thinning should be scaled up across western US forest landscapes as a wildfire management strategy. This raises an important question: what accounts for the discrepancy on this issue in the scientific literature? We believe several factors are likely to largely explain this discrepancy. First and foremost, because most previous research has not accounted for tree mortality from thinning itself, prior to the wildfire-related mortality, such research has underreported tree mortality in commercial thinning areas relative to unthinned forests. Second, some prior studies have not controlled for vegetation type, which can lead to a mismatch when comparing severity in thinned areas to the rest of the fire area given that thinning necessarily oc-

curs in conifer forests but unthinned areas can include large expanses of non-conifer vegetation types that burn almost exclusively at high severity, such as grasslands and chaparral. Third, some research reporting effectiveness of commercial thinning in terms of reducing fire severity has been based on the subjective location of comparison sample points between thinned and adjacent unthinned forests. Fourth, reported results have often been based on theoretical models, which subsequent research has found to overestimate the effectiveness of thinning. Last, several case studies draw conclusions about the effectiveness of thinning as a wildfire management strategy when the results of those studies do not support such a conclusion, as reviewed in DellaSala et al. (2022)." (internal citations omitted)

Prichard, S.J., et al. (co-authored by U.S. Forest Service). 2021. Adapting western US forests to wild-fires and climate change: 10 key questions. Ecological Applications 31: Article e02433.

In a study primarily authored by U.S. Forest Service scientists, and scientists funded by the Forest Service, the authors state that "There is little doubt that fuel reduction treatments can be effective at reducing fire severity..." yet these authors repeatedly contradict their own proposition, acknowledging that thinning can cause "higher surface fuel loads," which "can contribute to high-intensity surface fires and elevated levels of associated tree mortality," and mastication of such surface fuels "can cause deep soil heating" and "elevated fire intensities." The authors also acknowledge that thinning "can lead to increased surface wind speed and fuel heating, which allows for *increased rates of fire spread in thinned forests," and even the combination of thinning and prescribed fire "may increase the risk of fire by increasing sunlight exposure to the forest floor, drying vegetation, promoting understory growth, and increasing wind speeds."*

Despite these admissions, contradicting their promotion of thinning, the authors cite to several U.S. Forest Service-funded studies for the proposition that thinning can effectively reduce fire severity, but a subsequent analysis of those same studies found that the results of these articles do not support that conclusion, and often contradict it, as detailed in Section 5.2 of DellaSala et al. (2022) (see below).

DellaSala, D.A., B.C. Baker, C.T. Hanson, L. Ruediger, and W.L. Baker. 2022. Have western USA fire suppression and megafire active management approaches become a contemporary Sisyphus? Biological Conservation 268: Article 109499.

With regard to a previous U.S. Forest Service study claiming that commercial thinning effectively reduced fire severity in the large Wallow fire of 2011 in Arizona, DellaSala et al. (2022, Section 5.1) conducted a detailed accuracy check and found that the previous analysis had dramatically underreported high-severity fire in commercial thinning units, and forests with commercial thinning in fact had higher fire severity, overall.

DellaSala et al. (2022, Section 5.2) also reviewed several U.S. Forest Service studies relied upon by Prichard et al. (2021) for the claim that commercial thinning is an effective fire man-

agement approach and found that the actual results of these cited studies did not support that conclusion.

Bartowitz, K.J., et al. 2022. Forest Carbon Emission Sources Are Not Equal: Putting Fire, Harvest, and Fossil Fuel Emissions in Context. Front. For. Glob. Change 5: Article 867112.

The authors found that logging conducted as commercial thinning, which involves removal of some mature trees, substantially increases carbon emissions relative to wildfire alone, and commercial thinning “causes a higher rate of tree mortality than wildfire.”

Evers, C., et al. 2022. Extreme Winds Alter Influence of Fuels and Topography on Megafire Burn Severity in Seasonal Temperate Rainforests under Record Fuel Aridity. Fire 5: Article 41.

The authors found that dense, mature/old forests with high biomass and canopy cover tended to have lower fire severity, while more open forests with lower canopy cover and less biomass burned more severely.

USFS (U.S. Forest Service) (2022). Gallinas-Las Dispensas Prescribed Fire Declared Wildfire Review. U.S. Forest Service, Office of the Chief, Washington, D.C.

“A thinning project in the burn area opened the canopy in some areas, allowing more sunlight which led to lower fuel *moistures. Heavy ground fuels resulting from the construction of fireline for the burn project added to the fuel loading. This contributed to higher fire intensities, torching, spotting, and higher resistance-to-control."*

The only effective way to protect homes from fire is home-hardening and defensible space pruning within 100 to 200 feet of homes or less.

Cohen, J.D. (U.S. Forest Service). 2000. Preventing disaster: home ignitability in the wildland- urban interface. Journal of Forestry 98: 15-21.

The only relevant zone to protect homes from wildland fire is within approximately 135 feet or less from each home—not out in wildland forests.

Gibbons P, van Bommel L, Gill MA, Cary GJ, Driscoll DA, Bradstock RA, Knight E, Moritz MA, Stephens SL, Lindenmayer DB (2012) Land management practices associated with house loss in wildfires. PLoS ONE 7: Article e29212.

Defensible space pruning within less than 130 feet from homes was effective at protecting homes from wildfires, while vegetation management in remote wildlands was not. A modest additional benefit for home safety was provided by prescribed burning less than 500 meters (less than 1641 feet) from homes.

Syphard, A.D., T.J. Brennan, and J.E. Keeley. 2014. The role of defensible space for residential structure protection during wildfires. Intl. J. Wildland Fire 23: 1165-1175.

Vegetation management and removal beyond approximately 100 feet from homes provides no additional benefit in terms of protecting homes from wildfires.

Tree removal is not necessary prior to conducting prescribed fire as an additional community safety buffer.

Decades of scientific studies have proven that, even in the densest forests that have not experienced fire in many decades, prescribed fire can be applied without prior tree removal, as demonstrated in the following studies:

Knapp EE, Keeley JE, Ballenger EA, Brennan TJ. 2005. Fuel reduction and coarse woody debris dynamics with early season and late season prescribed fire in a Sierra Nevada mixed conifer forest. Forest Ecology and Management 208: 383–397.

Knapp, E.E., and Keeley, J.E. 2006. Heterogeneity in fire severity within early season and late season prescribed burns in a mixed-conifer forest. Int. J. Wildland Fire 15: 37–45.

Knapp, E.E., Schwilk, D.W., Kane, J.M., Keeley, J.E., 2007. Role of burning on initial understory vegetation response to prescribed fire in a mixed conifer forest. Canadian Journal of Forest Research 37: 11–22.

van Mantgem, P.J., A.C. Caprio, N.L. Stephenson, and A.J. Das. 2016. Does prescribed fire promote resistance to drought in low elevation forests of the Sierra Nevada, California, USA? Fire Ecology 12: 13-25.

van Mantgem, P.J., N.L. Stephenson, J.J. Battles, E.K. Knapp, and J.E. Keeley. 2011. Long-term effects of prescribed fire on mixed conifer forest structure in the Sierra Nevada, California. Forest Ecology and Management 261: 989−994.

Please find DellaSala et al. (2015) attached.

Schoennagel et al (2004) states: “we are concerned that the model of historical fire effects and 20th-century fire suppression in dry ponderosa pine forests is being applied uncritically across all Rocky Mountain forests, including where it is inappropriate.” Please find Schoennagel et al 2004 attached.

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

Schoennagel et al (2004) states: "it is unlikely that the short period of fire exclusion has significantly altered the long fire intervals in subalpine forests. Furthermore, large, intense fires burning under dry conditions are very difficult, if not im- possible, to suppress, and such fires account for the majority of area burned in subalpine forests.

Schoennagel et al (2004) states: "Moreover, there is no consistent relationship between time elapsed since the last fire and fuel abundance in subalpine forests, further undermining the idea that years of fire suppression have caused unnatural fuel buildup in this forest zone."

Schoennagel et al (2004) states: "No evidence suggests that spruce–fir or lodgepole pine forests have experienced substantial shifts in stand structure over recent decades as a result of fire suppression. Overall, variation in climate rather than in fuels appears to exert the largest influence on the size, timing, and severity of fires in subalpine forests []. We conclude that large, infrequent stand replacing fires are 'business as usual' in this forest type, not an artifact of fire suppression.".

Schoennagel et al (2004) states: "Contrary to popular opinion, previous fire suppression, which was consistently effective from about 1950 through 1972, had only a minimal effect on the large fire event in 1988 []. Reconstruction of historical fires indicates that similar large, high-severity fires also occurred in the early 1700s []. Given the historical range of variability of fire regimes in high-elevation subalpine fo- rests, fire behavior in Yellowstone during 1988, although severe, was neither unusual nor surprising."

Schoennagel et al (2004)(emphasis added) states: "Mechanical fuel reduction in sub- alpine forests would not represent a restoration treatment but rather a departure from the natural range of variability in stand structure.”

Schoennagel et al (2004) states: “Given the behavior of fire in Yellowstone in 1988, fuel reduction projects probably will not substantially reduce the frequency, size, or severity of wildfires under extreme weather conditions.”

Schoennagel et al (2004) states: “The Yellowstone fires in 1988 revealed that variation in fuel conditions, as measured by stand age and density, had only minimal influence on fire behavior. Therefore, we expect fuel reduction treatments in high-elevation forests to be generally unsuccessful in reducing fire frequency, severity, and size, given the overriding importance of extreme climate in controlling fire regimes in this zone. Thinning also will not restore subalpine forests, because they were dense historically and have not changed significantly in response to fire suppression. Thus, fuel reduction efforts in most Rocky Mountain sub-alpine forests probably would not effectively mitigate the fire hazard, and these efforts may create new ecological problems by moving the forest structure outside the historic range of variability."

Likewise, Brown et al (2004) states: "At higher elevations, forests of subalpine fir, Engelmann spruce, mountain hemlock, and lodgepole or whitebark pine predominate. These forests also have long fire return intervals and contain a high proportion of fire sensitive trees. At periods averaging a few hundred years, extreme drought conditions would prime the- se forests for large, severe fires that would tend to set the fo- rest back to an early successional stage, with a large carry- over of dead trees as a legacy of snags and logs in the regenerating forest . . . . natural ecological dynamics are largely preserved because fire suppres-sion has been effective for less than one natural fire cycle. Thin-ning for restoration does not appear to be appropriate in these forests. Efforts to manipulate stand structures to reduce fire haz-ard will not only be of limited effectiveness but may also move systems away from pre-1850 conditions to the detriment of wildlife and watersheds." "Fuel levels may suggest a high fire 'hazard' under conventional assessments, but wildfire risk is typically low in these settings."

Likewise, Graham et al (2004) states: "Most important, the fire behavior characteristics are strikingly different for cold (for example, lodgepole pine, Engelmann

spruce, subalpine fir), moist (for example, western hemlock, western redcedar, western white pine), and dry forests. Cold and moist forests tend to have long fire- return intervals, but fires that do occur tend to be high- intensity, stand-replacing fires. Dry forests historically had short intervals between fi- res, but most important, the fires had low to moderate severity."

According to Graham et al (2004), thinning may also increase the likelihood of wildfire ignition in the type of forests in this Project area: "The probability of ignition is strongly related to fine fuel moisture content, air temperature, the amount of shading of surface fuels, and the occurrence of an ignition source (human or lightning caused) . . . . There is generally a warmer, dryer microclimate in more open stands (fig. 9) compared to denser stands. Dense stands (canopy cover) tend to provide more shading of fuels, keep- ing relative humidity higher and air and fuel temperature lower than in more open stands. Thus, dense stands tend to maintain higher surface fuel moisture contents compared to more open stands. More open stands also tend to allow higher wind speeds that tend to dry fuels compared to dense stands. These factors may increase probability of ignition in some open canopy stands compared to dense canopy stands."

A new study soon to be published by Dominick A. DellaSala et. al. found that re- viewed 1500 wildfires between 1984 and 2014 found that actively managed forests had the highest level of fire severity. While those forests in protected areas burned, on average, had the lowest level of fire severity. In other words, the best way to reduce severe fires is to protect the land as wilderness, not “manage” it.

The Project will violate the NEPA if there are no valid snag surveys done for the project area both within and outside proposed harvest units.

The project will violate the NEPA if there are no valid surveys for old growth habitat within each project area, old growth types need to be defined and quantified by timber types, such as lodgepole pine, Douglas-fir, mixed conifer, spruce, subalpine fir, and limber pine.

Are you using the definition of old growth in the Forest Plan or Green et al. that the Regional Office has been asking forests to use?

Page II-14 of the Forest Plan states:

27. Management practices in essential habitat of threatened and endangered species must be compatible with habitat needs of the species (grizzly bear, gray wolf, bald eagle, and peregrine falcon) consistent with the goal of recovery to non threatened status.There are no other known plant or animal species on the Forest that have been identified as threatened or endangered under provisions of the Endangered Species Act of1973.If and when such habitats are identified, appropriate measures, pursuant to Section7 of the Endangered Species Act, will be taken to protect the species and its habitat consistent with National goals for species recovery to non threatened status. Cooperate with future interagency efforts to recover those species for which recovery goals have not yet been defined. For plant and animal species that are not threatened or endangered, but where viability is a concern (i.e., sensitive species), manage to maintain population viability. Habitat for management indicator species, which include the elk, goshawk, and pileated woodpecker, will be monitored. Elk population data, collected by the Department of Fish, Wildlife, and Parks will be compared against habitat data to test elk/ habitat relationships. As monitoring technology becomes available for the goshawk and pileated woodpecker, population trends will be monitored. In the interim, habitat parameters including old-growth acres and condition, and snag densities will be monitored as an indicator of population trend.

The project does not demonstrate that babitat for management indicator species, which include the elk, goshawk, and pileated woodpecker, have been monitored in violation of the Forest Plan.

Page 14 of the wildlife report states:

Old Growth
Wildlife species on the Lolo NF do not rely solely on "old growth". This conclusion is a result of more information on wildlife species habitat available currently than in the 1980s when the Lolo Forest Plan was written. In the 1980s, goshawks and pileated woodpeckers for example were thought to require old growth forest; current research shows that mature stands or larger trees within a portion of their home range can be critical, but much of the habitat used by these species are not old growth or even close to old growth. Although each species' need is somewhat different, the species commonly labeled as "old growth species" (i.e., goshawk, pileated woodpecker, flammulated owl, or marten), actually only require some larger trees or mature/saw timber sized stands. Because there are no vertebrate species on the Lolo NF (or in the Northern Region) that will only use old growth, effects of a project on old growth forests and effects on wildlife species must be separated.
Although old growth is excellent habitat for many species, mature stands that do not meet old growth characteristics as defined in Green et al. (1992) also serve as highly suitable habitat and contribute to maintaining viability of species. For this reason, the sensitive species listing process is used to discern species that may be at risk and direct special attention toward them. Forest Service wildlife biologists have gone further to develop individual species habitat models for sensitive or MIS that focus on what forest characteristics the most current scientific research indicates are important to the species. These species needs are discussed individually below.

The Wildlife Report is pretending the Forest Plan no longer requires that the Forest Service no longer has to monitor MIS and their habitat ion violation of the Forest Plan. The project will likely violate the NEPA if the mitigation measures for MIS, sensitive species, and Montana Species of Concern (birds, mammals including bats) are not clearly defined, and demonstrated to be effective as per the current best science.

Page 44 of the EA states:
Management indicator species, considered widespread and common animals, were designated in Forest Plans to represent species whose population changes are believed to indicate the effects of management activities on representative wildlife habitats. The Lolo Forest Plan defines Indicator Species as "species identified in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish including those that are socially or economically important" (Forest Plan, page VII-15). The Lolo Forest Plan identifies northern goshawk (natural old growth forests), pileated woodpecker (mature old growth with limited management), and elk (big game), as "Management Indicator Species" (MIS) (Forest Plan standard 27, at p. II-14 and Forest Plan Final Environmental Impact Statement, pp. III-28 through III-29).
The Lolo Forest Plan standard 27 states that habitat for management indicator species will be monitored. Elk population data collected by Montana FWP will be compared against habitat data to test elk/habitat relationships. Forest Plan standards 21, 22, and 23 (page II-13) provide for the protection of elk habitat such as wallows and winter range. The Plan further states that as monitoring technology become available for northern goshawk and pileated woodpecker, population trends will be monitored. In the interim, habitat parameters including old growth acres and condition, and snag densities will be monitored as an indicator of population trend. In recent years, both population and habitat have been monitored at a Region-wide scale and a Forest scale. This data indicates that population trends for northern goshawk and pileated woodpecker are stable or increasing. Information from these efforts is summarized in the Wildlife Report.

Page III-104 of the Forest Plan states:

B. Goals

I. Provide for old-growth succession in timber stands with an optimum arrangement of habitat components to maintain viable populations of old-growth-dependent wildlife species.

Page II-2 of the Forest Plan states:

The Forest Plan provides habitat for viable populations of the diverse wildlife and fish species on the Forest, with special attention given to species dependent on snags, old growth areas, and riparian zones.

The EA does not demonstrate that the project is complying with the Forest Plan's above requirement.

The Forest Service's failure to use the Forest Plan definition of old growth, and consequent failures to demonstrate compliance with Forest Plan old growth standards for retention and viability, violates NFMA, NEPA, and the APA.

The Forest Plan requirement is to maintain 5% of commercial forest lands in each Timber Compartment as old growth forest, the Forest Service. The Tyler's Kitchen project is using the Green et al definition of old growth rather than the Forest Plan definition.

Pages 20-21 of the EA states:

3.3-2 Old Growth

The Lolo Forest Plan (1986) defines old growth under "over mature timber" as "individual trees or stands of trees that in general are past their maximum rate in terms of the physiological processes expressed as height, diameter and volume growth" (pages VII-24 to VII-25). A region-wide old growth analysis using Forest Inventory and Analysis (FIA)[5] data (Czaplewski 2004) shows that the Lolo National Forest is not meeting the old growth strategy of the Forest Plan after the 2017-2021 wildfires. The estimated percentage of old growth (using the more restrictive definition provided by Green (2011) on all forested lands on the LNF is 6.09 percent (Bush et al. 2007), (Reyes, 2024) with a 90 percent confidence interval of 4.62 percent to 7.58 percent. The amount of old growth on the Forest has reduced from 9.0 percent in 2012 to 6.09 percent in 2024. The likely reason for this decline has been the result of past wildfires on the Forest in the last twelve years. Since 2012, wildfires have burned approximately 355,000 acres or 16 percent of the Lolo NF.

The Northern Region of the Forest Service defined old growth in(Green et al. 1992), errata corrected 2011. Old growth definitions are stratified by habitat type groups that reflect similarity of disturbance response, potential productivity, stocking density, down wood accumulation, fire frequency, and tree species. These old growth definitions are specific to forest type (the dominant tree species) and habitat type group, and are defined by a minimum number of live trees greater than a specific size and age, in stands with a minimum density. For example, the most common old growth types on the Lolo National Forest require at least 8-10 live trees per acre that are 170-180 years in age and 21 inches in diameter, and have a minimum stand density of 60-80 feet^2 of basal area. Because of these specific parameters, Green et al. old growth is a subset of that
[5]The Forest Inventory and Analysis (FIA) program provides a congressionally mandated, statistically based, continuous inventory of the forest resources of the United States. The FIA inventory design is based on a spatially balanced sample of inventory plots.Tyler's Kitchen Fuels Reduction and Forest Health Environmental Assessment described in the Forest Plan. The Lolo Forest Plan was not amended to adopt Green et al. definitions. Green et al. provides for a consistent Region-wide approach to the assessment of old growth, which is why it is discussed in this section.

Proposed treatment areas were inventoried to determine whether they contain Green et al. old growth. The inventory was not intended as a complete survey of old growth within the project area, but instead was used to identify where treatments overlapped old growth, to assess the relative condition of old growth stands, and help inform treatment objectives.

A sample of Green et al. old growth stands were also evaluated outside the areas initially considered for treatment to assess their relative health, distribution, and status. These stands are retained to provide a diversity of old growth stand conditions - some of which are relatively stable and resilient, some are developing toward characteristic stand-replacing wildfires, and some historically resilient stands are developing toward uncharacteristic stand-replacing wildfire or bark-beetle events. These untreated old growth stands include higher elevation and moist site stands of shade-tolerant species that are not included in the frequent low- and mixed-severity fire regimes, old growth stands within the inventoried roadless area, and old growth stands without reasonable access under the current transportation system.

As the distribution and abundance of old growth within the project area is variable due to the influence of past fires, insects and disease, and past management, more old growth exists within the project area than what was inventoried. Un-inventoried old forest attributes of Green et al. old growth definitions (e.g. large live trees, downed woody debris, and snags) exist within the project area based on field visits over the past several years.

The two old growth definitions have different requirements: a stand that meets Green et al criteria will not necessarily meet the Forest Plan definition and vice versa. Thus, the application of the Forest Plan old growth definition would lead to a completely different old growth forest analysis for this Project.

The Project will violate the NEPA if there are no valid snag surveys done for the project area both within and outside proposed harvest units.

The project will violate the NEPA if there are no valid surveys for old growth habitat within each project area, as identified by old growth types need to be defined and quantified by timber types, such as lodgepole pine, Douglas-fir, mixed conifer, spruce, subalpine fir, and limber pine.

The project will likely violate the NEPA if the mitigation measures for MIS, sensitive species, and Montana Species of Concern (birds, mammals including bats) are not clearly defined, and demonstrated to be effective as per the current best science.

Clearly the role of mature and old-growth forests to store carbon and serve as a natural climate- crisis solution must be part of any detailed project-level analysis. In fact, the Forest Service owes a duty to the public to ensure that these forests remain standing so that they can continue to perform their vital function of "storing large amounts of carbon." MOG Report 3; *see also Light v. U.S.*, 220 U.S. 523 (1911) ("the public lands . . . are held in trust for the people of the whole country."); *Juliana v. U.S.*, 217 F.Supp.3d 1224, 1259 (D. Or. 2016) ("[t]he federal government, like the states, holds public assets . . . in trust for the people.") (*rev'd on other grounds*, *Juliana v. U.S.*, 947 F.3d 1159 (9th Cir. 2020)); *Selkirk-Priest Basin Ass'n Inc. v. State ex rel Andrus*, 899 P.2d 949, 952-54 (Idaho 1995) (public trust doctrine permits challenge to timber sales since increased sedimentation could impact trust resources).

As such, the Forest Service should not be logging any mature and/or old-growth forests at least until it has completed the rulemaking that is currently being considered. Therefore, we are calling for a moratorium on mature and old-growth logging considering EO 14072 "calls particular attention to the importance of (MOG) forests on Federal lands for their role in contributing to nature-based climate solutions by storing large amounts of carbon and increasing biodiversity." 77 Fed. Reg. 24497, 24498; *see also* MOG Report at 3. Continuing to cut down and remove mature and old-growth trees, stands and forests and before the "definitions and inventory are established" and the current rulemaking is completed undermines the administration's focus on "nature-based climate solutions" for "storing large amounts of carbon."

The mixed-severity fire regime is the most prevalent one on the Lolo NF. And despite the EA's proclamations that the project area is dominated by a frequent, low severity fire regime it cites no project area-specific data or history to support such a position. Lesmeister et al. (2019) state, "Because of the spatiotemporal variability across the landscape, mixed-severity fire regimes are

[15] B. Law et al., 2020 The Status of Science on Forest Carbon Management to Mitigate Climate Change. Exhibit 7.

[16] Hudiburg, Tara & Law, Beverly & Turner, David & Campbell, John & Donato, Daniel & Duane, Maureen. (2009). Carbon dynamics of Oregon and Northern California forests and potential land-based carbon storage. Ecological applications : a publication of the Ecological Society of America. 19. 163-80. 10.1890/07-2006.1.

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the most complex and least understood fire regimes, unique in terms of patch metrics and the life history attributes of native species (Schoennagel et al. 2004, Agee 2005, Halofsky et al. 2011). Fire histories in mixed-severity regimes, in particular, are difficult to determine because most fire history techniques have been developed to study either the low- or high-severity extremes in fire regimes (Agee 2005)." Lesmeister et al. (2019) discuss in more enlightened terms the kind of fire events demonized in the EA's analyses:

Short-interval severe fires are an important characteristic of mixed-severity fire regimes and are typically considered extreme events and expected to be deleterious to forest succession and diversity (Donato et al. 2009). However, many native plants within these forests possess functional traits (e.g., persistent seed banks, vegetative sprouting, rapid maturation) lending to resilience to short-interval severe fires that result in distinct vegetation assemblages that enhance landscape heterogeneity inherent to mixed-severity fire regimes (Donato et al. 2009). Furthermore, high diversity of vegetation types, driven by short-interval repeat fires in a mixed-severity fire regime landscapes, plays an important role in conservation and the structure of avian communities (Fontaine et al. 2009).

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

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

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

(Lee, 2009.) We find nothing in the EA's discussion on old growth that recognizes these societal values. In 1989, Forest Service Chief Dale Robertson issued a "Position Statement on National Forest Old Growth Values" (Chief's Position Statement – see Green et al., 1992). The Chief's Position Statement began, "The Forest Service recognizes the many significant values associated with old growth forests, such as biological diversity, wildlife and fisheries habitat, recreation, aesthetics, soil productivity, water quality, and industrial raw material. Old growth on the National Forests will be managed to provide the foregoing values for present and future generations. ...Where goals for providing old growth values are not compatible with timber harvesting, lands will be classified as unsuitable for timber production."

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

• Old growth values shall be considered in designing the dispersion of old growth. This may range from a network of old growth stands for wildlife habitat to designated areas

for public visitation. In general, areas to be managed for old growth values are to be distributed over individual National Forests with attention given to minimizing the fragmentation of old growth into small isolated areas.

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

Green et al., 1992 states "...old growth is valuable for a whole host of resource reasons such as habitat for certain animal and plants, for aesthetics, for spiritual reasons, for environmental protection, for research purposes, for production of unique resources such as very large trees." And Hamilton, 1993 states, "Values for such items as wildlife, recreation, biological diversity, and juxtaposition of old-growth stands with other forest conditions need to be considered in relation to Forest land management planning objectives."

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

The "Open Letter to The Forest Service on the Importance of Large, Old Trees and Forests" signed in 2020 by dozens of scientists, is incorporated into these comments.

The Kootenai National Forest 1987 Forest Plan included Appendix 17 and other direction (USDA Forest Service 1987a). We incorporate that appendix as well as USDA Forest Service 1987b which contains a list of "species ...(which) find optimum habitat in the "old" successional stage..." And Kootenai National Forest (1991) states, "we've recognized its (old growth) importance for vegetative diversity and the maintenance of some wildlife species that depend on it for all or part of their habitat." (*Also see* USDA Forest Service, 1990a.) We also incorporate the Idaho Panhandle NF's forestwide old-growth planning document (USDA Forest Service, 1987d) and the IPNF Forest Plan's old-growth standards (USDA Forest Service, 1987c) because they provide biological information concerning old growth and old-growth associated wildlife species.

USDA Forest Service, 1987a states:

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

(see Appendix I[17]). While individual members or old growth associated species may be able to feed or reproduce outside of old growth stands, biologists are concerned that viable populations of these species may not be maintained without an adequate amount of old growth habitat.

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

The EA also does not properly analyze and disclose the natural historic range vs. current conditions regarding patch size, edge effect, and amount of interior forest old growth in the Lolo NF. Harris, 1984 discusses connectivity and effective interior habitat of old-growth patches:

Three factors that determine the effective size of an old-growth habitat island are (1) actual size; (2) distance from a similar old-growth island;

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

Harris, 1984 discusses habitat effectiveness of fragmented old growth:

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

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

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

USDA Forest Service, 2004a states:

[17] USDA Forest Service 1987b.

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

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

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

Effects on old growth habitat and old growth associated species relate directly to ... "Landscape dynamics—Connectivity"; and ... "Landscape dynamics—Seral/structural stage patch size and shapes."

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

The FS has also failed to provide adequate protection for designated old growth, resulting in a widespread loss of vital old-growth snag component due to firewood cutting and other activities adjacent to open roads. (*See* Bate and Wisdom, 2004.)

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

• In current planning and management activities on National Forests, old growth has several values (Sirmon 1985), and one of them is its importance as wildlife habitat (Meehan and others 1984, Meslow and others 1981, Raphael and Barrett 1984, Thomas and others 1988). Old growth provides optimal habitat for some management indicator species, including spotted owl, pileated woodpecker, and marten, and for many other

species of plants, fish, amphibians, reptiles, birds, and small mammals (Harris and others 1982, Meslow and others 1981, Raphael 1988c, Raphael and Barrett 1984). It also provides thermal and hiding cover for ungulates, especially in winter (Schoen and others 1984, Wallmo and Schoen 1980). Old growth, therefore, plays an important role in providing for productive populations of some species of special ecological and administrative interest. For some of these species, old growth may be a key factor in providing for continued population viability.

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

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

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

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

- Landscape attributes affecting the perpetuation of old-growth dependent and associated wildlife include the spatial distribution of old growth; the size of stands; the presence of habitat corridors between old-growth or old-forest stands; proximity to other stands of various successional stages and especially for well-developed mature-forest stages and species with different seasonal uses of habitats; and the susceptibility of the old-growth

habitat to catastrophic loss (such as wildfire, insects, disease, wind and ice storms, and volcanic eruptions.

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

Bollenbacher and Hahn, 2008 state:

- Relative to harvested forests, OG stands had higher species richness (Mazurek and Zielinski 2004; birds: Beese and Bryant 1999), supported more small mammal individuals and biomass (Rosenberg and Anthony 1993; Carey 1995; Carey and Johnson 1995), and allowed for greater movement and genetic diversity (tailed frog *Ascaphus truei*: Wahbe et al. 2004, 2005).

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

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

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

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

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

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

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

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

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

Wood Legacies in Managed Forests

John Hayes

Legacies are structures or components of ecosystems that exist prior to a disturbance and are "inherited" by the post-disturbance community. Legacies can provide important temporal connectivity within a stand, allowing organisms present in a pre-disturbance community to persist in an area following disturbance. In addition, legacy wood can provide structural elements and complexity in a stand that would otherwise require very long periods of time to develop. In managed forests, wood legacies, including large diameter trees, snags, and down wood, are ecologically important structures that play central roles in diverse ecosystem processes and functions, such as geomorphic processes, hydrology, nutrient cycling, and habitat for fish and wildlife. The ecological value of wood legacies has begun to gain widespread recognition only within the past two decades.[122, 164]

As a result of a variety of operational, safety, and economic considerations, application of intensive forest management practices often results in removal of legacy structures from stands and minimal retention of future legacy structures. Growing replacement structures with similar characteristics (e.g., large diameter trees with large diameter branches, thick and deeply-furrowed bark, and complex crown structure) requires decades or longer. Moreover, unless special provisions are made, large diameter trees, snags, and logs with these characteristics may never be produced in forests managed intensively on short- to moderate-length rotations. Habitat quality for species that depend upon or are closely associated with these structures can be seriously diminished with their loss from forest stands. The ecological importance of wood legacies combined with the difficulties of creating replacement structures provide convincing reasons to conserve legacy structures during management activities.

Managing wood legacies through time in managed forests is a multi-staged process. Existing structures that will serve as legacy structures in the post-disturbance environment should be identified prior to a disturbance event, such as logging. In some cases, it may be adequate to rely on the timber sale administrator or loggers to identify appropriate structures and implement the management strategy in the field. Since one intent of legacy structures is to provide various functions through time, it will often be valuable to either individually mark important legacy structures, or to document their location and purpose so that future managers can take the structures into account. Of equal importance, plans for recruitment of future legacy structures should be prepared to ensure that legacy structures will be available in future stands. Innovative silvicultural practices can be employed to create conditions favorable to development of future legacy structures.

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

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

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

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

- Hollow trees larger than 20 inches (51 cm) in diameter at breast height (dbh) are the most valuable for denning, shelter, roosting, and hunting by a wide range of animals. Hollow chambers are used as dens by black bears, as night roosts by woodpeckers, and as dens, shelter, roosts, and hunting sites by a variety of animals, including flying squirrels, wood rats, bats, American marten, northern flickers and Vaux's swift.

- Hollow trees and down wood are formed from only a few tree species that can maintain bole structural integrity as the heartwood decays. Western redcedar is especially valuable in providing hollow trees because the decay-resistant sapwood remains structurally sound

for centuries. In the Interior Columbia Basin, grand fir and western larch form the best

hollow trees for wildlife uses.

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

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

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

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

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

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

- Habitat structures in upper layers of the forest floor (soil, litter, duff) result from processes involving organic material (litter, decaying roots, vertebrate and invertebrate carrion, and fecal matter) and a diverse community of organisms, including bacteria, fungi, algae, protozoa, nematodes, arthropods, earthworms, amphibians, reptiles, and small mammals. The complex trophic web supported by nutrient and moisture conditions

within the litter and duff layers transforms plant material into a variety of degradation

products, thereby storing and releasing nutrients within the ecosystem.

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

- The role of down wood in salmon habitat has received much attention over the past two decades. Large wood is a key component of salmonid habitat both as a structural element and as cover and refugia from high flows. Large wood serves key functions in channel morphology, as well as sediment and water routing. The importance of wood to salmon habitat varies from headwater to stream mouth. As stream order increases and gradient decreases in third- to fifth-order streams, down wood is a dominant channel-forming feature. Larger wood deflects water and increases hydraulic diversity, producing a range of pool conditions that serve as habitats for juvenile salmonids in summer. Diverse channel margins are a primary aspect of rearing habitat. Flow obstructions created by large wood provide foraging areas for young salmonid fry that are not yet able to swim in fast currents, and provide refugia to juvenile salmonids at high flow. In higher order streams, flow deflections created by large wood trap sediments and nutrients, and enhance the quality of gravels for spawning. Down wood is less of a channel-forming feature along large rivers, but defines meander cutoffs and provides cover and increased invertebrate productivity for juvenile salmonids.

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

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

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

- The slow rate of nutrient release from decomposing wood may serve to synchronize nutrient release with nutritional demands in forests, and also to minimize nutrient losses via leaching to the ground water. In addition to nitrogen bound chemically within wood, down wood reduces nutrient losses from ecosystems by intercepting nutrients in litterfall and throughfall. Favorable temperature and moisture conditions also makes large decaying wood sites of significant nitrogen inputs via N-fixation.

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

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

- Mycorrhizae. Mycorrhiza, meaning fungus-root, is a symbiotic association of fungi with plant roots. The fungus improves nutrient and water availability to the host in exchange for energy derived from plant sugars. Mycorrhizae are necessary for the survival of numerous tree families, including pine, hemlock, spruce, true fir, Douglas-fir, larch, oak, and alder. Mycorrhizal associations are a source of nutrients to promote wood decay. By the time a log reaches more advanced stages of decomposition (Class 3) fungal colonization leads to the accumulation of nutrients in hyphae, rhizomorphs and sporocarps, especially for ectomycorrhizal fungi, where >90% of the fungal activity is associated with organic material. Ectomycorrhizal fungi decrease the ratio of carbon to nitrogen in decomposing wood, and mediate nutrient availability to plants while improving nutrient retention by forest ecosystems.

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

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

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

- Large wood is the principal factor determining the productivity of aquatic habitats in low- and mid-order forested streams. Large wood stabilizes small streams by dissipating energy, protecting streambanks, regulating the distribution and temporal stability of fast- water erosional areas and slow-water depositional sites, shaping channel morphology by routing sediment and water, and by providing substrate for biological activity. The

influence of large wood on energy dissipation in streams influences virtually all aspects of ecological processes in aquatic environments, and is responsible for much of the habitat diversity in stream and riparian ecosystems. The stair-step gradients produced by wood in small stream basins supports higher productivity and greater habitat diversity than that found in even-gradient streams lacking wood structure.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- Effective management of decaying wood must do more than simply provide for inputs of dead trees. Rather, management should strive to provide for diversity of tree species and size classes, in various stages of decay and in different locations and orientations within the stand and landscape.

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

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

- Management for certain species must consider habitat requirements at different spatial and temporal scales. It may then be possible to modify silvicultural practices at the stand scale to meet multiple objectives at landscape and larger scales. The landscape perspective also is pertinent to managing riparian systems, where the role of wood decay in riparian environments varies according to the type and geography of the associated water body.

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

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Retention of old- growth structural legacies has been identified as critical to conservation of biodiversity between large reserves and conservation areas.

Old-Growth Ecosystems

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

Habitat diversity is a measure of the variety, distribution, and structure of plant communities as the progress through various stages. Each stage supports different wildlife species. **One of the most critical elements of diversity in a managed forest is old growth. If sufficient old growth is retained, all other vegetative stages from grassland through mature forest will be represented in a managed forest.**

(Emphasis added.) Stands of trees meeting old-growth criteria are best viewed in the context of **old-growth ecosystems**, as stated in the FS's Green et al, and as discussed in Juel (2021) and the scientific sources cited therein.

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

- Old-growth forest is a biological or ecological concept that presumes ecosystems systematically change as they persist over long periods. An ecosystem has, in effect, a series of linked life stages ...which vary in composition, function, and structure. Such progressions can take a very long time in forests because the dominant organisms, trees, typically live very long.

- Characterizing old-growth forests is possible based on these concepts. Obviously, a series of ecological attributes must be considered because of the many relevant compositional, functional, and structural features. For practical reasons, however, a working definition— one for everyday use in gathering stand data—emphasizes structural and compositional rather than the conceptually important functional features that are difficult to measure.

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

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

- Structurally, old-growth stands are characterized by a wide within-stand range of tree sizes and spacing and include trees that are large for the particular species and site combination. Decadence is often evident in larger and older trees. Multiple canopy layers are generally present. Total organic matter accumulations are high relative to other developmental stages. Functionally, old-growth forests are characterized by slow growth of the dominant trees and stable biomass accumulations that are constant over long periods.

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

USDA Forest Service (1990) states, “Roads are generally undesirable within an old-growth habitat patch. The road corridor fragments the habitat by creating edge, and access may result in loss of snags to woodcutting.”

The EA provides scant details on how the FS is complying with LNF old-growth forestwide and distribution requirements/policies. Numbers are cited but spatial data is almost entirely lacking.

As far as the project area, we see discussion of how much old growth or “potential old growth” would be logged and/or burned and in which units, but old growth is not shown on any map. Apparently to the FS, old growth is little more than numbers in a document.

“Forest Inventory and Analysis (FIA) inventory data, extrapolated to account for wildfire that has occurred since the last plot measurements, indicates that currently at least 19.4 percent of the Lolo’s forest stands are over a mean of 160 years old (meeting the Forest Plan definition of old growth as overmature timber), and at least 10.2 percent is large tree classes with average tree size over 20 inches dbh. The Lolo National Forest is meeting its old growth strategy.” The EA cites FIA as “inventory data”, but such methodology cannot specify the location and extent of old- growth stands within a national forest. In discussing such methodology, a Northern Region report (Bollenbacher, et al., 2009) states, “All northern Idaho plots utilized a primary sample unit (PSU) composed of four fixed radius plots with trees 5 – 20.9 inches tallied on a 1/24th acre plot and trees 21.0 inches DBH and larger tallied on a 1⁄4 acre plot.” And, the Forest Service’s Czaplewski, 2004 states, “Each FIA sample location is currently a cluster of field sub-plots that collectively cover an area that is nominally one acre in size and FIA measures a probability sub- sample of trees at each sub-plot within this cluster.”

The EA doesn’t explain the meaning of the discrepancy between the 10.2 percent of “large tree size classes” and why almost twice that many forest stands are “over a mean of 160 years old.” More confusion is fed by the statement, “Green et al. old growth is a subset of that described in the Forest Plan” in the context of no attempt to correlate the two definitions in a statistically or scientifically robust manner. Still more confusion is lent by “Green et al. provides for a consistent Region-wide approach to the assessment of old growth, which is why it is discussed in

this section.” Why is the regional approach relevant here, if “The Lolo Forest Plan was not amended to adopt Green et al. definitions”? And why were “Proposed treatment areas ... inventoried to determine whether they contain Green et al. old
growth”?

And it’s quite telling that “The inventory was not intended as a complete survey of old growth within the project area, but instead was used to identify where treatments overlapped old growth, to assess the relative condition of old growth stands, and help inform treatment objectives.” This reinforces our point that the Lolo NF has no idea how they’re conforming to their forestwide and distribution policies/requirements.

Sample design for FIA plots is semi-systematic; a sample taken randomly within a systematically placed grid. As stated above, at most each plot samples a maximum of one acre—far smaller than an old-growth stand —and thus resulting estimates cannot indicate the capability to meet biological needs of the associated wildlife. Moreover, the location of plots is confidential, and for good reasons—managers are not allowed to know the location of FIA plots within national forests, to prevent skewing of data which would result from intentionally managing differently at plot locations. As a result, conclusions such as the percentages claimed by the Lolo National Forest cannot be verified by independent investigators. This prevents independent peer review— a hallmark of the scientific method.

FIA statistics thus have no correlation regulatory minimum old-growth stand sizes, nor to to ecological minimums such as spatial wildlife species' habitat needs. No mapping of existing old growth is possible using FIA data. The location of existing old-growth stands cannot be specified using FIA. There has been no systematic scientific study conducted to correlate any FIA estimate with the results from field data of old-growth habitat.

We would be reasonable to expect the Forest Service to have a fairly complete forest-wide inventory of old growth merely because nearly every area of the Forest outside Wilderness or Roadless has been logged over the life of the 1986 Lolo NF Forest Plan. Our assumption is reasonable because compliance with the Forest Plan involves identifying old growth within project boundaries.

In sum, the FS must disclose a forest-wide inventory from previously generated project area inventories, not present merely a questionable estimate based on FIA data. Please disclose such an inventory as part of the Superior North NEPA process.

The Lolo NF lacks any established way of maintaining a publicly accessible inventory of old growth, let alone "potential old growth." Over the 37 years of Forest Plan implementation there's no documentation of the

FS ever designating "potential" old growth that has eventually/later fully met existing old growth criteria.

Old-growth criteria and failure to apply best available science

"The eight percent was based on an interpretation of literature available at the time which considered the minimum habitat needed for various old growth associated wildlife species."

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These comments explain why this 8% assumption is fatally flawed. But first, it's important to point out that the FS believes that the Green et al. document and old growth criteria are best available science in regards to old growth. The February 2023 Record of Decision for the Clear Creek Integrated Restoration project, Nez Perce-Clearwater NF endorses the February 2015 Clear Creek Final EIS Appendix D which states, "The Green et al. definitions are regarded as the "best available science" for the classification of old growth at the site-specific level." And the September 2015 Clear Creek Final EIS Appendix D discusses how Green et al. is to be implemented as best available science:

Using Green et al. 1992, errata corrected 02/05, 12/07, 10/08, 12/11 the following criteria would be used to define old growth:

Each old growth type is determined by minimum criteria including minimum age class of large trees, minimum number of trees per acre with a particular diameter at breast height (DBH), with minimum basal area. Associated stand characteristics include:

1) Variation in diameter
2) Percent dead or broken top
3) Probability of down woody debris
4) Percent Decay
5) Number of canopy layers
6) Snags greater than or equal to 9 inches in diameter

The September 2015 Clear Creek Final EIS Appendix D goes on to present this table:

The September 2015 Clear Creek Final EIS Appendix D continues:

Table D-2. Old Growth Characteristics1

Minimum Criteria	Minimum Age of Large Trees (Years)	150
	Minimum Number of Trees Per Acre (TPA)	3-10
	Minimum Diameter at Breast Height (DBH) [6]	13-21
	Minimum Basal Area (Square Feet Per Acre) [5]	40-80
Associated Characteristics	Diameter at Breast Height Variation[3]	M-H[7]
	Percent Dead/Broken Top	0-36
	Probability of Down Woody[3]	L-H[7]
	Percent Decay[2]	0-41
	Number of Canopy Layers[4]	1-3
	Snags Greater Than or Equal to 9 Inches DBH[2]	0-42

[1]Green et al., 1992 Varies by Habitat Type -See Green et al. 1992 Old Growth Chart for Complete Description
[2]These values are not minimum criteria. They are the range of means for trees greater than or equal to 9 inches DBH across plots within forests, forest types, or habitat type groups.
[3]These are not minimum criteria. They are Low, Moderate, and High probabilities of abundant large down woody material or variation in diameters based on stand condition expected to occur most frequently.
[4]This is not a minimum criteria. The number of canopy layers can vary within an old growth type with age, relative abundance of different species, and successional stage.
[5]In Old Growth Type 4B, 120 square feet of basal area applies to habitat type groups F, G, and G1, and 80 square feet of basal area applies to habitat type groups H and I. In whitebark pine forest type, 60 square feet of basal area applies to habitat type groups I and J, and 40 square feet of basal area applies to habitat type group K.
[6]In Old Growth Type 7, the 25" minimum DBH only applies to cedar trees. Old trees of other species are evaluated with a minimum DBH appropriate for that species on these habitat types (21" for Douglas fir, grand fir, lodgepole pine, western hemlock, white pine, ponderosa pine; and 17" for subalpine fir, and mountain hemlock). (Green et al, 1992, Errata 2011)
[7]L = Low, M = Medium, H = High.

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The primary reason for managing for old growth is to maintain viable populations of old growth dependent species. Our reasoning for maintaining old growth has not changed in the amended old growth description.

...We have substituted the Green et al. 1992, errata corrected 02/05, 12/07, 10/08, 12/11 requirements for old growth but the process to designate and distribute old growth remains the same...

Adopting the definitions for old growth found in Green et al. (1992) that define successional stages, stratification by habitat types, and other site conditions would help refine our interpretation of the old growth characteristics described in Appendix N of the Forest Plan. (Emphasis added.)

...Following direction to use best available science, the Nez Perce National Forest has updated Forest direction for old growth and snag management. Old Growth Forest Types of the Northern Region by Green, Joy, Sirucek, Hann, Zack and Naumann is the current and best science available for defining old growth. Green et al. 1992, errata corrected 02/05, 12/07, 10/08, 12/11 is based on habitat types to determine old growth conditions. Greens research is based on field data called stand exams with over 20,000 samples. (Emphasis added.)

Although Green et al. 1992, errata corrected 02/05, 12/07, 10/08, 12/11 criteria for old growth is more complex, **the criteria is also more relevant, more precise and within the capability of the specific Nez Perce National Forest habitat types.** Each habitat type is assigned to a habitat type group which corresponds to an old growth type. Green et al. 1992, errata corrected 02/05, 12/07, 10/08, 12/11 defines old growth within the ecological conditions with specific criteria that are within the capability of the habitat type. Green et al. 1992, errata corrected 02/05, 12/07, 10/08, 12/11 old growth description is based on successional processes in which stands develop into late seral single storied stands or late seral multi storied stands or the stage where climax tree species dominates the stand. (Emphasis added.)

The rationale the FS used for amending the Nez Perce NF Forest Plan to adopt Green et al old- growth criteria for Clear Creek logically applies to the Lolo NF. There's nothing special about the Clear Creek project area nor its old growth that justify amending the forest plan in that case alone.

We invite an open discussion about how Green et al might be applied as best available science concerning old growth. To date the FS has chosen to be nonresponsive and arbitrary in its actions rather than attempting to identify what consensus may be reached between its experts, independent scientists, and conservation interests.

We see that the Green et al distinctions between various habitat types opens up the possibility of recognizing and protecting a wide diversity of old-growth conditions on the Lolo NF which might also result in better addressing wildlife habitat needs. But in order to find agreement with the public and to manage genuinely consistent with best available science the FS must halt its

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abuses of Green et al., as pointed out in Juel, 2021:

Green et al., 1992 recognizes a fairly common "old growth type" in the North Idaho Zone where one often finds large, old Douglas-fir, grand fir, western larch, western white pine, Engelmann spruce, subalpine fir, and western hemlock trees on cool, moist environments. (*Id*.) Such old growth is relatively dense: "There are an average of 27 trees per acre 21 inches DBH or more. The range of means across forests and forest types is from 12 to 53." (*Id*.)

However, Green et al., 1992 sets the "minimum number" of trees per acre 21 inches DBH at only ten. (*Id*.). Which means, under the above Idaho Panhandle Forest Plan standard, the "average" stand could experience logging 17 of its 27 largest, oldest trees and still qualify as old growth.

So why does Green et al., 1992 specify such a small minimum number of large, old trees— so far below the recognized average, and even less than the bottom limit of the recognized range? The answer lies in how those authors intended the criteria to be used: "The number of trees over a given age and size (diameter at breast height) were used as **minimum screening criteria** for old growth. ...The **minimum screening criteria** can be used to identify stands that **may meet** the old growth type descriptions. " (*Id*., emphases added.) Green et al., 1992 further explain:

The minimum criteria in the "tables of old growth type characteristics" are meant to be used as a screening device to select stands that maybe suitable for management as old growth, and the associated characteristics are meant to be used as a guideline to evaluate initially selected stands. They are also meant to serve as a common set of terms for old growth inventories. Most stands that meet minimum criteria will be suitable old growth, but there will also be some stands that meet minimum criteria that will not be suitable old growth, and some old growth may be overlooked**. Do not accept or reject a stand as old growth based on the numbers alone; use the numbers as a guide.**

(*Id*., emphasis in the original.) So the abuse of the Green et al., 1992 minimum large tree screening criteria results in logging of large, old trees from old growth. And even if the existing stand in the above example possesses only the bare minimum large, old trees, managers could still log smaller and/or younger trees in the old-growth stand without disqualifying it, because numbers of such trees are not a part of the minimum criteria.

Likewise, the Green et al. 1992 minimum total basal area was set well below the recognized range, again presumably for its utilization as a screening device. For the same old growth type discussed above, the "average basal area is 210 ft^2 per acre. The range is 160 to 270 ft^2". Yet the minimum is either 80 or 120 ft^2 depending upon type sub- categorization.[18] Basal area is a measure of stand density, or the square footage of an acre that is occupied by tree stems. So logging a stand with a basal area of 270 ft^2 (upper end of

[18] With the issuance of the Green et al. 1992 (**errata correction 2007**) the Forest Service emphasizes and clarifies that stand basal area is one of the "minimum criteria."

range) down to 80 ft^2 ("minimum") could result in the loss of medium diameter trees— another enticement for managers with timber priorities to log within old-growth stands.

In the above examples, the artificially reduced abundance of younger, smaller trees has unknown but dubious implications for the stand's potential development and habitat quality, since it is deviating from a natural trajectory.

So this has led to the situation where the FS justifies significant logging disturbance within old- growth stands. In the case of Superior North, this involves making nonsense statements that the logged and "regenerated" old growth would still be old growth:

The proposed action would treat a total of approximately 710 acres of existing old growth as defined by Green et al. through prescribed burning, shaded fuelbreak treatments, and timber harvest. Treatments would retain old growth characteristics within the criteria defined in Green et al. including large old trees, large snags, trees with evidence of cavity nesting, and down woody material. Therefore, the proposed action would not reduce the amount of existing old growth within the project area, at the watershed scale, or at the Forest scale.

...Approximately 48 percent of the treated acres of existing old growth would have regeneration harvest that would retain current old growth components while initiating a new understory of long-lived fire-tolerant tree species.

There is no comparison in the EA of Forest Plan criteria with the near-clearcut (or otherwise to be logged and/or burned) remains of the former forest. Apparently old growth is whatever the FS says it is.

This is also a topic of Kootenai National Forest (2004), which we incorporate into these comments. It states:

The publication "Old-Growth Forest Types of the Northern Region" (Green et al. 1992) is to be used as a means to initially define old growth, not as a management or prescriptive guide. The Green et al., document is not manual or handbook direction and not formally adopted as Regional guidance. It is, however, the only peer-reviewed document of old growth definitions in the Northern Rockies and recommended for use within Regional protocols. According to Green et al., old growth "...encompasses the later stages of stand development that typically differ from earlier stages in characteristics such as tree age, tree size, number of large trees per acre and basal area. In addition, attributes such as decadence, dead trees, the number of canopy layers and canopy gaps are important but more difficult to describe because of high variability”. In other words, minimum attribute characteristics of trees per acre, DBH, age, and basal area along with attributes of snags, structural layering, and downed wood minimally define old growth – not any one attribute or any minimum value of specific attributes.

Pages 11 and 12 of Green et al. state the appropriate use of the document. The following are pertinent quotes from the document to aid in that interpretation:

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1. No set of generated numbers can capture all the variation that may occur at any given age or stage in forest development.
2. Because of the great variation in old growth stand structures, no set of numbers can be relied upon to correctly classify every stand.

3. Do not accept or reject a stand as old growth based on the numbers alone; use the numbers as a guide.
4. The minimum criteria are used to determine if a stand is potentially old growth. Where these values are clearly exceeded, a stand will usually be old growth. The associated structural characteristics may be useful in decision making in marginal cases, or in comparing relative resource values when making old growth evaluations.

5. The basic concept is that old growth should represent “the late stages of stand development ...distinguished by old trees and related structural attributes.”
6. A stand’s landscape position may be as important, or more important as any stand old growth attribute. The landscape is dynamic. We need to do more than draw lines to manage this dynamic system. Consider the size of old growth blocks (large blocks have special importance), their juxtaposition and connectivity with other old growth stands, their topographic position, their shapes, their edge, and their stand structure com-

pared to neighboring stands. Stands are elements in dynamic landscapes. We need to have representatives of the full range of natural variation, and manage the landscape mosaic as a whole in order to maintain healthy and diverse systems.

The Green et al. document is an aid intended to define, evaluate, and monitor old growth – not to be used as a prescriptive, management guide with minimum attribute values as thresholds. This will not achieve the objective of maintaining old growth.

Another memo from the Forest Supervisor (May 14, 2003) states, "When minimums are used, they are intended to illustrate the beginning of what could be identified as old growth—or late seral, successional development for a specific habitat group within a specific zone—not what is recommended".

(Emphases in the original.) Although we disagree with a statement in that document ("no one is advocating a 'hands off' policy toward old growth"), its nascent hypothesizing that managing in old-growth stands and replacement old growth might be appropriate and its interpretation of science, that doesn't nullify the point we are making here on the intended purposes of Green et al and how it is being abused by the Lolo NF.

Without scientific basis in the Forest Plan EIS, the 1986 Forest Plan inserts itself into the natural processes that create and sustain old growth. On the last three pages of KNF Forest Plan Old Growth Appendix 17, the FS rejects the notion that logging is consistent with preserving old growth. But with Superior North the FS is promoting the idea that active management should be the defining relationship between the agency and old growth. In an attempt to sugar coat the habitat destruction logging and road building cause, the FS pretends it can play God in old growth, outperforming the natural processes that are the only known way old growth has ever come to existence in these forest ecosystems. Such hubris does not belong in a context of managing public resources.

The draft Revised Forest Plan for the Nez Perce-Clearwater National Forests (NPCNF) includes Glossary definitions:

Old Growth Forests: Are ecosystems distinguished by **old trees and related structural attributes**. Old growth encompasses the **later stages of stand development that typically differ from earlier stages in a variety of characteristics which may include tree size, accumulations of large dead woody material, number of canopy layers, species composition, and ecosystem function**. In the context of the Nez Perce-Clearwater ecosystem the definitions for old growth are those provided within the document titled "Old Growth Forest Types of the Northern Region (Green et al. 1992, and errata 12/11).

Old Growth Associated Species: the group of wildlife species that is associated with old- growth forest plant communities on the Nez Perce-Clearwater.

Old Growth Habitat: A community of forest vegetation characterized by a diverse stand structure and composition along with a significant showing of decadence. The stand structure will typically have multistoried crown heights and variable crown densities. There is a variety of tree sizes and ages ranging from small groups of seedlings and saplings to trees of large diameters exhibiting a wide range of defect and breakage both live and dead, standing and down. **The time it takes for a forest stand to develop into an old-growth habitat condition depends on many local variables such as forest type, habitat type, and climate.** Natural chance events involving forces of nature such as weather, insect, disease, fire, and the actions of man also affects the rate of development of old-growth stand conditions. Old-growth habitat may or may not meet the definition for old growth forest.

(Emphases added.) We realize the above cite doesn't refer to Lolo NF management direction. However, as the 2012 Planning Rule[19] indicates, revision assessment is intended to help define what the FS believes is best available science.

Kootenai National Forest (2004) identifies components of complexity as important for the Sensitive species, fisher.

- Jones, 1991: "...fishers did not use non-forested habitats." "It is crucial that preferred resting habitat patches be linked together by closed-canopy forest travel corridors."

- Ruggiero et al. 1994: "...**physical structure of the forest** and prey associated with forest structures are the **critical features that explain fisher habitat use**, not specific forest types.

- Thomas, 1995: "**Most habitats preferred by fishers have been described as structurally complex, with multiple canopy layers and abundant ground-level structure (in the form of logs, other downed wood, under-story shrubs, etc**.). Powell and Zielinski (1994) listed three **functions of structural complexity**, which may be

[19] 36 CFR § 219.3 Role of science in planning. "The responsible official shall document how the best available scientific information was used to inform the assessment..." 36 CFR § 219.6 Assessment. (a)(3) "Document the assessment in a report available to the public. ...Document in the report how the best available scientific information was used to inform the assessment."

important for fishers: high diversity of prey populations, high vulnerability of prey items, and increased availability of dens and rest sites. Structure also substantially influences snow accumulation and density, which have been shown to be important variables in fisher habitat use (Raine 1983, Leonard 1980, Powell and Zielinski 1994)."

(Emphases added.) Such complexity can be seen in the photographs included in "120802MWardEmsgProjDevelopmentDiscussioWithJOppenheimer.pdf". Finally, Attachment A includes documents the Nez Perce NF produced for NEPA analyses of previous timber sale projects, to comply with the Forest Plan. Two pdfs (Old Growth SurveysSelway RD 1,2) document 1992 field surveys for old growth on the Selway Ranger District. The document, entitled “OLD GROWTH SURVEY” shows that the Nez Perce NF created a standard field survey form using Forest Plan old-growth criteria as “CRITICAL COMPONENTS” ......

Up-to-date field survey data are necessary to identify old growth for the purposes of Forest Plan compliance and project assessments

We suspect the Lolo NF’s data regarding old growth is in some cases too old to be reliable. The FS is offering the results of a quick-and-dirty analysis in its haste to facilitate logging.

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

We offer examples of how proper old-growth surveys have been conducted by the FS. Attachment A includes documents produced for NEPA analyses of previous timber sale projects. One document (Old Growth SurveysSalmon River RD.pdf) is a series of 1992 documents on field surveys for old growth on the Salmon River Ranger District. They utilize a “SCORECARD FOR OLD GROWTH HABITATS” which features Forest Plan old-growth criteria for “West- side Mixed Conifer” and “West-side Ponderosa Pine”, which is apparently an early example of the FS integrating the Green et al habitat types into the old-growth identification and allocation process. The surveyors also use observations to rate the quality of the old-growth habitat, making notes of the habitat components they observe which biological knowledge indicates are used by old-growth associated wildlife. In these Attachment A documents the surveyors also take notes on actual wildlife sightings while they’re in the forest. Essentially, the surveyors are immersed in the experience of what it means to be in old growth, increasing their credibility as surveyors of old growth in the process.

Attachment B is a document entitled, “Kootenai N.F. – Three Rivers District Old Growth Validation Process – All Proposed Sales.” It includes a section, “Instructions For Old Growth Walkthrough and Write-up” which was “developed in an effort to standardize old growth walkthrough surveys and write-ups.” It also has a section listing old-growth criteria used by the Kootenai National Forest (similar to the Lolo NF), and includes a blank field form for use by the field surveyor. That form includes a couple lines where the surveyor is to indicate in his or her judgment why the stand meets the old-growth criteria displayed on the form.

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

During the next decade, each District will work towards completing a field inventory of designated old growth stands. Specific information items will be gathered which will help in monitoring and determining habitat suitability for several indicator species and will help to rate the relative value of each stand. The key information items will be stored in some type of data base to help facilitate use of habitat suitability models for monitoring of dependent wildlife species.

...It is anticipated that as old growth field verification and other stand exams continue, we will find that some designated stands are not suitable old growth habitat while others not previously designated will be found to be suitable. Records of these findings should be kept so that the Forest Plan data base can be updated.

So we know the FS has done in the past, and still can perform, proper old-growth field surveys if it wants to. But for the Superior North EA process “old growth” is little but an abstraction. They designate with data too unreliable for making valid conclusions, building little credibility in the process.

The FS apparently loathes the idea of the public being able to field check Superior North project area old-growth designations. There is no mapped old growth in any documents on the project website at the deadline date for these comments. The FS could potentially sign a Decision in the coming weeks, under the Emergency authority being pursued.

Old-growth maps must include important reference details to help facilitate navigation so the public can survey the old growth alleged in documents. By navigation details we mean, for example, roads, trails and streams that are relatively easy to find are juxtaposed on the map with old growth polygons.

Eight percent policy/standards are not based on best available science.

Our comments on the NPCNF's Hungry Ridge Draft EIS inquired as to what the historic levels of old growth were before industrial logging arrived on the scene: "What is the HRV for old growth forestwide?" The FS responded, "Estimating the amount of old growth that was historically present in the project area would be speculative." On this topic, our Objection to that project stated:

...a more recent issue is questioning of the scientific adequacy of the forestwide 10% standard. Our comments on the DEIS asked, "Please 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. Please **estimate** how much old growth in the project area has been destroyed by logging. What is the HRV for old growth forestwide?" The FS responded, "Estimating the amount of old growth that was historically present in the project area would be speculative." That is bizarre—the FS has no qualms about

speculating on the amounts of various other categories of forest in the project area, and basing the goals of this project on such speculation. Yet it won't speculate on the amount of old-growth habitat historically needed to maintain viability of its old-growth Management Indicator Species and other old-growth associated wildlife? The FS may be reluctant to discuss the issue because the amount of old growth on the Forest is well below the historic range; and that fact alone shows how the FS is managing inconsistent with best available science in proposing to destroy hundreds of acres of old growth.

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

One might assume the 8% policy minimum is based upon historic amounts prior to EuroAmerican exploitation, so that maintaining such minimum would safeguard wildlife populations so they wouldn't vanish from any national forest or need listing under the ESA. But estimates of the amount of old growth on the Lolo NF prior to EuroAmerican management are not available nor reliable, because so much forest had been logged long before adoption of old- growth definitions. This is demonstrated in FS statements responding to requests for data on presettlement amounts of old growth. For example, USDA Forest Service, 2019c states:

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

Similarly, the Northern Region's Bollenbacher and Hahn, 2008g state, "actual estimates for the amount of OG are constrained by the limited field inventory data collected before the 1930s, and inconsistent—or absent—OG definitions."

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

Gautreaux, 1999 states:

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

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

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

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

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

Also, Lesica (1996) states, “Results of this study and numerous fire-history studies suggest that

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

If the FS was interested in making its Forest Plan direction consistent with the best available science, it would undertake an amendment process that would increase its "minimum[20]" 8% policy up to a level at the very least within the natural range of variability, resembling reference conditions, then hedging with even more to consider the risks of climate change.

Since wildlife evolved prior to the era of pre-industrial logging when the abundance and distribution range of old growth was much greater than now, the FS has no scientific basis supporting its assumption that merely meeting its old growth percentage minimum will maintain viable populations as the Forest Plan requires. Along with climate concerns as discussed in these comments, this is why facilitating the destruction of old growth of any category would be reckless, arbitrary and capricious.

Whitebark pine seedlings, saplings and mature trees, present in subalpine forests proposed for burning, would experience mortality from project activity. Whitebark pine is fire intolerant (thin bark). Fire favors whitebark pine regeneration (through canopy opening and reducing competing vegetation) only in the presence of adequate seed source and dispersal mechanisms (Clarks Nutcracker or humans planting whitebark pine seedlings).

White pine blister rust, an introduced disease, has caused rapid mortality of whitebark pine over the last 30 to 60 years. Keane and Arno (1993) reported that 42 percent of whitebark pine in western Montana had died in the previous 20 years with 89 percent of remaining trees being infected with blister rust. The ability of whitebark pine to reproduce naturally is strongly affected by blister rust infection; the rust kills branches in the upper cone bearing crown, effectively ending seed production.

Montana is currently experiencing a mountain pine beetle epidemic. Mountain pine beetle prefer large, older whitebark pine, which are the major cone producers. In some areas the few remaining whitebark that show the potential for blister rust resistance are being at- tacked and killed by mountain pine beetles, thus accelerating the loss of key mature cone- bearing trees.

Whitebark pine seedlings and saplings are very likely present in the subalpine forests proposed for burning and logging. In the absence of fire, this naturally occurring white- bark pine regeneration would continue to function as an important part of the subalpine ecosystem. Since 2005, rust resistant seed sources have been identified in the Northern Rockies (Mahalovich et al 2006). Due to the severity of blister rust infection within the region, natural whitebark pine regeneration in the project area is prospective rust resistant stock.

Although prescribed burning can be useful to reduce areas of high-density subalpine fir and spruce and can create favorable ecological conditions for whitebark pine regeneration and growth, in the absence of sufficient seed source for natural regeneration maintaining the viability and function of whitebark pine would not be achieved through burning. Please find Keane and Parsons and Keane 2017 attached to our scoping comments.

Planting of rust-resistant seedlings would likely not be sufficient to replace whitebark pine lost to fire activities.

What surveys have been conducted to determine presence and abundance of whitebark pine re-generation? If whitebark pine seedlings and saplings are present, what measures will be taken to protect them? Please include an alternative that excludes burning in the presence of whitebark pine regeneration (consider 'Daylighting' seedlings and saplings as an alternative restoration method). Will restoration efforts include planting whitebark pine? Will planted seedling be of rust-resistant stock? Is rust resistant stock available? Would enough seedlings be planted to replace whitebark pine lost to fire activities? Have white pine blister rust surveys been accompli- shed? What is the severity of white pine blister rust in proposed action areas?

Does the Lolo N.F. have any forest plan biological assessment, biological opinion, incidental take statement, and management direction amendment for whitebark pine?

How will this project protect, maintain, and restore whitebark pine?

Page 23 of the Draft EA states:

The adjacent Rock Creek Ecosystem Maintenance burning project would complement the benefits to whitebark pine habitat of the Tyler's Kitchen project by improving forest resilience and reducing wildfire severity. The Rock Creek EMB project also received a determination of "May Affect, Likely to Adversely Affect" for whitebark pine due to the presence of individuals that could be inadvertently impacted.

Please formally consult with the US FWS on the impact of the project on whitebark pine.

Please formally consult with the US FWS on the LNF forest plan since whitebark pine were listed after the forest plan was signed.

Does the LNF have any forest plan biological assessment, biological opinion, incidental take statement, and management direction amendment for whitebark pine?

Please see the attached paper by Six et al 2021 Whitebark Genetics 2021. Six et al. found:

"Anthropogenic change is creating or enhancing a number of stressors on forests. To aid forests in adapting to these stressors, we need to move beyond traditional spacing and age- class prescriptions and take into account the genetic variability within and among populations and the impact our actions may have on adaptive potential and forest trajectories. Because so little is known about the genetic diversity in most forest trees, and because it is key to effective conservation, studies of genetic diversity and structuring in forest trees should be a top priority in forest adaptation and conservation efforts."

Page 22 of the Draft EA states:

Whitebark Pine
The Tyler's Kitchen project area was evaluated to determine if project activities may affect threatened whitebark pine in the area. A determination of "May Affect, Likely to Adversely Affect" was made. There are 420 acres of modeled whitebark pine habitat in the project area, and while less than one acre overlaps vegetation treatment areas, three on-the-ground whitebark pine observations were made outside of the modeled habitat.

Page 23 of the Draft EA states:

Road building and maintenance would not impact individual whitebark pine as none is proposed in the areas of whitebark pine habitat or occurrence. Whitebark pine were observed along the BPA powerline corridor, and resource protection measures to avoid or buffer these trees are included.

There is no evidence that the project area was surveyed for Whitebark pine instead the Forest Service's computer model says only 420 acres of the project area even though Forest Service employees saw Whitebark pine outside the model area without doing a survey. The LNF must also survey the project area for whitebark pine to avoid taking Whitebark pine.

The project is not following the best available science and is not meeting the purpose and need. Since Whitebark pine are listed under the ESA, you must formally reconsult with the FWS on the impact of the project on whitebark pine. To do this the Forest Service will need to have a complete and recent survey of the entire project area for whitebark pine and consider planting whitebark pine as the best available science by Keene et al. states is the only way to get new whitebark pine to grow.

Do spruce beetle effect whitebark pine?

In some areas the few remaining whitebark that show the potential for blister rust resistance are being attacked and killed by mountain pine beetles, thus accelerating the loss of key mature cone- bearing trees. Whitebark pine seedlings and saplings are very likely present in the subalpine forests proposed for burning and logging. In the absence of fire, this naturally occurring white- bark pine regeneration would continue to function as an important part of the subalpine ecosystem.

Since 2005, rust resistant seed sources have been identified in the Northern Rockies (Mahalovich et al 2006). Due to the severity of blister rust infection within the region, natural whitebark pine regeneration in the project area is prospective rust resistant stock. Although prescribed burning can be useful to reduce areas of high-density subalpine fir and spruce and can create favorable ecological conditions for whitebark pine regeneration and growth, in the absence of sufficient seed source for natural regeneration maintaining the viability and function of whitebark pine would not be achieved through burning. Please find Keane and Arno attached to our scoping comments. Planting of rust-resistant seedlings would likely not be sufficient to replace whitebark pine lost to fire activities. What surveys have been conducted to determine presence and abundance of whitebark pine re-generation?

Since Whitebark pine are listed under the ESA, the USFS-USDA must formally reconsult with the USFWS on the impact of the project on whitebark pine. To do this the Forest Service will need to have a complete and recent survey of the entire project area for the presence of whitebark pine and consider planting whitebark pine as the best available science. Keene et al. states that the only way to get new whitebark pine is to grow (seedlings) them (submitted in our DEA comments).

Hundreds of acres of clearcutting and burning threaten individual whitebark pine trees in the project area, including miles and miles of new roads, and including clearings around individual whitebark pines. The Forest Service fails to disclose the level of “take” and the incredibly high failure rate of these practices as a technique for natural restoration, regeneration and recovery of whitebark pine under these conditions.

The Forest Service does not disclose or address the results of its only long-term study on the effects of tree cutting and burning on whitebark pine. This study, named "Restoring Whitebark Pine Ecosystems," included prescribed fire, “thinning”, “selection cuttings,” and “fuel enhancement cuttings” on multiple different sites. The results were that “[a]s with all the other study results, there was very little whitebark pine regeneration observed on these plots.” See U.S. Forest Service, General Technical Report RMRS-GTR- 232 (January 2010). These results directly undermine the representations the Forest Service makes in the Project EIS. More specifically, the Forest Service’s own research at RMRS-GTR-232 finds: “the whitebark pine regeneration that was expected to result from this [seed] caching [in new openings] has not yet materialized. Nearly all sites contain very few or no whitebark pine seedlings.” Thus, even ten years after cutting and burning, regeneration was “marginal.” Moreover, as the Forest Service notes on its website: “All burn treatments resulted in high mortality in both whitebark pine and subalpine fir (over 40%).” Accordingly, the only proven method of restoration of whitebark pine is planting: “Manual planting of whitebark pine seedlings is required to adequately restore these sites.”

Therefor the project’s plan to cut down trees around whitebark pine will cause the whitebark pine to grow faster and then die from beetles. This is a violation of NEPA, NFMA, the APA and the ESA.

For whitebark pine, spring or fall burning may kill seedlings susceptible to fire. For mature whitebark pine trees, the bark is relatively thin compared to other species such as ponderosa pine and susceptible to scorching from fire. Fires that approach the tree trunks may scorch the bark, diminishing the bark’s protective properties from other stressors. Depending on the fireline intensity and residence time of lethal temperatures, the heat from the fire may also penetrate the bark, killing the underlying cambium layer. Harm to the bark and cambium may reduce individual tree vigor and also increase susceptibility to infections such as white pine blister rust or infestations by the mountain pine beetle.Whitebark pine seed banks and fine roots may also be impacted should fire move through an area when fuels and soil moisture is conducive to longer residence time of lethal temperatures. Seeds are buried by Clark’s nutcrackers generally within one inch of the soil surface and may be susceptible to longer residence time of lethal temperatures. Fine roots located near the soil surface serve as the primary water absorbing roots for trees and may be harmed or killed with longer residence times of lethal temperatures when soil moisture is low which would lead to an increase in the penetration depth of lethal temperatures. In general, the proposed prescription would attempt to achieve a low severity surface fire in which shrubs, needle cast and upper duff layers would be consumed. In some instances, including dense stands in which commercial or non-commercial thinning is not feasible, higher severity fire effects may be preferred to achieve the desired condition for those forested stands.In the long term, broadcast burning in the vicinity of living whitebark pine stands may improve the habitat suitability for seed caching by Clark's nutcracker; seed germination; and whitebark pine seedling establishment. Clark's nutcrackers prefer to cache seeds in recently burned areas as fire removes understory plants and creates soils surfaces that are easier to penetrate for seed caching. In addition, in the long term, broadcast burning may reduce the vigor of other species that would compete with whitebark pine seedlings for sunlight, soil water, and nutrients."

Whatebark pine are now a threatened species and the project is in violation of the ESA.

On December 2, 2020, the U.S. Fish and Wildlife Service issued a rule proposing to list whitebark pine (Pinus albicaulis) under the Endangered Species Act. The Project area includes whitebark pine. The whitebark pine present in the project area represents a major source within the larger geographic area. The Project proposes tree cutting and burning across thousands of acres where whitebark pine may be present. Regardless of whether individual activities are intended to im-pact whitebark pine, whitebark pine may be affected by damage from equipment and equipment trails, cutting, soil compaction and disturbance, mortality from prescribed burning, scorching from jackpot burning, trampling of seedlings and saplings, and removal of necessary microclimates and nursery trees needed for sapling survival. Additionally, thousands of acres of whitebark pine habitat manipulation are proposed for the Project, including intentionally cutting and burning Whitebark pine trees. No discussion on the success rate of natural regeneration under these conditions is provided. No discussion of the success rate of planting seedlings in clearcuts is provided. There have been no surveys for whitebark pine in violation of the ESA, NEPA, NFMA, and the APA.

The Forest Service admits that whitebark pine is known to be present in the area and that the Project "may impact individuals. . . ." The Forest Service further admits: "some adverse impacts are possible." The Forest Service further admits that "implementation of the project may cause incidental loss of whitebark pine seedlings and saplings . . . ." Crucially, the Forest Service does not disclose or address the re- sults of its only long-term study on the effects of tree cutting and burning on whitebark pine. This study, named "Restoring Whitebark Pine Ecosystems," included prescribed fire, thinning, selection cuttings, and fuel enhancement cuttings on multiple different sites. The results were that "[a]s with all the other study results, there was very little whitebark pine regeneration ob- served on these plots." See U.S. Forest
Service, General Technical Report RMRS-GTR-232 (January

2010). More specifically: "the whitebark pine regeneration that was expected to result from this [seed] caching [in new openings] has not yet materialized. Nearly all sites contain very few or no whitebark pine seedlings." Thus, even ten years after cutting and burning, regeneration was "marginal." Moreover, as the Forest Service notes on its website: "All burn treatments resulted in high mortality in both whitebark pine and subalpine fir (over 40%)." Accordingly, the only proven method of restoration of whitebark pine is planting: "Manual planting of whitebark pine seedlings is required to adequately restore these sites."

The scoping notice states:

Proposed treatments include approximately 6,097 acres of timber harvest (Small Tree Commercial Thinning, Intermediate, and Regeneration Harvest), 7,496 acres of prescribed burning, 3,002 acres of acquired land treatments, 2,741 acres of non-commercial thinning, and 228 acres of fuel breaks.
Regeneration timber harvest treatments are designed to replace the existing stand with one that has a species composition and stocking density that meets desired future conditions specified in management objectives. Regeneration harvests are proposed where stand conditions (insects, disease, blowdown, etc.) do not meet, and are not projected to meet desired conditions, and where intermediate harvest cannot alter stand development to a desired condition. Regeneration harvests would be used to reduce fuels and break up fuel continuity, increase landscape heterogeneity and species diversity, and address stand-level health and resilience issues such as root disease and bark beetle susceptibility.

It appears that the agency is trying to convert habitat types in the project area in violation of NFMA, NEPA and the APA.

What are the habitat types in project area?

Please find Pfister attached. The agency must show the habit types in the project area to demonstrate that they are not trying top convert habitat types.

The project needs to be amended to include an analysis of habitat types based on Pfister since different habitat types burn at different intervals.

The project is trying to convert habitat types in most of the project area which violates NFMA and won't work. Forests are vital to all life on Earth, they purify the air we breathe, filter the water we drink, prevent erosion, provide habitat, bring rain to the interior states, protect communities from the impacts of the climate crisis and globally reduce Earth's temperature by about 0.5 degrees C. It is incumbent upon the media to vigorously question whether employing chainsaws to remove trees does far more harm than good.

The primary "rare terrestrial animal community" on the Forest is the old growth dependent wildlife species community.

The agency is violating the NEPA by promoting fuel reduction projects as protection of the public from fire, when this is actually a very unlikely event; the probability of a given fuel break to actually have a fire in it before the fuels reduction benefits are lost with conifer regeneration are extremely remote; forest dry- ing and increased wind speeds in thinned forests may increase, not reduce, the risk of fire.

The agency is violating the NEPA by providing false reasons for logging to the public by claiming that insects and disease in forest stands are detrimental to the forest by reducing stand vigor (health) and increasing fire risk. There is no cur- rent science that demonstrates that insects and disease are bad for wildlife, including dwarf mistletoe, or that these increase the risk of fire once red needles have fallen.

The agency is violating the NEPA by claiming that logging is needed to create a diversity of stand structures and age classes; this is just agency rhetoric to conceal the real purpose of logging to the public.

The agency is violating the NEPA by using vague, unmeasureable terms to rationalize the proposed logging to the public. How can the public measure "resiliency?" Please demonstrate that fuel breaks work.

a. When ladder fuels are removed (by thinning), ground-level wind speed and turbulent mixing both increase, leading to faster fire spread and greater oxygen- transport efficiency; this, in turn, results in increased fire intensity.

b. In many cases this aerodynamic effect is more important than the fire-dampening effects of the fuels reduction being evaluated.

c. Two recent studies demonstrate just how consequential neglecting canopy wind-drag effects can be, leading to potentially disastrous results if aggressive ladder-fuel removal is applied. See Atchley et al. 2021 and Banerjee et al. 2020.

d. Both papers demonstrate that the removal of ladder fuels reduces the sub-canopy wind drag, ultimately leading to increased fire spread.

e. In other words, they both show how fuels-reduction treatments can increase fire spread, which is the opposite of what currently-used operational model studies predict.

f. Furthermore, the Banerjee et al. 2020 paper goes further and also shows that aggressive ladder fuel removal increases the likelihood of overstory crown fires compared to more modest ladder fuel reductions, which is again opposite to operational model-run predictions.

g. Other recent studies also confirm these findings. Cohen et al. 2018 demonstrate that drought and fuel load were secondary effects compared to fire-induced atmospheric motions, which operational fire-behavior models neglect.

h. Bradley et al. (2016) analyzed satellite data for 1500 fires from 1984 to 2014, affecting 23.5 million acres of forestland. Their results show that the more heavily forestland is managed, the more severely it burns, and the least-managed land (i.e., our National Parks and Wilderness Areas) are the most firesafe.

i. By omitting atmospheric dynamics and wind-drag effects associated with vegetation treatments, fuels reductions designed to reduce fire intensity and fire spread are undoubtedly producing the opposite effect.

Please find A More Effective Approach for Preventing Wildland-Urban Fire Disasters Jack Cohen which I attached to my scoping comments.

Please see the following article titled:

Montana researchers urge towns to focus on wildfire preparation

https://missoulacurrent.com/research-wildfire-preparation/

Laura Lundquist

(Missoula Current) For more than a decade, a small group of scientists have been trying to convince people that fireproofing their homes is far more effective than logging the forest when it comes to surviving wildfire. But few people are listening.

In mid-December, six researchers published a paper in the Proceedings of the National Academy of Sciences journal warning that communities across the nation, but particularly those in the West, aren't prepared to survive an urban conflagration such as the one that devastated Lahaina, Hawaii, in August.

The paper, titled "Wildland-urban fire disasters aren't actually a wildfire problem," points out that, since 2016, communities

from Lahaina to Gatlinburg, Tenn., that have lost hundred of homes to fires have certain things in common: the fires occurred under extreme weather conditions - high winds and persistent drought - and most of the structures weren't fire-resistant.

"These problem fires were defined as an issue of wildfires that involved houses. In reality, they are urban fires initiated by wildfires. That's an important distinction - and one that has big repercussions for how we prepare ourselves for future fires," the authors wrote.

The authors included three researchers from the Forest Science and Fire Sciences laboratories of the U.S. Forest Service Rocky Mountain Research Station in Missoula and one from Headwaters Economics in Bozeman.

In a 2014 paper in the Proceedings of the National Academy of Science, some of the same authors developed a community risk assessment that put the focus on improving the security of individual homes in a community, not the forest around them.

The emphasis is placed on modifying the house and the home ignition zone, a region within 100 feet of a house where debris and vegetation should be eliminated or minimized to reduce the chance of fire getting close to the house.

The reason that urban conflagrations begin and spread is because wind pushes embers and heat from one unprotected building to another, overwhelming fire departments that normally train to fight fire in just one building. Conditions are *made worse when buildings are close together, because radiant heat becomes a bigger factor, spreading fire quicker.*

"Reducing the likelihood that a home will ignite interrupts the disaster sequence by enabling effective structure protection. New construction siting, design, construction materials, and landscaping requirements should take wildfire potential into account," the authors wrote in the December paper.

One of the paper's authors, Jack Cohen, is a fire-behavior analyst and heat transfer engineer who has spent 40 years investigating wildfires, particularly those that are linked to incidents where hundreds of homes burned. He has spent at least the past decade writing papers and giving talks about the need to focus on making homes less susceptible to wildfires, which are a natural process, especially in the arid West.

When asked why the researchers decided to submit the recent article that seeks to drum home points they already promoted a decade ago, Cohen said cities and agencies have done very little during that time period to put their recommendations into place.

"What prompted us this time was the Lahaina urban conflagration that was associated with a grassfire. It may be a repeated message on our part, but it's not being received very well. Not much has changed," Cohen said. "The federal and state agencies still don't get it - they're still defining the problem as a wildfire control problem."

Since the 2014 paper, Cohen and other researchers have had to just watch as town after town has burned terribly but predictably, as if no one has read their research. In Gatlinburg and Pigeon Forge, Tenn., 2,460 buildings burned in a 2016 fire; in 2018, the Camp Fire led to the loss of almost 19,000 buildings in Paradise, Calif.; in December 2021, 1,084 buildings burned in Superior and Louisville, Colo. from a grass fire; and in November 2021, a grassfire sparked fires in 23 homes in Denton, Mont.

Each wildfire had very little connection to most of the burning buildings, Cohen said. A wildfire is the source of initial ignition, but from that point on, it's a series of structure fires that lead to more structure fires. For example, with the Four Mile Canyon Fire in Boulder, Colo., the state of Colorado and the Forest Service had completed a number of fuel treatments nearby that they touted as protective. But high winds carried fire brands to ignite the houses far from the fire. Cohen found that while 168 houses burned, a lot of vegetation around the houses didn't, "so the wildfire didn't sweep through town."

"In the past five years, a number of incidents with more than 100 houses burning have been initiated by grass fires, which burn quickly. The grass fires pass through and are gone while the community continued to burn," Cohen said. "What I've found, particularly over the past five or six years, is that extreme wildfire is not dependent on closed-canopy conifers that produce big flames. The only time these urban disasters occur is under extreme conditions. That typically means it's very windy."

Nothing about the Lahaina Fire surprised Cohen. Not even the overblown claims that a wildfire "roared through and destroyed the town." Again, the wildfire was over before the town really started to burn. The fire started as a grassfire fanned by high winds, and had Lahaina not been there, the fire would have burned through the buffel grass and guinea grass within a matter of minutes before it died out on the beach.

But Lahaina was there, a high-density community with several blocks of multi-story, largely-connected wooden structures. That configuration caused buildings to catch fire either due to burning embers flying from other buildings or from catching fire due to the overwhelming heat from nearby buildings.

"The ignition initiated where the grassfire came down, and that was it - it was a conflagration," Cohen said. "You don't want to be in a high-density community when you can't control the fire. Thirteen of the 26 fatalities in the 1991 Oakland Hills Fire occurred in the street when two-story buildings were burning on both sides of the street and the road became blocked. The heat was untenable."

One house in Lahaina stood untouched and was dubbed "the miracle house." But Cohen said it was just a good example of the points he and his fellow authors have been trying to communicate about defensible space and being fire-adapted. The owners had recently renovated the house with a nonflammable roof. It had wood walls, but the nearest building was about 30 feet away - far enough to prevent radiant heat from starting a fire - and there was little debris on the grounds or the house to actively spread the fire.

"The home ignition zone works," Cohen said. "The home ignition zone came out of the modeling I did and then the crown fire experiments I did with wood walls to show the distance, the proximity required to produce an ignition was realistic. At the same time, California was cutting 300-foot clearances around communities, which means nothing to (airborne) burning embers, but it's way over (what's required) for radiant heat exposure."

Cohen and his colleagues hope their latest paper prompts more action from local governments. Cohen is hoping Missoula County can do a better job when it updates its Wildfire Protection Plan in the near future.

But more than likely, Cohen said, they'll be writing a similar paper in another few years, trying to make politicians and the public understand. It doesn't help that they're fighting some in their own agency, the Forest Service, who insist that logging, not home modification, will save communities.

"Fire is inevitable. But nobody's figuring it out," Cohen said. "We're starting from the presumption that it's wildfire that spreads through a community that lays it to waste. We even have the agencies responding in that fashion by being obsessed with this notion of wildfire control. So they do fuel treatments to have safe firefighting. That's not only counter ecologically, it doesn't work."

Contact reporter Laura Lundquist at lundquist@missoulacurrent.com.

Please find the paper Cohen co-authored that is mention in the article above, Calkin et al. 2024 attached.

Based on Calkin's paper, the project is not an emergency and not following the best available science.

What are the specific criteria used to define resiliency, and what are the ratings for each proposed logging unit before and after treatment? How is the risk of fire as affected by the project being measured so that the public can understand whether or not this will be effective? How is forest health to be measured so that the public can see that this is a valid management strategy? What specifically constitutes a diversity of age classes, how is this to be measured, and how are proposed changes measured as per diversity? How are diversity measures related to wildlife (why is diversity needed for what species)? If the reasons for logging cannot be clearly identified and measured for the public, the agency is not meeting the NEPA requirements for transparency.

The agency will violate the Forest Plan by logging riparian areas; almost all wildlife species will be harmed by this treatment.

The agency will violate the NFMA by failing to ensure that old growth forests are well-distributed across the landscape with the all of the its projects.

Please include an easily understandable accounting of all costs for the various types of treatments, including burning. For commercial logging, fuels reduction, and prescribed burning, we would like to know what the estimated cost is "per acre" for that particular treatment. We would also like to know the costs for construction of new temporary roads, reconstruction of existing roads, and road obliteration and/or decommissioning per mile of road.

The U.S. District Court just ruled that the Forest Service has to formally consult with the U.S. FWS on the Northern Rockies Lynx Management Direction effect on lynx and lynx critical habitat. Have you done this? If not please do so.

THE AGENCIES MUST REINITIATE

CONSULTATION ON THE NORTHERN ROCKIES LYNX

MANAGEMENT DIRECTION.

The Northern Rockies Lynx Management Direction is inadequate to ensure conservation and recovery of lynx. The amendments fail to use the best available science on necessary lynx habitat elements, including but not limited to, failing to include standards that protect key winter habitat.

The Endangered Species Act requires the FS to insure that the these project are not likely to result in the destruction or adverse modification of critical habitat. 16 U.S.C. §1536(a) (2). Activities that may destroy or adversely modify critical habitat are those that alter the physical and biological features to an extent that appreciably reduces the conservation value of critical habitat for lynx. 74 Fed. Reg. 8644. The Northern Rockies Lynx Management Direction (NRLMD) as applied in the project violates the ESA by failing to use the best available science to insure no adverse modification of critical habitat. The NRLMD carves out exemptions from Veg Standards S1, S2, S5, and S6. In particular, fuel treatment projects may occur in the WUI even though they will not meet standards Veg S1, S2, S5, or S6, provided they do not occur on more than 6% of lynx habitat on each Nation- al Forest. Allowing the agency to destroy or adversely modify any lynx critical habitat has the potential to appreciably reduce the conservation value of such habitat. The agency cannot simply set a cap at 6% forest-wide without looking at the individual characteristics of each LAU to determine whether the project has the potential to appreciably reduce the conservation value. The ESA requires the use of the best available science at the site-specific level. It does not allow the agencies to make a gross determination that al- lowing lynx critical habitat to be de- stroyed forest-wide while not appreciably reduce the conserva- tion value.

The FS violated NEPA by applying the above-mentioned excep- tion without analyzing the impacts to lynx in the individual LAUs. The Project violates the NFMA by failing to in- sure the viability of lynx. Ac- cording to the 1982 NFMA regulations, fish and wildlife must be managed to maintain vi- able popula- tions of Canada lynx in the planning area. 36 C.F.R. 219.19. The FS has not shown that lynx will be well distributed in the plan- ning area. The FS has not addressed how the project's adverse modification of denning and foraging habitat will impact distri- bution. This is important because the agency readily admits that the LAUs already contain a "relatively large percentage of un- suitable habitat."

The national forests subject to this new direction will provide habitat to maintain a viable population of lynx in the northern Rockies by maintaining the current distribution of occupied lynx habitat, and maintaining or enhancing the quality of that habitat.

The FS cannot insure species viability here without addressing the impacts to the already low amount of suitable habitat. By cutting in denning and foraging habitat, the agency will not be "maintaining or enhancing the quality of the habitat."

This project is in Canada lynx habitat. In order to meet the requirements of the FS/USFWS Conservation Agreement, the FS agreed to insure that all project activities are consistent with the Lynx Conservation Assessment and Strategy (LCAS) and the requirements of protecting lynx critical habitat. The FS did not do so with its project analysis. This project will adversely affect lynx critical habitat in violation of the Endangered Species Act. The BA/BE needs to be rewritten to reflect this information to determine if this project will adversely modify proposed critical habitat for lynx and if so conference with USFWS.

The Lolo National Forest (LNF) is home to the Canada lynx, and lynx critical habitat. Canada lynx are listed as a Threatened species under the Endangered Species Act (ESA). In December 1999, the Forest Service and Bureau of Land Management completed their "Biological Assessment Of The Effects Of National Forest Land And Resource Management Plans And Bureau Of Land Management Land Use Plans On Canada Lynx" (Programmatic Lynx BA). The Programmatic Lynx BA concluded that the cur- rent programmatic land management plans "may affect, and are likely to adversely affect, the subject population of Canada lynx."

The Lynx BA team recommended amending or revising Forest Plans to incorporate conservation measures that would reduce or eliminate the identified adverse effects on lynx. The Programmatic Lynx BA's determination means that Forest Plan implementation is a “taking” of lynx, and makes Section 7 formal consultation on the Lolo Forest Plan mandatory, before actions such as the proposed project are approved.

Continued implementation of the Forest Plan constitutes a “taking” of the lynx. Such taking can only be authorized with an incidental take statement, issued as part of a Biological Opinion (B.O.) during of Section 7 consultation. The Lolo National Forest must incorporate terms and conditions from a programmatic B.O. into a Forest Plan amendment or revision before projects affecting lynx habitat, such as this one, can be authorized.

The Programmatic Lynx BA’s “likely to adversely affect” conclusion was based upon the following rationale. Plans within the Northern Rockies:

• Generally direct an aggressive fire suppression strategy within developmental land allocations. ...this strategy may be contributing to a risk of adversely affecting the lynx by limiting the availability of foraging habitat within these areas.

• Allow levels of human access via forest roads that may present a risk of incidental trapping or shooting of lynx or access by other competing carnivores. The risk of road-related adverse effects is primarily a winter season issue.

• Are weak in providing guidance for new or existing recreation developments. There- fore, these activities may contribute to a risk of ad- verse effects to lynx.

• Allow both mechanized and non-mechanized recreation that may contribute to a risk of adverse effects to lynx. The potential effects occur by allowing compacted snow trails and plowed roads which may facilitate the movements of lynx competitors and predators.

• Provide weak direction for maintaining habitat connectivity within naturally or artificially fragmented landscapes. Plans within all geographic areas lack direction for coordinating construction of highways and other movement barriers with other responsible agencies. These factors may be contributing to a risk of adverse effects to lynx.

• Are weak in providing direction for coordinating management activities with adjacent landowners and other agencies to assure consistent management of lynx habitat across the landscape. This may contribute to a risk of adverse effects to lynx.

• Fail to provide direction for monitoring of lynx, snowshoe hares, and their habitats. While failure to monitor does not directly result in adverse effects, it makes the detection and assessment of adverse effects from other management activities difficult or impossible to attain.

• Forest management has resulted in a reduction of the area in which natural ecological processes were historically allowed to operate, thereby increasing the area potentially affected by known risk factors to lynx. The Plans have continued this trend. The Plans have also continued the process of fragmenting habitat and

reducing its quality and quantity. Consequently, plans may risk adversely affect- ing lynx by potentially contributing to a reduction in the geographic range of the species.

• The BA team recommends amending or revising the Plans to incorporate conservation measures that would reduce or eliminate the identified adverse effects to lynx. The programmatic conservation measures listed in the Canada Lynx Conservation Assessment and Strategy (LCAS) should be considered in this regard, once finalized. (Programmatic Lynx BA, at 4.)

The Programmatic Lynx BA notes that the LCAS identifies the following risk factors to lynx in this geographic area:

- Timber harvest and pre-commercial thinning that reduce denning or foraging habitat or converts habitat to less desirable tree species

- Fire exclusion that changes the vegetation mosaic maintained by natural disturbance processes

- Grazing by domestic livestock that reduces forage for lynx prey

What are the redd counts in bull trout critical habitat in the project area? Please also provide the all the historical bull counts that you have in the project area?

The NEPA analysis must fully and completely analyze the impacts to bull trout critical habitat and westslope cutthroat trout habitat. What is the standard for sediment in the Forest Plan?

Sediment is one of the key factors impacting water quality and fish habitat. [See USFWS 2010]

The introduction of sediment in excess of natural amounts can have multiple adverse effects on bull trout and their habitat (Rhodes et al. 1994, pp. 16-21; Berry, Rubinstein, Melzian, and Hill 2003, p. 7). The effect of sediment beyond natural background conditions can be fatal at high levels. Embryo survival and subsequent fry emergence
success have been highly correlated to percentage of fine material within the stream-bed (Shepard et al. 1984, pp. 146, 152). Low levels of sediment may result in sublethal and behavioral effects such as increased activity, stress, and emigration rates; loss or reduction of foraging capability; reduced growth and resistance to disease; physical abrasion; clogging of gills; and interference with orientation in homing and migration (McLeay et al. 1987a, p. 671; Newcombe and MacDonald 1991, pp. 72, 76, 77; Barrett, Grossman, and Rosenfeld 1992, p. 437; Lake and Hinch 1999, p. 865; Bash et al. 2001n, p. 9; Watts et al. 2003, p. 551; Vondracek et al. 2003, p. 1005; Berry, Rubinstein, Melzian, and Hill 2003, p. 33). The effects of increased suspended sediments can cause changes in the abundance and/or type of food organisms, alterations in fish habitat, and long-term impacts to fish populations (Anderson et al. 1996, pp. 1, 9, 12, 14, 15; Reid and Anderson 1999, pp. 1, 7-15). No threshold has been determined in which fine sediment addition to a stream is harmless (Suttle et al. 2004, p.

973). Even at low concentrations, fine-sediment deposition can decrease growth and survival of juvenile salmonids.

Aquatic systems are complex interactive systems, and isolating the effects of sediment to fish is difficult (Castro and Reckendorf 1995d, pp. 2-3). The effects of sediment on receiving water ecosystems are complex and multi-dimensional, and further compounded
by the fact that sediment flux is a natural and vital process for aquatic systems (Berry, Rubinstein, Melzian, and Hill 2003, p. 4). Environmental factors that affect the magnitude of sediment impacts on salmonids include duration of exposure, frequency of exposure, toxicity, temperature, life stage of fish, angularity and size of particle, severity/magnitude of pulse, time of occurrence, general condition of biota, and availability of and access to refugia (Bash et al. 2001m, p. 11). Potential impacts caused by excessive suspended sediments are varied and complex and are often masked by other concurrent activities (Newcombe 2003, p. 530). The difficulty in determining which environmental variables act as limiting factors has made it difficult to establish the specific effects of sediment impacts on fish (Chapman 1988, p. 2). For example, excess fines in spawning gravels may not lead to smaller populations of adults if the amount of juvenile winter habitat limits the number of juveniles that reach adulthood. Often there are multiple independent variables with complex inter-relationships that can influence population size.

The ecological dominance of a given species is often determined by environmental variables. A chronic input of sediment could tip the ecological balance in favor of one species in mixed salmonid populations or in species communities composed of salmonids and nonsalmonids (Everest et al. 1987, p. 120). Bull trout have more spatially restrictive biological requirements at the individual and population levels than other salmonids (USFWS (U.S. Fish and Wildlife Service) 1998, p. 5). Therefore, they are especially vulnerable to environmental changes such as sediment deposition.

Aquatic Impacts

• Classify and analyze the level of impacts to bull trout and westslope cutthroat trout in streams, rivers and lakes from sediment and other habitat alterations:

Lethal: Direct mortality to any life stage, reduction in egg-to-fry survival, and loss of spawning or rearing habitat. These effects damage the capacity of the bull trout to produce fish and sustain populations.

Sublethal: Reduction in feeding and growth rates, decrease in habitat quality, reduced tolerance to disease and toxicants, respiratory impairment, and physiological stress. While not leading to immediate death, may produce mortalities and population decline over time.

Behavioral: Avoidance and distribution, homing and migration, and foraging and predation. Behavioral effects change the activity patterns or alter the kinds of activity usually associated with an unperturbed environment. Behavior effects may lead to immediate death or population decline or mortality over time.

Direct effects:
Gill Trauma - High levels of suspended sediment and turbidity can result in direct mortality of fish by damaging and clogging gills (Curry and MacNeill 2004, p. 140).

Spawning, redds, eggs - The effects of suspended sediment, deposited in a redd and potentially reducing water flow and smothering eggs or alevins or impeding fry emergence, are related to sediment particle sizes of the spawning habitat (Bjornn and Reiser 1991, p. 98).

Indirect effects:
Macroinvertebrates - Sedimentation can have an effect on bull trout and fish populations through impacts or alterations to the macroinvertebrate communities or populations (Anderson, Taylor, and Balch 1996, pp. 14-15).

Feeding behavior - Increased turbidity and suspended sediment can affect a number of factors related to feeding for salmonids, including feeding rates, reaction distance, prey selection, and prey abundance (Barrett, Grossman, and Rosenfeld 1992, pp. 437, 440; Henley, Patterson, Neves, and Lemly 2000, p. 133; Bash et al. 2001d, p. 21).

Habitat effects - All life history stages are associated with complex forms of cover including large woody debris, undercut banks, boulders, and pools. Other habitat characteristic important to bull trout include channel and hydrologic stability, substrate composition,
temperature, and the presence of migration corridors (Rieman and McIntyre 1993, p. 5).

Physiological effects - Sublethal levels of suspended sediment may cause undue physiological stress on fish, which may reduce the ability of the fish to perform vital functions (Cederholm and Reid 1987, p. 388, 390).

Behavioral effects - These behavioral changes include avoidance of habitat, reduction in feeding, increased activity, redistribution and migration to other habitats and locations, disruption of territoriality, and altered homing (Anderson, Taylor, and Balch 1996, p. 6; Bash et
al. 2001t, pp. 19-25; Suttle, Power, Levine, and McNeely 2004, p. 971).

• How will this project affect native fish and bull trout critical habitat? What is the current condition in the riparian areas? How will this project protect rather than adversely impact fish habitat and water quality? No logging or road building should be done in riparian areas. There should not be any stream crossings. Roads should be decommissioned and removed, not upgraded and rebuilt.

• Hauer, et al. (1999) found that bull trout streams in wilderness habitats had consistent ratios of large to small and attached to unattached large woody debris. However, bull trout streams in watersheds with logging activity had substantial variation in these ratios. They identified logging as creating the most substantive change in stream habitats.

“The implications of this study for forest managers are twofold: (i) with riparian logging comes increased unpredictability in the frequency of size, attachment, and stability of the LWD and (ii) maintaining the appropriate ratios of size frequency, orientation, and bank attachment, as well as rate of delivery, storage, and transport of LWD to streams, is essential to maintaining historic LWD characteristics and dynamics. Our data suggest that exclusion of logging from riparian zones may be necessary to maintain natural stream morphology and habitat features. Likewise, careful upland management is also necessary to prevent cumulative effects that result in altered water flow regimes and sediment delivery regimes. While not specifically evaluated in this study, in general, it appears that patterns of upland logging space and time may have cumulative effects that could additionally alter the balance of LWD delivery, storage, and transport in fluvial systems.

These issues will be critical for forest managers attempting to prevent future detrimental environmental change or setting restoration goals for degraded bull trout spawning streams.”

Muhlfeld, et al. (2009) evaluated the association of local habitat features (width, gradient, and elevation), watershed characteristics (mean and maximum summer water temperatures, the number of road crossings, and road density), and biotic factors (the distance to the source of hybridization and trout density) with the spread of hybridization between native westslope cutthroat trout Oncorhynchus clarkii lewisi and introduced rainbow trout O. mykiss in the upper
Flathead River system in Montana and British Columbia.

They found that hybridization was positively associated with mean summer water temperature and the number of upstream road crossings and negatively associated with the distance to the main source of hybridization. Their results suggest that hybridization is more likely to occur and spread in streams with warm water temperatures, increased land use disturbance, and proximity to the main source of hybridization.

The NEPA analysis must use the best available science to analyze how logging riparian habitat will impact native fish and water quality.

The following article from the 9/25/15 Missoulian disagrees with the Forest Service and says it is habitat destruction causing bull trout declines.

http://missoulian.com/news/local/montana-fwp-biologist-despite-successes-bull-trout-populations-still-in/article_2798e4c6-0658-522f-be4c-4274f903129e.html

Montana FWP biologist: Despite successes, bull trout populations still in peril
Ladd Knotek is disturbed by the lack of attention being paid to the many western Montana streams where bull trout populations are struggling to survive.

The fisheries biologist with Montana Fish, Wildlife and Parks knows people love to latch on to the success stories from streams like Fish Creek and several Blackfoot tributaries, where bull trout populations are viable.

"But what nobody talks about is all these other populations that, 50 years ago, these were all viable populations," he said Tuesday as part of a presentation on bull trout in Rattlesnake Creek. "You know, Gold Creek, Belmont Creek, Trout Creek, there's a whole list of them. There's a whole bunch of them that are just basically on the verge of disappearing. And what we like to talk about are the ones that are doing OK. But in places like Lolo Creek and some Bitterroot tributaries, bull trout there are just barely hanging on."

Bull trout have faced a long, slow decline over the past century, to the point where they are now listed as a threatened species under the Endangered Species Act. Success is *a relative term even in the places where they are doing well.*

"They're nowhere near what they were historically," Knotek said of the tributaries where the populations are relatively healthy. "But they have a fair number of adult spawners coming in. People see them in the fishery. But we need to start looking at all these other tributaries that used to be bull trout spawning tributaries and recognize what's going on in the bigger picture. We're just looking at a very thin slice instead of looking at the whole thing. A lot of this stuff is just symptoms of what's going on at the larger scale. Bull trout are the canary. They're very susceptible to environmental change, whether it's temperature, whether it's physical, whether it's sediment. There's something going on in these drainages and the symptoms we're seeing are the bull trout distribution is shrinking, we're losing populations and we're seeing expansion of nonnatives."

Bull trout – which are native to the Columbia River Basin and are only found west of the Continental Divide in Montana – need clear, cold mountain waters to spawn and require clean gravel beds, deep pools, complex cover, good in-stream flows in the fall and large systems of interconnected waterways for their migrations. Rising temperatures and falling water levels trigger their migration to spawning tributaries in June, and they hang out until they spawn in the fall. They are much more susceptible to *warming temperatures and habitat change than nonnative species such as brown and rainbow trout.*

Knotek was the featured presenter Friday for a discussion on restoration efforts and the importance of Rattlesnake Creek as a bull trout habitat. The event was organized by the Clark Fork Coalition, a nonprofit in Missoula that aims to protect water quality for the 22,000-square-mile Clark Fork River Basin.

Knotek explained that because Rattlesnake Creek is south-facing and doesn't have much groundwater recharging, it has much less of a buffer against a warming climate than other streams.

"The water temperatures are significantly higher than they were 10 years ago," he said. "The types of temperatures we're seeing in late summer and early fall, we never saw those 10 to 15 years ago. Water temperature is driving a lot of what we're talking about. It's definitely stressful on fish. It doesn't spell good news for bull trout."

Knotek said it's a common misconception that brown trout and rainbows are driving out bull trout, and he explained that those nonnative species are simply moving in because the native species is dying off.

“It’s replacement rather than displacement,” he said.

In Rattlesnake Creek, biologists have conducted redd counts of the migratory population in the lower reaches since 1999. There is a healthy resident population in the upper reaches, but researchers are more interested in the fish that actually migrate to the Clark Fork River.

The results have been disturbing.

They found a high of 36 in 2006 and 24 in 2008, before Milltown Dam was removed. There was an expected drop to just four redds – spawning beds – after the dam was removed in 2009, because of the massive disturbance. However, the number of redds has not bounced back since, and researchers found just six last year.

“That tells us that it wasn’t just the dam removal that caused it, because they should be recovering by now,” Knotek said. “And there are lots of populations like this stream that are not doing well but need more attention. We’ve got a problem here, but it’s not inconsistent with other tributaries. There’s something bigger going on.”

Knotek said that Rattlesnake Creek was historically braided before the area was developed, and that eliminated a lot of the back channels the juvenile fish need to grow.

“You need complexity,” he said. “When you have a straight ditch in a system that used to be braided, it ain’t good.”

He’s also seen much more algae growth in the upper sections, something that is obviously related to higher temperatures and added nutrients.

“We have browns and rainbows progressing upstream, and we attribute that to water temperature,” he said. “That’s consistent with other streams, too. It’s very obvious something is going on here.”

Knotek believes that a “ramping up” of current conservation work is the only thing that can save bull trout populations. Fish screens, the removal of dams, awareness of anglers and water conservation – especially by people using stream irrigation to water their lawns – is crucial.

“Bull trout are the canary,” he said. “But there are a lot of other species that we could be looking at as indicators as well. A lot of research needs to be done. There’s a lot of species being affected.”

As Knoteck pointed out, bull trout need clear, cold mountain waters to spawn and require clean gravel beds, deep pools, complex cover, good in-stream flows in the fall and large systems of interconnected waterways for their migrations.

What is the total amount of sediment currently going into the streams in the project area? How much will the project increase sediment? How will the project affect bull trout habitat and bull trout critical habitat? How many bull trout will be killed during the implementation of the project?

How will the Tyler's Kitchen project make the waters clearer in the short term?

How will the Tyler's Kitchen project make the waters colder in the short term?

How will the Tyler's Kitchen project make the gravel beds of the streams int he project area cleaner in the short and long term?

How will the Tyler's Kitchen project make the affect deep pools in streams in the project area in the short and long term?

How will the Tyler's Kitchen project make the affect complex cover over the streams in the project area in the short and long term?

How will the Tyler's Kitchen project make the affect the in-stream flows in the fall in the short and long term?

How will the Tyler's Kitchen project make the affect large systems of interconnected waterways for bull trout migrations?

Critical habitat receives protection under section 7 of the Endangered Species Act through the prohibition against destruction or adverse modification of critical habitat with regard to actions carried out, funded, or authorized by a Federal agency. There is no exception for the short run? How long is the project scheduled to last?

Will this project adversely modify bull trout critical habitat in the short run?

How will the Tyler's Kitchen project affect the temperature of the streams in the project area including bull trout critical habitat?

Will all of the proposed logging increase the temperature of the streams in the project area?

Will all of the proposed road building and road use by log truck, clearcutting, and other logging put more sediment into streams in the project area?

How will this affect bull trout and bull trout critical habitat?

When was the last time the project area was surveyed for bull trout?

What was the results of these surveys?

The EA does not characterize or evaluate the project area watersheds based on the Watershed Condition Framework or the baseline condition developed for bull trout. We do not know what the current condition of streams are in the project area, i.e., are they functioning acceptably, at risk or at unacceptable risk? And for what ecosystem parameters? How will this project affect stream function, i.e., degrade, maintain, restore?

- The project relies on BMPs to protect water quality and fish habitat. First, there is no evidence that application of BMPs actually protects fish habitat and water quality.
- Second, BMPs are only maintained on a small percentage of roads or when there is a logging project.

BMPs fail to protect and improve water quality because of the allowance for "naturally occurring degradation." In Montana, "naturally-occurring degradation" is defined in ARM 16.20.603(11)
as that which occurs after application of "all reasonable land, soil and water conservation practices have been applied." In other words, damage caused directly by sediment (and other pollu-

tion) is acceptable as long as BMPs are applied. The result is a never-ending, downward spiral for water quality and native fish. Here's how it works:

- Timber sale #1 generates sediment damage to a bull trout stream, which is "acceptable" as long as BMPs are applied to project activities.
- "Natural" is then redefined as the stream condition after sediment damage caused by Timber Sale #1.
- Timber sale #2 – in the same watershed – sediment damage would be acceptable if BMPs are applied again – same as was done before.
- "Natural" is again redefined as the stream condition after sediment damage caused by Timber Sale#2.

The downward spiral continues with disastrous cumulative effects on bull trout, westslope cutthroat trout and most aquatic life. BMPs are not "reasonable." Clearly, beneficial uses are not being protected. In Montana, state water quality policy is not being followed. § 75-5-101 et seq. and ARM 16.20.701 et seq.

The U.S. Fish and Wildlife Service found that bull trout are exceptionally sensitive to the direct, indirect, and cumulative effects of roads. Dunham and Rieman demonstrated that disturbance from roads was associated with reduced bull trout occurrence. They concluded that conservation of bull trout should involve protection of larger, less fragmented, and less disturbed (lower road density) habitats to maintain important strongholds and sources for naturally recolonizing areas where populations have been lost. (USFS 2000, page 3-82.

Hitt and Frissell showed that over 65% of waters that were rated as having high aquatic biological integrity were found within wilderness-containing subwatersheds.

Trombulak and Frissell concluded that the presence of roads in an area is associated with negative effects for both terrestrial and aquatic ecosystems including changes in species composition and population size. (USFS 2000, pages 3-80-81).

"High integrity [forests] contain the greatest proportion of high forest, aquatic, and hydrologic integrity of all are dominated by wilderness and roadless areas [and] are the least altered by management. Low integrity [forests have] likely been altered by past management are extensively roaded and have little wilderness." (USFS 1996a, pages 108, 115 and 116).

"Much of this [overly dense forest] condition occurs in areas of high road density where the large, shade-intolerant, insect-, disease- and fire-resistant species have been harvested over the past 20 to 30 years. Fires in unroaded areas are not as severe as in the roaded areas because of less surface fuel, and after fires at least some of the large trees survive to produce seed that regenerates the area. Many of the fires in the unroaded areas produce a forest structure that is consistent with the fire regime, while the fires in the roaded areas commonly produce a forest structure that is not in sync with the fire regime. In general, the effects of wildfires in these areas are much lower and do not result in the chronic sediment delivery hazards exhibited in areas that have been roaded." (USFS 1997a, pages 281-282).

"Increasing road density is correlated with declining aquatic habitat conditions and aquatic integrity An intensive review of the literature concludes that increases in sedimentation [of streams] are unavoidable even using the most cautious roading methods." (USFS 1996b, page 105).

"This study suggests the general trend for the entire Columbia River basin is toward a loss in pool habitat on managed lands and stable or improving conditions on unmanaged lands." (McIntosh et al 1994).

"The data suggest that unmanaged systems may be more structurally intact (i.e., coarse woody debris, habitat diversity, riparian vegetation), allowing a positive interaction with the stream processes (i.e., peak flows, sediment routing) that shape and maintain high-quality fish habitat over time." (McIntosh et al 1994).

"Although precise, quantifiable relationships between long-term trends in fish abundance and land-use practices are difficult to obtain (Bisson et al. 1992), the body of literature concludes that land-use practices cause the simplification of fish habitat.” (McIntosh et al 1994).

"Land management activities that contributed to the forest health problem (i.e., selective harvest and fire suppression) have had an equal or greater effect on aquatic ecosystems.

If we are to restore and maintain high quality fish habitat, then protecting and restoring aquatic and terrestrial ecosystems is essential." (McIntosh et al 1994).

"Native fishes are most typically extirpated from waters that have been heavily modified by human activity, where native fish assemblages have already been depleted, disrupted, or stressed []." (Moyle et al 1996).

"Restoration should be focused where minimal investment can maintain the greatest area of high-quality habitat and diverse aquatic biota. Few completely roadless, large watersheds remain in the Pacific Northwest, but those that continue relatively undisturbed are critical in sustaining sensitive native species and important ecosystem processes (Sedell, et. al 1990; Moyle and Sato 1991; Williams 1991; McIntosh et al. 1994;

Frissell and Bayles 1996). With few exceptions, even the least disturbed basins have a road network and history of logging or other human disturbance that greatly magnifies the risk of deteriorating riverine habitats in the watershed." (Frissell undated).

"[A]llocate all unroaded areas greater than 1,000 acres as Strongholds for the production of clean water, aquatic and riparian-dependent species. Many unroaded areas are isolated, relatively small, and most are not protected from road construction and subsequent timber harvest, even in steep areas. Thus, immediate protection through allocation of the unroaded areas to the production of clean water, aquatic and riparian-dependent resources is necessary to prevent degradation of this high quality habitat and should not be postponed." (USFWS et al 1995).

"Because of fire suppression, timber harvest, roads, and white pine blister rust, the moist forest PVG has experienced great changes since settlement of the project area by Euroamericans.

Vast amounts of old forest have converted to mid seral stages."(USFS/BLM 2000, page 4-58).

"Old forests have declined substantially in the dry forest PVG []. In general, forests showing the most change are those that have been roaded and harvested. Large trees, snags, and coarse woody debris are all below historical levels in these areas."

(USFS/BLM 2000, page 4-65).

"High road densities and their locations within watersheds are typically correlated with areas of higher watershed sensitivity to erosion and sediment transport to streams. Road density also is correlated with the distribution and spread of exotic annual grasses, noxious weeds, and other exotic plants. Furthermore, high road densities are correlated with areas that have few large snags and few large trees that are resistant to both fire and infestation of insects and disease. Lastly, high road densities are correlated with areas that have relatively high risk of fire occurrence (from human caused fires), high hazard ground fuels, and high tree mortality." (USFS 1996b, page 85, parenthesis in original).

In simpler terms, the Forest Service has found that there is no way to build an environmentally benign road and that roads and logging have caused greater damage to forest ecosystems than has the suppression of wildfire alone. These findings indicate that roadless areas in general will take adequate care of themselves if left alone and unmanaged, and that concerted reductions in road densities in already roaded areas are absolutely necessary.

Indeed, other studies conducted by the Forest Service indicate that efforts to “manage" our way out of the problem are likely to make things worse. By "expanding our efforts in timber harvests to minimize the risks of large fire, we risk expanding what are well established negative effects on streams and native salmonids. The perpetuation or expansion of existing road networks and other activities might well erode the ability of [fish] populations to respond to the effects of large scale storms and other disturbances that we clearly cannot change." (Reiman et al 1997).

The following quotes demonstrate that trying to restore lower severity fire regimes and forests through logging and other management activities may make the situation worse, compared to allowing nature to reestablish its own equilibrium. These statements are found in “An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins, Volume 3 (ICBEMP):

"Since past timber harvest activities have contributed to degradation in aquatic ecosystems, emphasis on timber harvest and thinning to restore more natural forests and fire regimes represent risks of extending the problems of the past." (ICBEMP page 1340).

"Proposed efforts to reduce fuel loads and stand densities often involve mechanical treatment and the use of prescribed fire. Such activities are not without their own drawbacks -- long-term negative effects of timber harvest activities on aquatic ecosystems are well documented (see this chapter; Henjum and others 1994; Meehan 1991; Salo and Cundy 1987)." (ICBEMP page 1340).

"Species like bull trout that are associated with cold, high elevation forests have probably persisted in landscapes that were strongly influenced by low frequency, high severity fire regimes. In an evolutionary sense, many native fishes are likely well acquainted with large, stand-replacing fires." (ICBEMP page 1341).

“Attempts to minimize the risk of large fires by expanding timber harvest risks expanding the well-established negative effects on aquatic systems as well. The perpetuation or expansion of existing road networks and other activities might well erode the ability of populations to respond to the effects of fire and large storms and other disturbances that we cannot predict or control (National Research Council 1996). (ICBEMP page 1342).

“Watersheds that support healthy populations may be at greater risk through disruption of watershed processes and degradation of habitats caused by intensive management than through the effects of fire.” (ICBMP page 1342).

"Timber harvest, through its effects on forest structure, local microclimate, and fuels accumulation, has increased fire severity more than any other recent human activity. If not accompanied by adequate reduction of fuels, logging (including salvage of dead and dying trees) increases fire hazard by increasing surface dead fuels and changing the local microclimate. Fire intensity and expected fire spread rates thus increase locally and in areas adjacent to harvest". (USFS 1996c, pages 4-61-72).

"Logged areas generally showed a strong association with increased rate of spread and flame length, thereby suggesting that tree harvesting could affect the potential fire behavior within landscapes...As a by-product of clearcutting, thinning, and other tree-removal activities, activity fuels create both short- and long-term fire hazards to ecosystems. Even though these hazards diminish over time, their influence on fire behavior can linger for up to 30 years in dry forest ecosystems of eastern Oregon and Washington". (Huff et al 1995).

The answer, therefore, is not to try managing our way out of this situation with more roads and timber harvest/management. In summary:

• Roads have adverse effects on aquatic ecosystems. They facilitate timber sales which can reduce riparian cover, increase water temperatures, decrease recruitment of coarse woody debris, and disrupt the hydrologic regime of watersheds by changing the timing and quantity of runoff. Roads themselves disrupt hydrologic processes by intercepting and diverting flow and contributing fine sediment into the stream channels which clogs spawning gravels. High water temperatures and fine sediment degrade native fish spawning habitat.

According to the U.S. Forest Service 82% of all bull trout populations and stream segments range-wide are threatened by degraded habitat conditions. Roads and forest management are a major factor in the decline of native fish species on public lands in the Northern Rockies and Pacific Northwest.

The Wildlife Report and EA inaccurately state there will be no impacts on bull trout or critical habitat designated for the bull trout. Both Rock Creek and the Clark Fork River are designat-edcritical habitat for bull trout. The south end of the Project Area borders a hydrologic divide and the entire Project Area drains into these two streams. The temporary roads and the amount of-ground disturbance and cover removal lasting 20 years or more will produce sediment that reaches designated critical habitat.

The extensive existing road network in the Project Area and the amount of cover removal have heavily impacted this area. The focus for protection of water quality, retention of summer flows, bull trout, cutthroat trout and other native aquatic life should be an extensive road decommissioning project.

Riparian Area Protection for Multiple Species

To protect riparian habitat throughout the Project Area for multiple species, the best available science shows no-cut buffer withs.

The Montana Stream Protection Act prohibits clearcutting in Streamside Management Zones. The NRCS includes the following which states buffer widths apply to both occupied and unoccupied bull trout stream zones. The Endangered Species Act and impacts on bull trout critical habitat include "upland areas" that drain into designated critical habitat.

The United States Department of Agriculture Natural Resources Conservation Service MT-CPA-186 (Bull Trout) July 2016 states: "Unoccupied stream" are those streams with direct connectivity to occupied stream zones, including intermittent streams and those perennial streams where recent sampling (e.g., < 5years) indicates the stream is not likely to be occupied or potentially occupied by bull trout; seasonal downstream direct connectivity is confirmed.

"Direct connectivity" of unoccupied stream zones includes intermittent and perennial streams, either upstream or downstream, with a direct connection to occupied stream zones or critical habitat within a 6th HUC. Direct connectivity is viewed in two ways: 1) no known barriers exist to prevent a fish from accessing an unoccupied stream zone; and 2) intermittent or perennial streams, reservoirs, ponds, lakes with the potential to deliver sediment, nutrients, or contaminants to an occupied stream zone or critical habit.

Issues That Must Be Addressed in the Final EA and Biological Opinion:

•The Project should be reconfigured to focus exclusively on road decommissioning and water quality restoration.

•The analysis and formal consultation with USFWS must include effects on grizzly bear connectivity habitat as well as residential occupancy by grizzly bears. This will result in another Likely to Adversely Affect determination. It must also consider impacts to bull trout occupied and unoccupied streams as per Department of Agriculture Department's Natural Resources Conservation Service MT-CPA-186 (Bull Trout) July 2016.

•The Biological Opinion must be completed prior to a Decision Notice and FONSI.

•All clearcut units must be removed.

•There should be no temporary roads.

•All roads open to the public must have no cut/no treatment areas up to 500m from either side of the road.

•All roads added to the system should be decommissioned and removed from the system.

- An open road density (ORD) of one mile per square mile of land reduces elk habitat effectiveness to only 60% of potential. When ORD increases to six miles per square mile, habitat effectiveness for elk decreases to less than 20%. (Lyon 1984).

What is the open and total motorized and route density in the project area? The desired range is less than 1.7 miles/mile^2 (Christensen et al. 1993)."

- Black bears in southern Appalachia begin avoiding Forest Service roads when the density exceeds 0.8 miles per square mile. (Brody 1984). Grizzly bears use habitats less than expected when ORD exceeds one mile per square mile and total road density (TRD) exceeds two miles per square mile. (Mace and Manley 1993). Open roads contribute to grizzly bear mortality by poaching and, especially during the black bear hunting season, by mistaken killing. (Holland 1985).

How will the project effect grizzly bears since the project area is a travel corridor for grizzly bears?

Hillary Cooley, the Fish and Wildlife Service's grizzly bear recovery coordinator has stated that a grizzly bear recently denned in the project area and gave birth to 3 cubs. Please make sure your analysis reflects this.

New road building in the Forest without meaningful reclamation to ensure no net increase in the road system presents a significant threat to grizzly bears, because motor vehicle users and other people recreating can trespass on the supposedly "impassable" roads and thus encroach on grizzly bear habitat. Further, even unused roads cause detrimental impacts to grizzly bear survival and reproduction, because grizzly bears are displaced from roaded habitat, regardless of whether the roads receive public or administrative use. However, in concluding that the Forest Plan will not jeopardize the species, FWS's Revised Biological Opinion failed to adequately examine adverse impacts to grizzly bears from unauthorized motorized use on roads closed according to the Forest Plan's weaker closure standards; failed to consider the displacement impacts caused by roads even when they do not receive motorized use; and failed to account for increased roadbuilding enabled by the Forest Service's abandonment of stringent road-reclamation requirements.

Please find attached the paper titled, "The importance of natural forest stewardship in adaptation planning in the United States" by Faison et al 2023 which found that protecting more forests with natural stewardship is a cost effective way to harness the inherent adaptation and mitigation powers in forests and ensure that they are at their most functional to regulate planetary processes. Which is the opposite of the purpose and need of this project.

There are several significant inaccuracies and missing current information in the Project File including the Wildlife Report. For example, the Section 7 consultation is not complete. Table 8 on page 37 of the EA and the Draft FONSI state that there is a “May Affect, Likely to Adversely Affect” determination for grizzly bear. The project documents also state that Section 7 consultation with the USFWS is “ongoing.” Issuing the Project for public comment prior to completion of Section 7 consultation and issuance of a Biological Opinion is inappropriate.

These must be corrected in a Supplemental EA.2
This project will harm habitat for the threatened bull trout and grizzly bear.

Inaccuracy #1-
The Wildlife Report inaccurately claims there have been no confirmed observations of grizzly bears in the project area and the vicinity. Grizzly bears have been verified including a female with three cubs within the Project Area at Gillespie Creek. A male grizzly bear has denned two years in a row in the Welcome Creek area and has a home range throughout the northern Sapphire and John Long Mountains. A pair of siblings were also within the project area vicinity on their way from the Sapphires to the NCDE.

Inaccuracy #2-
The Wildlife Report has no analysis of impacts on habitat connectivity for grizzly bears even though the newest SSA and the

Proposed Rule find connectivity is vital to long-term grizzly bear survival and recovery. The Project Wildlife Report does not include any reference to the Sells, et al. (2023) paper on grizzly bear connectivity for females and males. The area in the John Long and Sapphire Mountains is shown to have moderate to high value for grizzly bear connectivity and the map shows yet another verified observation within the Project Area.

Other studies have also shown the John Long/Northern Sapphire as part of connectivity between the NCDE-GYE and NCDE-BE (Walker and Craighead 1997; Peck et al. 2019).

The EA states that cover will be reduced for 20 years. This is a significant impact on grizzly bears that increases mortality risk and reduces the ability of the landscape to serve as connective habitat. In fact, a compilation of connectivity study results shows that the maximum overlap (4) covers the Project Area.

Inaccuracy #3-
The Wildlife Report cites to an outdated Species Status Assessment for Grizzly Bear (USFWS 2020). The SSA was updated in 2024, and the USFWS found that grizzly bear viability in the lower 48 states would be jeopardized by reduced standards and protections in connectivity areas between the recovery areas.

The new SSA states: “Further, the lack of regulatory mechanisms to address the threats of human-bear conflicts, human population growth, and potential reductions in connectivity further increases the risk of a possible reduction in the resiliency of the grizzly bear populations in the grizzly bear DPS within the foreseeable future."6

"However, there are no mortality thresholds in connectivity areas outside of the GYE and NCDE DMAs for grizzly bears, as discussed above under Mortality Limits. In addition, recent legislation in Montana and Idaho expanding hunting and trapping tools available for wolves and black bears could reduce the probability of natural connectivity between the GYE and NCDE populations, as discussed above in Mistaken-Identity Killings."

"…additional data are needed to inform the effects of motorized access in potential connectivity areas that could facilitate natural recolonization of the BE." (emphasis provided).

The Proposed Rule Maintaining Threatened Species Status for Grizzly Bears (USFWS 2025) states:

"In addition, there are no regulatory mechanisms to facilitate natural connectivity between grizzly bear populations, which could reduce the potential to improve long-term genetic health of small or isolated populations and natural recolonization of the unoccupied ecosystems.

Therefore, without adequate conservation measures, human-caused mortality would continue to be a threat to the grizzly bear DPS." (emphasis provided).

"Therefore, in the absence of measures to allow for connectivity, habitat fragmentation would

continue to be a threat to the grizzly bear DPS." (emphasis provided).
"The lack of mortality thresholds in connectivity areas may result in a contraction of estimated
occupied range, which could decrease the likelihood of successful immigration. Therefore, in the
absence of conservation measures, connectivity and genetic health would continue to be a
threat to the grizzly bear DPS." (emphasis provided).
"After evaluating threats to the species and assessing the cumulative effect of the threats under
the Act's section 4(a)(1) factors, we conclude that the grizzly bear DPS is at increased risk of
extinction within the foreseeable future." (emphasis provided).
"Further, the lack of regulatory mechanisms to address the threats of human-bear conflicts,
human population growth, and potential reductions in connectivity further increases the risk of
a possible reduction in the resiliency of the grizzly bear populations in the grizzly bear DPS within
the foreseeable future." (emphasis provided).
"…we determine that the grizzly bear DPS is likely to become in danger of extinction within the
foreseeable future throughout all of its range." (emphasis provided).
Inaccuracy #4-
The Forest Service is playing the game that it has minimal obligations to grizzly bears outside of
the NCDE PCA and Zone 1. This is untrue. This area is within the Court injunction area still in

effect that defines where grizzly bears reside in Montana (Flathead-Lolo-Bitterroot Citizen Task
Force et al. v. State of Montana Case CV 23-101-M-DWM) and where full ESA protection applies. The
Project Area is also within the May Be Present map prepared by USFWS (2024).7

Inaccuracy #5-

The Wildlife Report inaccurately claims all denning has been inside the NCDE PCA while there has been denning on Wisherd Ridge, Welcome Creek and near Miller Peak and in the Coeur d'Alene Mountains. The Wildlife Report also inaccurately claims there is no modeled denning habitat for the Lower Rock Creek GBAU. The Lolo NF refuses to cite to Bader and Sieracki (2022) a peer-reviewed scientific journal publication. As can be plainly seen in the graphic from the paper, there is a significant amount of modeled grizzly bear denning habitat in the Lower Rock GBAU and in fact, a grizzly bear has denned two years in a row in one of the high probability areas.

The EA also finds that there is a "Likely to Affect" determination for whitebark pine, a key food source for grizzly bears.

Inaccuracy #6-

The Wildlife Report and EA inaccurately state there will be no impacts on bull trout or critical
habitat designated for the bull trout. Both Rock Creek and the Clark Fork River are designated

critical habitat for bull trout. The south end of the Project Area borders a hydrologic divide and
the entire Project Area drains into these two streams. The temporary roads and the amount of
ground disturbance and cover removal lasting 20 years or more will produce sediment that
reaches designated critical habitat.
The extensive existing road network in the Project Area and the amount of cover removal have
heavily impacted this area. The focus for protection of water quality, retention of summer flows,
bull trout, cutthroat trout and other native aquatic life should be an extensive road
decommissioning project.
Riparian Area Protection for Multiple Species
To protect riparian habitat throughout the Project Area for multiple species, the best available
science shows no-cut buffer widths.
Figure 7. Bader and Sieracki 2022.

Habitat type

Please do not dismiss the importance of the following information relating to Pfister, et al. (1977).

The scoping notice states on of the purposes of the project is to:

- Promote ponderosa pine and western larch.

What is the habitat type of the project area?

Quote from Pfister et al. (1977):

RESEARCH SUMMARY

A land-classification system based upon potential natural vegetation is presented for the forests of Montana. It is based on an intensive 4-year study and reconnaissance sampling of about 1,500 stands. A hierarchical classification of forest sites was developed using the habitat type concept. A total of 9 climax series, 64 habitat types, and 37 additional phases of habitat types are defined. A diagnostic key is provided for field identification of the types based on indicator species used in development of the classification. In addition to site classification, descriptions of mature forest communities are provided with tables to portray the ecological distribution of all species. Potential productivity for timber, climatic characteristics, and surface soil characteristics are also described for each type. Preliminary implications for natural resource management are provided, based on field observations and current information.

FOREST HABITAT TYPES OF MONTANA, Robert D. Pfister, Bernard L. Kovalchik,
Stephen F. Amo, and Richard C. Presby
INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION
Forest Service-U. S. Department of Agriculture
Ogden, Utah 84401 (hereafter, Pfister, et al. (1977), or Pfister)

Pfister et al. (1977) established a new, and vastly improved, forest classification system which further developed the application of habitat type classification to forest ecosystem

classification. A better classification system for forest communities and the characteristics of the specific site locations upon which forest vegetation develop and
depend.

The habitat type approach to classification of forest sites was developed more than 20 years ago by Daubenmire (1952) for forests of northern Idaho and eastern Washington. His original classification, and a subsequent revision and J. Daubenmire 1961, have proven useful in forest management and research

(Laysex 1974; Pfister 1976). Id. p.1
In 2022, Pfister et al. is considered the "best available science" in this field (and old-growth habitat) of study. It is often, to this day, spoken fondly of as "The Bible" for habitat-type classification, a detailed expression of the overall environment, ie. an ecological classification. There is, quite simply, no better system in existence being used for interpreting the ecological potential of the forested landscapes of Montana and the Northern Rockies. Federal land managers attempting to make intelligent prescriptions for managing/manipulating forest vegetation should, and must use Pfister's habitat type classifications as the foundation of forest ecosystem analysis.

Pfister is foundational; it is the ground upon which forest ecology and ecosystem science rests. There is no substitute, and any and all attempts to truncate, or compartmentalize elements within Phister's holistic, habitat-type classification system, represents a most objectionable form of "scientism" that reeks of a hidden agenda that has little to do with interpreting the forest's ecological potential.

ESA - As a foundational ecosystem analysis and interpretation tool, Pfister et al. is linked directly to specific language, unambiguously articulated by Congress, to describe
the Purposes of ESA (Endangered Species Act).

(b) PURPOSES
The purposes of this chapter are to provide a means whereby the ecosystems upon which endangered species and the threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section. Page one, 16 USC, Chapter 35, §1531(b)

We urge the Forest Service to simply comply with the clear intent of Congress, and its own (government funded) research to properly identify the habitat type in the project area using Pfister, et al. (attached) and arrive at an intelligent decision based on the best available science, and the intent and purposes of the federal laws which govern these types of project-level management actions. Emphasis added.
….end of project/EA analysis which references Pfister, and then proceeds to depart into a lengthy narrative, not about habitat type, but some typing using inadequate date, insufficient field examination and data and computer modelling that fails to follow Pfister's habitat typing methodology.

Roadless rule says: "... maintain or restore the characteristics of ecosystem composition and structure..."

May I suggest that HABITAT TYPE, NOT "***...Vegetation condition class (VCC; formally known as fire regime condition class)...***" is the foundation and best available science to determine characteristics of ecosystem composition and structure. (Pfister, et al. (1977). All this "vegetative" mumbo-jumbo is used to avoid Pfister and proper, foundational identification of the habitat type. The Forest Service is looking at the Tyler's Kitchen project as "tree farmers" not scientists studying natural forest succession/evolution in violation of NEPA, NFMA, the APA, the Clearwater Act and the ESA.

Thank you for your attention to these concerns.

Sincerely yours,

Mike Garrity

Alliance for the Wild Rockies

P.O. Box 505

Helena, Montana 59624

And on behalf of:

Sara Johnson

Native Ecosystems Council

P.O. Box 125

Willow Creek, MT 59760

And on behalf of:

Steve Kelly

Council on Wildlife and Fish

P.O. Box 4641

Bozeman, MT 59772

And for

Kristine Akland

Center for Biological Diversity

P.O. Box 7274
Missoula, MT 59807

kakland@biologicaldiversity.org