Blue Mountains Biodiversity Project

Fossil Office
27803 Williams Lane
Fossil, Oregon 97830
Phone: 541-385-9167

Eugene Office
1560 Chambers St.
Eugene, Oregon 97402
Phone: 510-715-6238

Tom Buchele
Clinical Professor
Earthrise Law Center at Lewis & Clark Law School
10101 S. Terwilliger Blvd.
Portland, OR 97219
phone 503-768-6736
fax 503-768-6642
tbuchele@lclark.edu
earthriselaw.org

October 6, 2025

Eric Watrud, Forest Supervisor
Umatilla National Forest
Attn: Blue Mountains Forest Plans Revision
72510 Coyote Road
Pendleton, OR 97801

Re: Blue Mountains Biodiversity Project's comments on the Notice of Intent to Prepare and Environmental Impact Statement for the Malheur, Umatilla, and Wallowa-Whitman National Forests; Oregon and Washington; Revision of the Land Management Plans (90 Fed. Reg. 37,458) and the Preliminary Draft Proposed Malheur, Umatilla, and Wallowa-Whitman National Forest Land Management Plans (Pub #. 64157)

Submitted online at: https://cara.fs2c.usda.gov/Public/CommentInput?Project=64157 *and via email to:* sm.fs.bluesforests@usda.gov

Dear Mr. Watrud and the Blue Mountains Forest Plans Revision team:

Blue Mountains Biodiversity Project ("BMBP") submits the following comments on the United States Forest Service's (Forest Service") August 2025 Notice of Intent ("NOI") to Prepare and Environmental Impact Statement ("EIS") and the associated Preliminary Draft Proposed Malheur, Umatilla, and Wallowa-Whitman National Forest Land Management Plans ("Draft Plan").

BMBP is a nonprofit environmental advocacy organization dedicated to the protection of the natural ecosystems of the Blue Mountains and Oregon East Cascade Bioregions. BMBP has been working to protect and restore these ecosystems and the native flora and fauna they support 1991. BMBP's work area encompasses federal public lands in eastern Oregon and southeastern Washington including the Deschutes, Ochoco, Malheur, Umatilla, Fremont-Winema, and Wallowa-Whitman National Forests. BMBP prioritizes the protection of mature and old-growth forest including large trees, sensitive and Endangered Species Act listed species, water quality, roadless areas, and natural ecological processes. BMBP has a long-held and vested interest in the management and ecological health of the Blue Mountains National Forests. BMBP's Fossil office address is 27803 Williams Lane, Fossil, OR 97830. BMBP's Eugene office address is 1560 Chambers St., Eugene, OR 97402.

BMBP's attorney Tom Buchele is submitting and signing these comments on behalf of his client, BMBP. BMBP is submitting these comments online via the Forest Service's CARA system and via email to sm.fs.bluesforests@usda.gov.

Per instructions provided in an October 3, 2025 email exchange with Christopher Dennis, the Deputy Public Affairs officer for the Umatilla National Forest, BMBP will be compiling all exhibits cited below in these comments in a Google Drive folder and will share a link with Chrisopher via email in order to get these exhibits into the project record. Exhibit 001. A list of those exhibits is included at the end of these comments. This folder will also include exhibits BMBP requests the Forest Service consider to inform its planning process, but were not directly cited in these comments.

Two additional environmental organizations are signing onto these comments:

- **John Muir Project**, a project of Earth Island Institute, is an environmental nonprofit based in California dedicated to protecting forest ecosystems, the ecological benefits of natural processes, such as fire, for native biodiversity, and exposing why logging our forests does not create fire-safe communities. John Muir Project has also written supplemental scoping comments that will be submitted along with BMBP's comments. John Muir Project's contact for the Blue Mountains Forest Plan Revisions is Chad Hanson, Director and Principal Ecologist, cthanson1@gmail.com.
- **Western Watersheds Project** is an environmental nonprofit based in Idaho dedicated to protecting western public lands from the destructive effects of livestock grazing. Western Watersheds Project's contact for the Blue Mountains Forest Plan Revisions is Paul Ruprecht, Nevada Director, paul@westernwatersheds.org.

Scoping Requirements for Forest Planning under the 2012 Planning Rule

The scoping stage of forest planning is the initial step in the NEPA process and establishes the foundation for developing or revising a forest plan under the 2012 Planning Rule. At this stage, the Forest Service must provide public notice that it is beginning the planning process, typically through a Notice of Intent in the Federal Register and other outreach such as news releases, website postings, and direct notification to individuals and groups on the interested parties list.

The purpose of scoping is to gather input from the public, Tribes, state and local governments, and other federal agencies about the issues, concerns, desired conditions, and possible alternatives that should be addressed in the Environmental Impact Statement. This includes identifying which issues are significant and warrant detailed analysis, as well as documenting issues considered but eliminated from further review.

The process requires meaningful opportunities for public comment and early coordination and consultation, especially with Tribes, in accordance with statutory and executive order requirements. Scoping also provides the venue for initiating compliance with other environmental statutes, such as Section 7 consultation under the Endangered Species Act and Section 106 consultation under the National Historic Preservation Act.

The information gathered must be documented as part of the administrative record, including records of who was contacted, how the outreach occurred, and what input was received. While scoping does not result in a stand-alone report, its results directly shape the scope of the EIS by defining the range of reasonable alternatives, including the no-action alternative, and identifying the significant environmental issues to be analyzed.

Scoping builds on the forest assessment stage required by the 2012 Rule, using data on current conditions and trends to help focus public input and refine the scope of analysis. Overall, scoping ensures that the planning process begins with broad participation, transparency, and early identification of key issues so that the EIS and resulting forest plan are legally defensible and responsive to both scientific and public concerns.

Authorities Governing Forest Plan Development Under the 2012 Planning Rule

1. Core Planning Regulations

Forest plan development is governed by the 2012 Planning Rule, codified at 36 CFR Part 219 (Subpart A). The Rule establishes the framework for developing, amending, and revising land management plans and requires the Forest Service to use the best available scientific information in all phases of planning (36 CFR §219.3). It mandates plan components that provide for ecological sustainability, species diversity, and multiple uses, and sets forth requirements for designated areas, monitoring, and public participation (36 CFR §§219.7–219.10).

2. Statutory Authorities Explicitly Referenced

Forest plans must comply with the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976 (16 U.S.C. §§1600–1614), which provides the basic legal framework for planning. The Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. §§528–531) requires management for a balanced combination of timber, range, water, recreation, and wildlife. Environmental protection is governed by the Endangered Species Act of 1973 (16 U.S.C. §§1531–1544), including Section 7 consultation requirements; the Clean Water Act (33 U.S.C. §1251 et seq.), including §313 requiring federal agency compliance with state water quality laws; the Clean Air Act (42 U.S.C. §7401 et seq.); and the Wilderness Act of 1964 (16 U.S.C. §§1131–1136), which requires recognition and protection of designated and recommended wilderness areas.

3. National Environmental Policy Act Requirements

The National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. §§4321–4370h) applies to all forest plan decisions. Each plan or plan revision must be accompanied by an Environmental Impact Statement or other NEPA document. The Forest Service implements NEPA through FSM 1950 (Environmental Policy and Procedures) and FSH 1909.15 (NEPA Handbook), which establish policy and procedures for environmental analysis, scoping, public involvement, and cooperating agency coordination.

4. Forest Service Directives Implementing the Rule

Agency directives operationalize the 2012 Rule. FSM 1920 (Land Management Planning) sets overall policy and responsibilities. The Land Management Planning Handbook (FSH 1909.12) provides procedural requirements for each stage of planning, including assessment (Ch. 10), plan components (Ch. 20), public participation and collaboration (Ch. 40), timber management and harvest limitations (Ch. 60), designated and recommended areas such as wilderness and wild and scenic rivers (Ch. 80), and monitoring programs (Ch. 90). These directives are binding on planning teams and ensure nationwide consistency.

5. Consultation and Coordination Requirements

Forest plan development must include intergovernmental consultation. Section 7 of the Endangered Species Act requires consultation with the U.S. Fish and Wildlife Service or NOAA Fisheries to ensure that plans do not jeopardize listed species or critical habitat. Section 106 of the National Historic Preservation Act of 1966 (54 U.S.C. §306108; 36 CFR Part 800) requires consultation with State Historic Preservation Officers, Tribal Historic Preservation Officers, and affected Tribes concerning historic properties. Additional obligations include Executive Order 13007 (Indian Sacred Sites), Executive Order 13175 (Tribal Consultation), and Section 8106 of the Food, Conservation, and Energy Act of 2008 (25 U.S.C. §3056) regarding protection of sensitive Tribal information.

6. Other Applicable Federal Statutes

Several additional laws apply to forest plan development. The Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271–1287) requires evaluation of river segments for eligibility and suitability during planning. The National Trails System Act of 1968 (16 U.S.C. §§1241–1271) governs management of national scenic and historic trails. Cultural resources are protected under the Archaeological Resources Protection Act of 1979 (16 U.S.C. §§470aa–470mm), the Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. §§3001–3013), and the American Indian Religious Freedom Act of 1978 (42 U.S.C. §1996). Wildlife is addressed by the Migratory Bird Treaty Act of 1918 (16 U.S.C. §§703–712) and Executive Order 13186 (Migratory Bird Conservation). Management in inventoried roadless areas must comply with the Roadless Area Conservation Rule (36 CFR Part 294). Existing statutory regimes for grazing (36 CFR Part 222) and mineral development (36 CFR Part 228) must also be incorporated into forest plans.

7. Substantive Content Requirements Under the 2012 Rule

The 2012 Planning Rule imposes substantive obligations that must be addressed in all forest plans. Plans must document how best available scientific information was used in assessments, alternatives, decisions, and monitoring (36 CFR §219.3). They must provide for ecological integrity and sustainability of ecosystems, including protection of watersheds (36 CFR §219.8). Plans must maintain species diversity and address species of conservation concern to ensure viability (36 CFR §219.9). They must identify and evaluate designated and recommended areas, including wilderness recommendations and wild and scenic river segments (36 CFR §219.10). Timber management components must respect NFMA's harvest limitations, determine areas suitable for timber production, and establish sustained-yield and allowable sale quantities (36 CFR §219.11).

8. External Information for Assessments

The 2012 Rule requires that plan assessments incorporate relevant external information in addition to Forest Service data. This includes peer-reviewed scientific research, regional ecological assessments, state and Tribal conservation strategies, and locally developed plans such as State Wildlife Action Plans, community wildfire protection plans, and transportation or infrastructure strategies. Consideration of these external sources ensures that assessments reflect the best available science and the broader ecological and social context in which national forests operate (36 CFR §219.6; FSH 1909.12, Ch. 10).

Loss of Eastside Screens

One overarching problem is that the Plan fails to meaningfully incorporate the Eastside Screen's mandatory large-tree protection standards, which generally prohibit the harvesting of trees greater than or equal to 21-inches diameter at breast height (DBH). If this omission were to continue for the final plan, it would undermine the ecological, social, and economic values that large trees provide and violate established legal requirements for Forest Management. The proposed plan applies to a wide swath of Oregon's Eastside forests, an area which is still recovering from a deficit of large trees which prompted the initial enactment of the rule. The geographic extent and number of large trees (≥21 inches) across six national forests in eastern Oregon and Washington shrank dramatically over the last century. **Exhibit 002. Exhibit 003. Exhibit 004. Exhibit 005.** A Forest Service Bulletin from 1975 found that between the mid-1950s and 1975, there was a 44% reduction in the acreage of trees ≥21 inch DBH. **Exhibit 002**

The Forest Service should retain the 21-inch rule as a mandatory standard to retain and increase large trees. Furthermore, the omission of the 21-inch rule would contradict the best available science which indicates the retention of large trees is integral to forest and wildlife resilience, particularly in the face of climate change and the concomitant rise in drought and high-intensity forest fire risk.

History of the Screens: understanding what's being lost

The 21-inch rule was adopted in 1994 as a part of the Eastside Screens. For over 30 years, it has protected large trees which provide critical ecological and social functions. The need for such protections was made apparent by the release of the 1994 Eastside Forest

Ecosystem Health Assessment (EFEHA). This comprehensive report on the health of forests east of the Cascade Crest found significant loss of large trees and late/old structural stage forest (LOS), resulting in fragmented landscapes prone to severe disturbance from wildfire, insects, and disease. Historic timber-harvesting and fire exclusion practices had decimated LOS, and the EFEHA identified a need for forest management practices to preserve large trees as a key component of maintaining ecosystem integrity and biodiversity. **Exhibit 006.**

The adoption of the Screens was also heavily influenced by the threat of litigation from National Resources Defense Council (NRDC) over the lack of adequate protections for large-tree habitats for certain fauna species which rely on such trees for critical habitat. Specifically, NRDC delivered a petition to the Forest Service, shortly before the release of the EFEHA requesting the cessation of all old growth timber harvest east of the Cascades premised on the fact that adequate habitat was not being provided for American Martens, Northern Goshawks, and various woodpecker species, including the Pileated Woodpecker. The claims in the petition were reviewed by Forest Service biologists and found to be credible, establishing that then-current timber harvesting practices posed a threat to the continued viability of those species. **Exhibit 007.**

In direct response to the findings of the EFEHA and threat to viability of key management indicator species, the Forest Service adopted the 21-inch rule to halt the ongoing loss of large trees. This bright-line limit was intended as an enforceable backstop against further degradation, ensuring that the last remaining cohorts of large trees would be retained as anchors for restoration, habitat connectivity, and disturbance resilience. This was explicitly intended as a wildlife conservation standard to prevent species in the Eastside being listed on the endangered species list. Just a few years prior, litigation on Forest Plans west of the Cascade Crest had resulted in the listing of the Northern Spotted Owl under the Endangered Species Act. This effectively halted all old-growth and large tree logging west of the Cascade Crest, since the statute prohibits the destruction or adverse modification of designated critical habitat for listed species. 16 U.S.C. § 1536(a)(2). Consequently, the Screens were explicitly intended to serve as a wildlife management standard that maintained the viability of key wildlife species, therefore preserving a more flexible approach to timber harvesting. The Screens provided a minimum enforceable standard tied to a historically verifiable range of variation in LOS forest. **Exhibit 006.** By contrast, the current Plan does not provide for any meaningful safeguards for large trees or the recovery of LOS forests. It disregards decades of science-based management and eliminates what has been the most durable protection against the loss of LOS forests, and fundamentally threatens the viability of key wildlife species by failing to maintain the minimum standards enshrined in the original Eastside management direction, which were explicitly incorporated in the interest of maintaining the viability of such species. Thus, the current Plan is not only scientifically unsound and legally defective, but it also presents the very real possibility of future litigation which will substantially erode the Forest Service's ability to promulgate a flexible management plan if it results in the listing of additional species under the ESA.

Although the Plan defines large trees as greater than or equal to 21 inches DBH, it makes an exception for large Grand fir, which it defines as greater than or equal to 30 inches DBH. This exception is both unsupported by the science and ecologically unsound. The original Screens recognized that DBH was the key determinant of wildlife habitat value and forest resilience. Large diameter trees, regardless of species or age, provide the vertical structure, canopy, and cavities that are critical for ensuring connectivity and species viability across the landscape. Studies have consistently shown that numerous species, including American Goshawk and American Marten (identified as a key management indicator species in the original Screens) rely on large trees of multiple species, not only pines. Grand fir also provide habitat for species such as American marten, Canada lynx, Rocky Mountain elk, flying squirrel, Vaux's Swift, American Goshawk, Pacific tree frog and many others. **Exhibit 008. Exhibit 009.** Grand fir provide a large percentage of the hollows that serve as critical nesting, shelter, and foraging habitat. **Exhibit 009.** In many eastside forests, grand fir and western larch comprise the *majority* of the hollow trees used by wildlife. **Exhibit 010**. The relatively soft wood of grand fir trees creates ideal wildlife habitat by providing natural hollows, cavities, and unusual growth forms that wildlife use for shelter, nesting, and foraging (Henjum 1994; Wisdom et al. 2000). "No artificial means to create or encourage the formation of a hollow tree structure has been found, so retaining such trees … is essential to providing habitat for the species that depend on them." **Exhibit 010**.

Furthermore, Grand fir's natural resistance to fire is second only to Ponderosa Pine among dominant Eastside tree species. **Exhibit 011.** Thus, Grand fir offers several benefits in increasing forest wide resilience to disturbance (**Exhibit 012)**, including creating cooler moister conditions which further moderate fire severity, suppressing growth of surface and ladder fuels (**Exhibit 013)**, and reducing evaporative demand and susceptibility to drought stress. **Exhibit 014.** Thus, the Plan's attempt to erode the standards which protect this species will have substantial effects on the viability of wildlife and the ability of Eastside forests to resist disturbances, especially wildfire, directly undercutting the original intent of the Eastside Screens.

Moreover, the likely adverse impacts to ecosystem health brought about by the lack of enforceable protections are only compounded by failures of the Forest Service to develop forest plan components that abide by the requirements of the 2012 Planning Rule (36 C.F.R. part 219, subpart A). Under the 2012 Planning Rule, desired conditions are required to be "specific enough to allow progress toward their achievement to be determined…," while standards and guidelines act as constraints on Forest Service actions in order to achieve desired conditions or avoid undesirable effects. 36 C.F.R. § 219.7(d)(1). Throughout the Forest Service's Draft Plan, desired conditions not only describe ecological, social, and economic characteristics that are insufficient to maintain sustainable levels of individual large trees and old trees and MOG forests, but are also too vague to ever measure progress toward their achievement. Further, the Forest Service's heavy reliance on guidelines to achieve desired conditions—rather than mandatory standards—curtails the accountability of the Forest Service to actually meet those desired conditions.

Like many components of the Draft Plan, as written FW-FOR-OLD-DC-01 does not comply the 2012 Planning Rule because there are no specific ecological, social, or economic characteristics against which progress could be measured. And while FW-FOR-OLD-DC-02 and -03 provide more in terms of specific conditions, the Draft Plan provides no objectives or standards that may help guide the Forest Service towards achieving those conditions. As past and recent management actions have shown—and as the current Draft Plan reflects—the Forest Service cannot be trusted to prioritize the protection of large and old trees and MOG forests of its own accord.

Moreover, in place of the rigorous standards imposed by the Eastside Screens, the Plan proposes the adoption of mere guidelines subject to be overridden by the needs of other plan components. In fact, most of the guidelines—components intended to be **constraints** on management actions—within the FW-FOR-OLD section of the Draft Plan exist only to detail situations where the logging of large trees is permitted. Moreover, because these are voluntary guidelines, the Forest Service may actually log old trees and large trees in any situation whatsoever so long as there is some indication that they are still moving the landscape towards their ill-defined desired conditions. This is significant because of the regulatory difference between standards and guidelines; 36 C.F.R. § 219.7(e) defines "standards" as mandatory whereas "guidelines" may be departed from so long as the purpose of the guideline is achieved. Whereas the original Eastside Screens provided only narrow exceptions with clearly defined circumstances to the removal of large trees, the current Plan's broad language permits the removal of such trees wherever "provided in other plan components" or deemed necessary for achieving vaguely defined "desired conditions." Guideline 5 of that plan component in particular allows for the removal of large trees where doing so would, "maintain, move toward, or achieve ecological desired conditions." This is an incredibly vague directive which could theoretically justify the removal of large trees in almost any circumstance, so long as it is shown to "move toward" undefined "desirable" ecological conditions. In fact, the plan endorses "short-term loss of large or old trees … for long-term gain," a legally and scientifically flawed approach that contravenes the original intent of the Screens to halt the ongoing loss of LOS forest, as well as regulations under the 2012 Planning Rule and the best available science which indicates retention of large trees is critical to maintaining ecological integrity. **Exhibit 015.** Logging trees that are already large reduces the overall number of large trees and the number of future large snags and dead and decaying large trees. It does so in light of an existing, current deficit of this critical resource. The plan never proves or even explains how reducing the number of existing large trees will somehow result in more large trees in any foreseeable future. These claims lack scientific support and perhaps more importantly make no sense.

In other sections of the Draft Plan where one would expect to see Forest Plan components that address the same concerns as the original Eastside Screens—namely Species Diversity (SPDIV)" and "Snags and Down Wood (SNAG)"—there are significant shortcomings that simply do not provide adequate levels of protection for these at-risk ecosystem features. The Draft Plan includes a guideline that calls for the retention of existing down wood at levels detailed in Table 7 (page 49), but there is no indication as to how the Forest Service determined these down wood levels, meaning there is nothing that connects the listed down wood amounts to levels required by native wildlife. To ensure adequate wildlife habitat, the Forest Service must include a mandatory standard that ensures the recruitment and maintenance of large snags and green replacement trees at 100% potential population levels of primary cavity excavators.

In the Species Diversity section, the Forest Service acknowledges that the 2012 Planning Rule "adopts a complementary ecosystem and species approach[] to provide for … long-term persistence of native species in the plan area." Draft Plan at 54. Despite this acknowledgment, the only plan component addressing large and old trees across the landscape is reduced to a non-binding guideline (FW-SPDIV-GDL-01), rather than a mandatory standard. Similarly, in the Snags and Down Wood section, the Draft Plan downgrades the Eastside Screens' mandatory protections for large snags to discretionary guidelines. This shift toward voluntary, unenforceable measures reflects a "trust us" approach to managing critical ecological structures, undermining the scientific and policy foundation for their protection. Furthermore, the Preliminary Need to Change which informed the drafting of the Plan explicitly identified the need to incorporate new science into the Eastside Screens. The Plan's comprehensive rollback of the 21-inch rule directly contradicts recent studies demonstrating the imperative of retaining large trees as a means of supporting ecosystem integrity, particularly in the face of climate change. **Exhibit 016.** In fact, the Plan makes no mention whatsoever of changing climatic conditions in relation to large trees, despite an express intent that the Forest Service consider "climate change" in its planning process in 36 C.F.R. § 219.5.

In sum, the Plan represents a historically significant rollback of protections for large trees across a vast swath of forest which will seriously undermine the ecological integrity of the landscape. It swaps strict standards for a "Swiss cheese" approach of non-mandatory, non-enforceable guidelines with exceptions so broad and ill-defined as to render the guidelines essentially meaningless. It does so at the expense of its legally mandated duty to provide management that maintains or restores ecosystem integrity and diversity.

Why it matters

The ecological, social, and scientific significance of the 21-inch rule cannot be overstated. Large trees provide critical ecological functions that cannot be replicated on human timelines, provide important cultural links across human generations, and have relatively limited economic value for the communities who benefit from them.

The ecological functions of large trees are manifold and irreplaceable. Their effect on the integrity of the forest ecosystem is disproportionate. Large trees serve as keystone structures for wildlife habitat, including key management indicator species such as Pileated Woodpecker and American Marten. They stabilize microclimates and regulate hydrology by providing canopy cover which reduces the effect of insolation on water availability, thereby improving forest resistance to drought and fire. **Exhibit 016.** Furthermore, peer reviewed science confirms that large trees store a disproportionate amount (42%) of aboveground carbon in Oregon's Eastside, despite making up less than 3% of overall trees. **Exhibit 017.** Finally, large trees are increasingly vulnerable to mortality from climate stressors. **Exhibit 015**. At a time when forest ecology disturbances are reaching new extremes of destruction, driven in large part by climate change, it is more imperative now than ever that the Plan adopt strict standards which protect large trees and their associated ecological values.

Furthermore, the Plan's Management Approach in FW-FOR-OLD-MAPR that "short-term loss of large or old trees in some areas" is necessary for "long-term gain" is ecologically unsound. Large trees are fundamentally irreplaceable; most species take over a century to reach a size where they are protected by the 21-inch rule, a timescale that is far outside the scope of even the most comprehensive forest plans, of which this is not one. Given mounting climate uncertainty and its deleterious effect on the mortality of large trees, it is irresponsible and illogical for the Forest Service to assume that the removal of large trees will facilitate a return to LOS forest conditions. A 2025 study examining tree mortality in the Plan area found that, in addition to a dramatic mortality rate in large trees, succession of younger trees is unlikely to replace recent losses of large trees. **Exhibit 015**. Thus, the Plan's management approach to large trees is fundamentally unworkable; at best it will drastically reduce the number of large trees in the forest, but most likely it will create a cyclical scenario where the inability of forests to replace large trees leads to ever more severe disturbances, loss of wildlife and biodiversity, and the complete devastation of LOS forests and large trees in general.

The severe scientific deficiencies in the plan implicate legal deficiencies as well. NEPA requires an agency to take a "hard look" at environmental effects in a detailed statement that addresses the environmental impacts of the action, unavoidable adverse effects, and a reasonable range of alternatives (including no-action). 42 U.S.C. § 4332(2)(C)(i)–(v). CEQ's regulations make clear that an EIS must analyze direct, indirect, and cumulative effects and compare the reasonably foreseeable environmental effects of the proposed action and alternatives "in comparative form." 40 C.F.R. §§ 1508.1(i), 1502.14, 1502.16 (2024). This requirement comes from case law predating the CEQ regulations that required an analysis of cumulative impacts was an essential part of any "hard look" by an EIS. When effects may be significant an EIS is required. 40 C.F.R. § 1501.3(d) (2024); *City of Davis v. Coleman*, 521 F.2d 661, 675–76 (9th Cir. 1975) (requiring further evaluation of significance of environmental effects of proposed highway interchange where "substantial questions have been raised about the environmental consequences of federal action," and holding that "this is precisely the kind of situation Congress had in mind when it enacted NEPA"); *Nat. Res. Def. Council, Inc. v. Grant*, 341 F. Supp. 356, 367 (E.D.N.C. 1972) (holding that "[a]ny action that substantially affects, beneficially or detrimentally, the depth or course of streams, plant life, wildlife habitats, fish and wildlife, and the soil and air 'significantly affects the quality of the human environment'"). In the 2024 decision Greater Hells Canyon Council v. Wilkes, Judge Aiken granted summary judgment to plaintiffs on a claim that the Forest Service had violated NEPA by failing to prepare an EIS prior to attempting to amend the 21-inch standard into a guideline. This finding was premised on the fact that the loss of large trees (which the rescission of the standard would inevitably lead to) would have a profoundly significant effect on the environment.

Drawing on Magistrate Hallman's fact finding in the previous disposition, Judge Aiken emphasized the importance and scope of the 21-inch rule in protecting large trees across the entirety of Oregon's Eastern Forests ecosystem. Thus, in order for the Forest Service to promulgate an amendment to replace the 21-inch standard as a mere guideline, they must conduct an extensive environmental review process and take a hard look at the cumulative effects of any proposed amendment because the loss of large tree protections will undoubtedly have a significant effect on the environment. In addition, that decision emphasized that NEPA requires agencies to consider less environmentally-destructive alternatives, something which the Plan entirely fails to incorporate. Although the Forest Service has indicated that they are planning to comply with the legal requirement to complete an EIS prior to promulgating the Plan revision, Judge Aiken's decision underscores the need for the agency to consider the cumulative and indirect effects, as well as direct, effects on the environment. **Exhibit 019.** Because of the paramount ecological importance of preserving large trees and the clear evidence that such trees are dying at a higher rate and are unlikely to be replaced by new generations of trees, EIS analysis will likely show that loss of the 21-inch rule would violate substantial provisions of the 2012 Planning Rule's requirements to maintain or restore ecological integrity and provide ecological conditions to maintain viable populations of species of conservation concern. 36 C.F.R. § 219.9(a), 36 C.F.R. §219.9(b)(1). In addition, the EIS will likely show that the loss of protections for large trees will incur jeopardy for threatened species and constitute an adverse modification to critical habitat in violation of 16 U.S.C. §1536(a)(2).

In addition, the rescission of large tree protections further violates several provisions of the mandates of the 2012 Planning Rule. Pursuant to 36 C.F.R. § 219.7(e)(1)(i), the Forest Service must draft plans that include "desired conditions" specific enough to allow progress towards their achievement. The current Plan's description of desired conditions is extremely vague and fails to effectively describe measurable conditions. As the primary desired condition for large and old trees, the Forest Service writes that "old forest conservation is integrated and balanced with other ecological, social and economic desired conditions to the extent practicable." This does not provide a workable condition that can be met as it sets no standards for the extent of the integration nor of the specific tertiary desired conditions which should be considered, nor what the extent of "practicable" integration of those conditions might be. In effect, it does not describe a desired condition, but a vague preposition that ecological integrity of large and old trees be balanced against other competing concerns.

Moreover, 36 C.F.R. § 219.9(a) mandates that any given plan must contain components which maintain or restore ecosystem integrity and diversity. As demonstrated above, the best and most recent science indicates that large trees serve multiple functions with regards to ecosystem integrity and diversity. They regulate hydrologic processes and provide crucial habitat for a large array of species. Furthermore, the mortality of large trees, particularly in the Blue Mountains region, is increasing, and younger trees are unlikely to be able to effectively replace them. **Exhibit 015.** Thus, the rescission of the 21-inch rule, which will inevitably lead to the removal of yet more large trees, will have extremely negative consequences for ecosystem integrity as irreplaceable LOS forest will be destroyed. Given the importance of large trees in mitigating disturbance effects, this will likely have a cascading effect where fewer large trees means ever increasing disturbances and a concomitant destruction of irrecoverable forest. In addition, the effect on ecosystem diversity would be likewise catastrophic. As stated, many species depend on large trees for crucial habitat; the loss of these trees would likely drive such species from their historic range, reducing wildlife diversity in the forest which would in turn likely severely impact aquatic and riparian ecosystems. Even studies critical of the DBH-only approach reinforce that the retention of large trees is critical to maintaining ecosystem integrity and diversity. **Exhibit 019.**

Given the great weight of scientific evidence that large trees are indispensable to ecosystem integrity and diversity, and the mandate of 36 C.F.R. § 219.3 that officials consider the "best available scientific information," the rescission of the 21-inch rule may be subject to challenge under the APA's "arbitrary and capricious" standard. The Plan as it currently stands completely fails to take into account the destructive effects of the removal of large trees. It operates on the demonstrably false assumption that removing large trees will lead to undefined, unproven and logically unlikely "long term gains" when even science critical of the 21-inch rule maintains that large trees are irreplaceable to the forest ecosystem. By effectively removing any meaningful standard for protecting such trees, the Forest Service is completely ignoring the best available science which it is required to consider. 36 C.F.R. § 219.3.

Looking Forward

The path forward must build upon, not dismantle, the protections which have safeguarded Oregon's Eastside forests for three decades. When originally proposed, the 21-inch rule was intended as a floor to prevent further loss while long term planning could chart a course towards restored forest health. That long-term plan is now before us, and the Forest Service should use this as an opportunity to strengthen, not weaken, protections, especially given the cumulative effects of climate change and the ongoing effects of degradation of the Eastside forest ecosystem.

For starters, and perhaps most importantly, the final Plan must preserve the 21-inch rule as a binding standard, not amend it as an optional guideline. Although the best available science has fostered new insights into forest health in relation to large trees, the basic premise of the 1994 rule—that LOS forests are in retreat and large trees provide irreplaceable wildlife habitat and are critical to ecosystem health—remain unchanged. If anything, the present climatic conditions require a stricter standard as evidence clearly shows a deleterious impact on the mortality of large trees. To this end, the Plan should incorporate strict and binding standards that bar the removal of large trees across the entirety of the Blue Mountains region. In addition, the continued use of Historic Range of Variability ("HRV") as a management goal for forested vegetation structural stages by the FS is inappropriate and not supported by the best available science. While HRV provides some historical context, it is a poor management indicator under dynamic climate and disturbance regimes. Numerous studies have shown that the deficiencies of HRV in assuming stationary conditions, as well as lack of reliable data, may actually promote maladaptation by locking management to past structures that no longer confer resilience. As Keane et al. (2009) discussed:

> To use HRV in an operational context, it must be assumed that the record of historical conditions more or less reflects the range of possible conditions for future landscapes; an assumption that we now know is overly simplistic because of documented climate change, exotic introductions, and human land use. … If expected biotic responses to climate change come true, tomorrow's landscapes will be so altered by human actions that current management philosophies and policies of managing for healthy ecosystems, wilderness conditions, or historical analogs will no longer be feasible because these objectives will be impossible to achieve in the future.

Exhibit 021. Thus, we urge the Forest Service to adopt a forward-looking climate-responsive objective that may reference HRV as background information as opposed to a prescriptive management standard. This will necessarily result in a stricter standard given the best available science showing that LOS forests are severely impacted by changing conditions.

Furthermore, the plan must clarify and set ambitious (yet achievable) desired conditions. In its current iteration, the Plan provides only vague and immeasurable desired conditions in direct contravention of its regulatory duty. These conditions must be measurable and sufficient to restore LOS conditions across the ecosystem. This means aiming not just for maintaining minimum percentages, but at active recovery at scales that sustain wildlife viability, hydrologic integrity, and carbon storage. This is a regulatory requirement enshrined in the 2012 Planning rule, and the desired conditions should ideally set concrete qualitative and quantitative goals which incorporate the changing conditions our forests are increasingly subject to.

It is also critical that the Plan consider a changing climate in its final plan. This will necessarily entail greater protections of large trees, as the great weight of scientific evidence points to these trees being far more resistant to drought, fire, and insects which have increased in severity and intensity over the 20th and 21st centuries. Protecting all large trees is the surest way to anchor climate resilience and ecological integrity in the face of the changing conditions of climate change specifically contemplated in 36 C.F.R. § 219.5(a).

In addition, the Plan should incorporate the cultural and social values that large trees provide in terms of their cultural, economic, and recreational value. Indigenous peoples and Tribal Nations throughout the Blue Mountains region have deep historical and cultural ties to large trees, and recent Forest Service literature has recognized these important and irreplaceable values. Thus, any standards regarding large trees should seek to incorporate and protect those values. In its current iteration, the plan makes no mention of the social values associated with old trees, and sets no desired conditions tied to the preservation of large trees for cultural purposes. Thus, the Plan should incorporate these important values into its set of desired conditions and set management practices accordingly.

Finally, the Plan completely fails to consider the cumulative effects of climate change. As has been mentioned ad nauseam, changing climatic conditions are resulting in less resilient forests more prone to catastrophic disturbance. Retention of large trees is not merely about preserving the past — it is key component in giving future forests a fighting chance to resist decimation and ecological collapse in the face of conditions which are unequivocally destroying the very trees that this Plan fails to protect.

The Blue Mountains deserve a plan that reflects the lessons of the last three decades of forest management and the best science available today. Removing old and large trees is not a viable Plan — it is a regression to 20th century practices which are the direct cause of the ecological state our forests exist in today. Our forests in the Pacific Northwest are our greatest natural resource, and they deserve a plan which retains their grandeur, ecological integrity, and resilience, so that they might serve as a tangible legacy for our people, wildlife, and watersheds.

Climate Change

Forest ecosystems like those found in the Blue Mountain National Forests present the best examples of natural mitigators to climate change and its impacts. Historically, forested mountain ranges have been able to act as refugium for various species during periods of changing climate. **Exhibit 021.** As temperatures rise the forests move higher in elevation to stay in its optimal range, and species unable to adapt would move with them, spreading back into their prior ranges when "normal" temperatures return. Also, recent studies have shown that old and large trees (≥21 in.) accumulate carbon at an accelerated rate, with some species seeing a 6-fold increase in carbon accumulation in the span from 10 inches to 20 inches, and an 18-fold increase in the span of 10 to 30 inches. **Exhibit 017.** They are also more efficient at retaining carbon while standing than when processed (**Exhibit 022)** and release emissions when logged or burned. **Exhibit 017.**

Large trees also provide crucial shade, preventing the understory from receiving direct solar radiation. This leads to temperatures beneath a forest canopy being cooler than exposed forest, reducing drying out of the soil and increasing seedling survivability. **Exhibit 017.** This contributes to a lower severity of forest fires by limiting the amount of dried vegetation at low levels while retaining moisture on the ground. **Exhibit 012.** In addition, old growth ponderosa pine and douglas-fir were found to help water retention in the soil during periods of drought. **Exhibit 017.**

Large and old trees are also naturally fire resistant, particularly Grand fir and ponderosa pines, as their thick bark protects the base while high canopies remain outside the reach of the flames and reduce growth of ladder vegetation. **Exhibit 011.** Moris et al. 2022 found that Grand fir forest types had a mean fire severity at the same level as typically fire-resistant species like western larch, ponderosa pine, and Douglas-fir. Overall, Moris et al. (2022) found that the "fire resistance score" of Grand fir forests "was the second highest among the forest types, only behind ponderosa pine[.]" This is of particular importance when climate change is expected to increase the severity of wildfires, with northwestern ecoregions like the Blue Mountains facing an increased burn area by a factor of 380% in addition to already being sensitive to increasing temperatures. **Exhibit 023.** Climate change is expected to increase the mean temperatures in the Blue Mountains region, which combined with altering weather patterns and a reduced snowpack will alter the hydrology in the region. Snowpack is the main source of groundwater recharge in the region, so while the exact effects are uncertain, a change in vegetation composition in the aquatic, wetland and riparian ecosystems is expected to occur. **Exhibit 023.**

In the Climate Change Impacts Assessment for the Blue Mountain National Forests, the Forest Service states that "[c]limate change is a stressor that is *currently affecting* (**Exhibit 023)** and is anticipated to have a large influence on future temperature and precipitation patterns…compound[ing] drivers of forest change like fire, flooding, and drought – with profound effects on nearly every resource area." (emphasis added). **Exhibit 023**. It considered resources and activities reliant on historic climate conditions to be at risk, including *inter alia* "ecosystem and forest composition, disturbance, health and distribution; wildfire planning; water availability and timing."

In spite of this 53-page resource and the one hundred and seventy-four articles of scientific literature it references, "climate change" is not mentioned once in this draft land management plan (DLMP). This is also despite referring to the Final Assessment, which substantively begins with "climate," as the[1] source of findings used to develop the DLMP. This blatant and intentional ignorance serves to undercut the importance of protecting these forests and their ecosystems for the role they play in combating climate change.

The Draft Plan must acknowledge climate change

The Forest Service DLMP is inconsistent with the obligations put on plan amendments by 36 CFR 219.13(a). The Forest Service must amend plans to keep them "current" and help them "adapt to new information or changing conditions." The planning framework itself is in three stages so that the process may inform integrated resource management and so "the Forest Service [can] adapt to changing conditions, including *climate change*, and improve management based on new information and monitoring." 36 CFR 219.5(a) (emphasis added) The Forest Service refusing to address the information assessed regarding climate change in the DLMP violates the principles and plain language of this binding regulatory framework.[2]

The Forest Service must address climate change in each section of the Forest-wide Plan Components, the Management Area Plan Components, and pursuant to its obligation under 36 C.F.R. 219.12(5)(vi), pose monitoring questions regarding "measurable changes on the plan area related to climate change" in the Monitoring Program section. Climate change will have an impact on every aspect of the forests, including increasing non-native pests and disease-conducive conditions in the forest, decreasing the preservability of cultural resources, and influencing the results in the Wilderness Study Area. Its impact must be acknowledged and addressed for the plan to successfully address the changing climate and its impact on the Blue Mountains forests.

Generally speaking, the introduction, desired conditions, standards, and guidelines should describe how the current conditions are expected to change and how the Forest Service can plan for resiliency, mitigation and adaptation across various sectors of the forest. Language in the current draft which refers to climate change indirectly, such as "regional projections for future conditions," or "changing temperatures" which are "projected to occur," and other similar examples must be changed to properly acknowledge climate change. By not directly addressing climate change the Forest Service is effectively saying it is not happening in these forests. This will limit the long-term viability of these plans by hampering the ability of future forest managers to properly respond to occurrences resulting from climate change. Beyond generalities, certain sections require more in-depth analysis.

Wildland Fire & Mitigation Methods

The Forest Service should address how climate change can increase fire likelihood and severity in the Wildland Fire ("WF") section. The Service should define "natural fire regime" and remove the definition provided for "natural historical fire regime," on the same basis for

---

[1]The Preliminary Need to Change was also used as a source of information. Notably, the draft version includes "Address a Changing Climate," whereas the final version has removed all mentions of "climate" from the document.

[2] See *infra*: indirect references are insufficient.

altering "natural historical range of variation."[3] The fire regime will be changing with the climate to one distinct from historical standards, and the term should be defined with that consideration in mind. Any plan component referring to "historical fire regimes" should be modified as a result of this.

Mitigation methods such as "hazardous fuel mitigation treatments," "fuel reduction treatment," and "fuel treatments" need definitions to distinguish between them or be consolidated properly. Analysis must be conducted into the overlap of effects from climate change and such mitigation methods, such as grazing[4] and logging to reduce fuel availability. Additionally, the Forest Service should consider as an alternative leaving all large and old trees in Community Protection Areas standing, as they are the most resilient to wildfires.[5] Should the Service find that such tree resiliency does provide a positive impact to reducing wildfire spread in those areas then it must provide constraints to logging them.

Additionally, science is not supportive of the Forest Service's strategy regarding how best to protect Community Protection Areas. "A shift in policy and management… to adapting to changing fire regimes and [away] from unsustainable defense of the wildland-urban interface to[wards] developing fire-adapted communities is needed…the most effective changes in terms of protection of people and property will be near homes and on private property." **Exhibit 017.**

As a result, WF-GDL-02 presents serious problems regarding the arbitrary prioritization of "fuel reduction treatments"[6] over "other standards and guidelines." It is not clear whether this is meant to be isolated to the wildland fire section or apply to the entire plan. Contextually the wording does not fit if it only preempts the one other standard and guideline in the section. This would then make the two lines of text potentially preemptive over all other constraints in the draft plan. Such preemption could render ineffective other constraints tailored towards meeting the desired conditions for their plan components. This guideline must either be dropped or modified towards fire resilience.

Connectivity[7]

According to a review of 22 years of scientific recommendations, connectivity is the most commonly recommended strategy for preserving biodiversity in the face of climate change. **Exhibit 024.** With the Blue Mountains operating as a transverse bridge between the Cascade Mountains and the Rocky Mountains, more consideration and management directives must be given to provide improved connectivity in these forests.

As the climate continues to alter, ecological zones may shift to different elevations and resident species plus those that exist in said ecological zones elsewhere will follow, if they may

---

[3] See Definitions *infra*.

[4] The forest service should also conduct analysis of such overlapping effects of climate change and grazing for non-fuel mitigation purposes.

[5] See Forested Vegetation *infra.* This fact is not reflected in FW-FOR-OLD-GDL 01, 03 & 05.

[6] See also Definitions *infra*.

[7] See also Definitions *infra*.

reach it. This has occurred during previous instances of rapid climate change allowing species unable to rapidly adapt to persist.[8] The Forest Service has acknowledged this and set forward strategies to promote creating refugia of this type. **Exhibit 025**[9]**.** Refugia creation must be considered as an element of this DLMP to help the forest adapt to a changing climate. Yet refugium alone would be insufficient if the species are unable to reach them. The Forest Service must manage the forests to improve connectivity; only by improving connectivity between the Blue Mountains National Forests and the surrounding environment could at-risk species take advantage of potential refugium there.

As a result, FW-CON-DC-03 must be rewritten to express connectivity between the National Forests. Further, this effort should be expanded pursuant to 36 CFR 219.9(b)(2) to encourage increased collaboration between the Forest Service and other land managers. Species currently experiencing conservation concern will likely experience increased viability challenges as the climate changes. Including this helps future proof the plan, while also improving the effectiveness of forest connectivity. FW-CON-GDL-02 must be rewritten or replaced as a standard; it is unclear which species isn't dependent on "structurally complex forest." A standard must be added to preserve connectivity corridors, areas where unharvested and un-roaded forests connect within and between the different National Forests. Among other things these corridors allow for species to colonize areas following disturbances, which will help species adapt during a changing climate and redistribute in the future should temperatures stabilize.[10]

Water Quality and Aquatic Ecosystems

Aquatic ecosystems will be one of the heaviest impacted by climate change in the region. Increased temperatures, decreasing snowpack resulting in less spring melt, and an overall increased likelihood for drier years combine to lower water levels while raising water temperatures variability. **Exhibit 023.** The Forest Service must address these eventualities in the DLMP. Desired conditions, such as FW-WTR-DC-09, must acknowledge climate change and go into more detail about desired conditions to mitigate uncontrollable effects of climate change.

An objective should be added to monitor stream temperatures in watersheds based on data in the Watershed Condition Framework, in addition to those produced by other collaborators and partners. As climate change will generally alter the hydrology in the region[11] monitoring should be conducted to analyze the effects it will have on local fish populations. Standards should be added to offer protection to watersheds and their surrounding vegetation which are susceptible to dangerous increases in water temperatures, as derived from such monitoring reports. This includes preventing logging of trees which provide crucial shading. **Exhibit 026.**

---

[8]See *supra*, pgs 13–14.
[9]*See also* Blue Mountain National Forest Climate Change Impacts Assessment.
[10]See *supra*, pgs 13–14.
[11]See *supra*, pgs 13–14.

Guidelines should reinforce this need to preserve shading trees in all areas. They help provide cooler refuge from warming streams, which when considering the projected increase in water temperatures[12] will become crucial for cool-water dependent fish. The synergistic effects of climate change, high temperatures, and increased fine sediments from logging, road use, and fires (**Exhibit 023)** warrants protecting shade, ecosystem integrity, and terrestrial and aquatic connectivity.

Finally, FW-WTRUSE-DC-01 should be modified to address the expected decreased flows that are likely to occur due to climate change.

Forested Vegetation & Forest Products

As already mentioned in the comments on the loss of large tree protections, this Draft Plan section needs standards throughout it to address the expected impacts of climate change and ability of forested landscapes—and especially old growth forests and large and old trees—to mitigate those impacts. The impacts of climate change on forests, in addition to how logging will affect emissions of carbon dioxide, must be discussed throughout the various forest sections.[13] The Forest Density section ("FW-FOR-DEN") should analyze how to prevent overcrowded underbrush while allowing canopies to continue providing shade to the ground floor. FW-FOR-CMP should include a discussion of how much carbon each tree species accumulates each year, and Table 2 should have amounts for such calculations at the "large tree" phase.[14]

FW-FOR-OLD must include a discussion of how these trees are crucial to combatting climate change. The Forest Service must acknowledge the proven science behind old and large trees' accelerated accumulation of carbon dioxide from the atmosphere, and their ability to keep soils well hydrated during droughts. Removal of such old and large trees is incongruent with the Eastside Screens, which have proven effective at combatting climate change through retention of these natural carbon sinks. Mildrexler provides great analysis regarding the potential impact of removing the 21-inch Rule. His team conducted a case study around the Snow Basin Vegetation Management Project in Wallowa-Whitman National Forest to see how much carbon would be emitted due to logging large trees. With a level of 95% confidence, they concluded that the Forest Services' 12,000 acre alternative project would emit 131,000 metric tons of carbon stored in large trees. This isn't taking into account trees >21 inches, and while retaining a little more than half of large trees; it would "create a carbon deficit" persisting "for many decades to the end of the century." **Exhibit 017.** With this in mind, any desired conditions and guidelines which allow for large trees and old trees removal must be reworked. Conservation of these large trees should be top priority in their environments, including over infrastructure.

These large trees are also best suited to handle more extreme wildfires. Not only are trees of larger diameter more resistant to deep burns and able to have their canopies remain

[12]See *supra*, pgs 13–14.
[13]See *supra*, pgs 13–14.
[14]See *supra*, pgs 13–14..

unaffected, but they also help keep the soil both cool and hydrated due to their shade and from hydraulic conductivity respectively.[15] For these reasons, FW-FOR-OLD faces a substantial need for reworking. The forest product section must acknowledge how the harvest of timber will increase carbon emissions. It is proven that trees, particularly large ones, are highly effective natural carbon sinks. It has also been proven that felling them leads to the carbon they stored returning to the atmosphere, as a majority of the carbon does not remain in the wood following harvest. **Exhibit 017.** The Service must analyze the effects of its draft plan, which proposes to increase logging of trees across 5 million acres, essentially converting effective carbon storage into another source of carbon emissions.

FW-FORPROD-STD-01 should be reworked to disallow any harvesting of timber on lands designated not suitable for harvest, as it will always be in the ecological interest to allow trees to remain, particularly as ecosystem dynamics shift with climate change. STD–03 should be reworked as such timber trees are likely to be a part of the protections afforded to bodies of water.[16] Additionally, logging of large trees in riparian corridors is likely to decrease connectivity in mixed-conifer areas that serve as important corridors for dense forests. A standard should be added to guarantee no large trees are ever harvested, even if they are snags. Constraints on salvage logging must be added. The scientific consensus has long been that salvage logging is unnecessary for recovery of the natural environment and instead has a compounding negative effect for the disrupted post-fire ecosystem. **Exhibit 027.** Its damage to soil through compacting, topsoil erosion, and removing organic matter through the "salvaged" trees leads to increased runoff of sediments, harming nearby watersheds. **Exhibit 026.** Conducting salvage operations post-fire will also lead to increased emissions when live trees are taken

Finally, the forest service should consider turning more of the lands into designated reserve systems. Preserving half of high priority forests by 2050, around 321,000 acres in the Blue Mountain National Forest specifically, would triple carbon accumulation compared to current levels. **Exhibit 029.** Additionally, afforestation on unutilized fields would allow for carbon absorption and water retention in such areas which currently operate at a net neutral. **Exhibit 022.** This is an appropriate use of public lands because of the services they provide including water retention, clean water production, improving biodiversity, carbon accumulation and storage, and regional cooling by evapotranspiration, which all serve the public interest and promote sustainable economies. **Exhibit 017.**

Monitoring

Under the 2012 Planning Rules, the Forest Service must develop a monitoring program for the plan area. The Forest Services provided monitoring program in the DLMP is inadequate under those regulations. Pursuant to 39 C.F.R. 219.12(a)(5)(vi) the Service must pose monitoring questions for "measurable changes on the plan area related to climate change…" These questions are absent in the DLMP's Table 30 which lays out the monitoring questions.

---

[16] See Water Quality and Aquatic Ecosystems *supra*.

Climate change is also absent in the discussion of "Drivers and Stressors" on the page prior, even though it is listed as one in 36 C.F.R. 219.6(b)(3). While the list provided in the discussion isn't exhaustive, comparing how predominant climate change was in the assessment phase which identified the stressors to how this draft does not mention it anywhere, it raises concerns that the Forest Service will not uphold its obligations under their own regulations. The Forest Service must analyze climate change as a stressor, and must include monitoring questions for it pursuant to its regulatory obligations.

Cumulative Effects

The biggest loss that comes from climate change not being mentioned is the lack of analysis into the cumulative effects that come from the changing climate in addition to management activities in the forests. For instance, regulating sediment deposits to streams, such as is described in FW-WTR-DC-04, is irrelevant when you don't acknowledge that a changing climate may lead to that stream having a lower flow which then increases any sediment deposits impact. The effects of logging, grazing, mining, road building, and other operations which alter the ecosystem of the forest will all overlap with the effects of climate change. This is why, in addition to fulfilling their regulatory obligation, it is important for the Forest Service to acknowledge climate change by name and plan for it accordingly. If the Forest Service does not address and analyze the cumulative impacts that climate change has on all their operations in the forest, then they manage the forest with a plan already outdated.

Aside from the impacts of Forest Service operations, it will also overlap with non-management stressors the ecosystems face in the anthropocene. Habitat loss, fragmentation, increased likelihood of extreme wildfires, invasion of non-native species, and diseases all have a likelihood of interacting with the effects of climate change. The Forest Service must acknowledge this and take it into consideration when evaluating cumulative impacts. *See Conservation Council of N. Carolina v. Costanzo*, 398 F. Supp. 653, 672 (E.D.N.C.), *aff'd*, 528 F.2d 250 (4th Cir. 1975) ("the cumulative effects of any federal action must be considered in determining the significance of the impact of the federal action on the human environment"); *Hanly v. Kleindienst (Hanly II)*, 471 F.2d 823, 830–31 (2d Cir. 1972) (holding that controversy "as to the size, nature or effect of the major federal action" is relevant to a significance determination; holding that the "cumulative harm that results" from the action's contribution to existing conditions is one of "at least two" relevant significance factors, and notable remarking that "one more factory polluting air and water . . . may represent the straw that breaks the back of the environmental camel"); *Minnesota Pub. Int. Rsch. Grp. v. Butz*, 498 F.2d 1314, 1322 (8th Cir. 1974) (including the fact that the forested area subject to potential logging was "recognized as unique" in its "natural beauty" as a relevant part of the significance threshold analysis; holding that "cumulatively considerable" effects of federal projects must be considered, and that logging project was significant where: "Logging destroys virgin forest, not only for recreational use, but for scientific and educational purposes as well. All these are significant impacts on the human environment.).

Definitions – Ecological Integrity, Fuel Management Activities, and Connectivity

The Forest Service bases many objectives on attaining ecological integrity pursuant to 36 C.F.R. 219.8. However, the couched term "natural range of variation" has no official definition and the Forest Service's definition is inappropriate for attaining ecological integrity. It is based on pre-European influence characteristics and "past ecological knowledge developed for use by resource managers."

The climate that currently exists is greatly different from that of pre-European influence, and will only depart farther as the Forest Service has acknowledged. **Exhibit 023.** Managing the land to be within that standard will not allow it to "withstand…most perturbations imposed by natural environmental dynamics" of the anthropocene. The Forest Service should rewrite the definition for natural range of variation to incorporate the current climate and anticipated climatic changes.

FW-WF-OBJ-01 describes hazardous fuel mitigation treatments as "prescribed fire, natural fire, mechanical fuel, [and] silvicultur[e]." Later, in FW-WF-MAPR-02 priority is given to implementing fuel *treatments* such as vegetation management and targeted grazing. Finally, In FW-WF-GDL-02, "*fuel reduction treatments* should be prioritized over other standards and guidelines" (emphasis added). Although the first two provide examples, none of the three terms are defined. The Forest Service should provide definitions to properly delineate these important actions. Finally, the term "mechanical treatment" must also be defined given how frequently it is considered as an option for use in attaining and maintaining desired conditions in forests.

Finally, the Forest Service must rework its definition of "connectivity." In addition to the link at the end of the plans definition not functioning, it departs too far from the definition given to the term by the 2012 Planning Rules. Found at 36 CFR 219.19 (Connectivity) it must be included in full, particularly the final section: "...and the long distance range shifts of species, such as in response to climate change." This definition is all that is said of connectivity in the introduction to its section, minus the reference to climate change. As described in the connectivity section *supra*, connectivity is potentially key to the survival of slow adapting species. Further, it is more than just an arrangement of habitats; connectivity interplays with the ability for species to share genetic information and therefore acquire new traits amplifying diversification. The Forest Service must replace its definition for "connectivity" with the one found in 219.19, and replace the connectivity introduction with an actual description of connectivity's importance in the Blue Mountain National Forests.

The Forest Service has stated that "[w]arming will continue in the Blue Mountains, and at a faster rate than previous warming periods in the geological record."[17] They have described how the current forest plan lacks the proper protocols needed to address climate change, and that monitoring and research specific to the Blue Mountains on "climate…snowpack…and other resources" are essential to making sure forest managers can adapt while balancing

[17] Blue Mountain National Forest Final Assessment Report.

economic and social needs.[18] Yet, this DLMP instead stays in the past and would leave its resource managers stuck in the mud for decades to come.

While making slight attempts to acknowledge the need for resiliency and adaptation in the face of a changing climate, it also encourages "fuel reduction treatments…over other standards and guidelines." FW-WF-GDL-02. In addition to this outdated and carbon emitting method of fire control, the plan does not consider alternatives such as fire resilient infrastructure, which is more likely to save lives over time than cutting back forests.[19] The plan seemingly overrules the Eastside Screens and the 21 inch rule which has protected large trees for the past thirty years; these trees are incredibly efficient carbon sinks and would likely be unable to be utilized by local timber industries. Estimates suggest that should they be cut it would take over a century to reacquire their carbon accumulation benefits.[20]

The DLMP fails to properly promote connectivity between the National Forests themselves and surrounding lands, instead using that space to discuss removing ten miles of fence over the span of a decade. FW-CON-OBJ. When connectivity is needed to combat fragmentation that occurs as a result of forest management, and which may occur due to climate change, a lack of discussion on how to develop proper routes for species who may need a refuge is disheartening. Truly there are numerous areas that can be called out, because as said *supra*, climate change has an impact on every plan component. For these reasons the Forest Service must acknowledge and address it directly in its next draft land management plan.

Wildlife

Wildlife Habitat Requirements in Forest Planning

In developing or revising forest plans, the Forest Service must ensure that wildlife habitat is addressed in compliance with statutory requirements and the 2012 Planning Rule. The Rule requires that plans be based on the best available scientific information (36 CFR §219.3) and that they include plan components designed to maintain or restore ecological integrity and sustain diverse plant and animal communities. Specifically, 36 CFR §219.8(a) directs that plans provide for ecosystem integrity by maintaining or restoring the structure, function, composition, and connectivity of ecosystems, including watersheds, riparian areas, wetlands, and old-growth forests. These ecological components form the foundation of habitat for native species and must be considered in the plan's desired conditions, objectives, standards, and guidelines.

Under 36 CFR §219.9, forest plans must provide for the diversity of plant and animal communities and the long-term persistence of native species within the planning area. To achieve this, the Forest Service is required to identify species of conservation concern (SCC)—species that are not federally listed as threatened or endangered but for which the regional forester determines there is substantial concern about their long-term viability within the unit. The plan must include habitat-related components sufficient to maintain viable populations of these species within the planning unit. This requirement builds on the National Forest

[18] *Id.*
[19] Exhibit 17
[20] *Id.*

Management Act's diversity mandate (16 U.S.C. §1604(g)(3)(B)), which directs the agency to provide for diversity of plant and animal communities to meet overall multiple-use objectives.

For federally listed threatened and endangered species, candidate species, and designated critical habitat, the Forest Service must comply with the Endangered Species Act (16 U.S.C. §§1531–1544). This includes ensuring that plan components do not result in jeopardy to listed species or destruction or adverse modification of critical habitat. Section 7 consultation with the U.S. Fish and Wildlife Service or NOAA Fisheries may be required at the plan level to evaluate the potential effects of plan components on listed species and critical habitat.

Habitat considerations must extend beyond individual species to address landscape-scale ecological processes and connectivity. Pursuant to 36 CFR §219.8(a)(1)(iv), the Forest Service is required to consider ecological connectivity within the plan area and across administrative boundaries to ensure that species can move, disperse, and maintain viable populations. This requires coordination with state wildlife agencies, Tribes, and other federal and local governments as required under 36 CFR §219.4. Plans must also account for stressors such as climate change, invasive species, and altered disturbance regimes, which may affect habitat availability and suitability in the future.

Habitat requirements are reinforced through monitoring provisions. Under 36 CFR §219.12, each plan must include a monitoring program that evaluates whether management actions are maintaining or restoring ecological integrity and whether habitat needs of species, particularly SCC and federally listed species, are being met. Monitoring results must be used to inform adaptive management and, where necessary, plan amendments or revisions.

<u>Vague Draft Plan language undermines the Draft Plan's efficiency in managing for wildlife viability</u>

A pervasive flaw in the Draft Plan is its reliance on vague, undefined, and imprecise language, such that many plan components are inconsistent with 36 C.F.R. 219.7(e) (Planning Rule) and the Forest Service Handbook ("FSH") 1909.12, ch. 20 (July 30, 2025). **Exhibit 33.** A shared requirement across all plan components is that the Forest Service must write with clarity, conciseness, and state a clear purpose and geographic applicability. (FSH 1909.12, ch. 20 § 22.1). Plan components *must* indicate whether they apply to the entire plan area, to specific management areas or geographic areas, or to other areas as identified in the plan. (36 C.F.R. 219.7(e)). Plain, operational language is necessary for two reasons: first, it enables consistent project-level "consistency" determinations against plan components; second, it gives managers actionable direction when designing and screening projects, prioritizing work, and adapting management. Where the Plan uses broad phrases (e.g., "adequate quality," "resilient," "where appropriate") rather than clear subjects, indicators, scales, and thresholds, it frustrates both compliance review and day-to-day decisionmaking, undermining the Plan's ability to guide management toward the desired conditions.

For example, referring to "wildlife" or "habitat" in the abstract obscures exactly what the Plan intends to conserve and how managers should judge success. These terms include and apply to species with conflicting needs—what benefits one group, but harms another. For example, retaining abundant large snags and down wood improves nesting and foraging for cavity nesters and small mammals; conversely, high coarse-woody-debris levels can disadvantage species that require open ground or unobstructed movement. Similarly, aggressive invasive-plant control that reduces broadleaf forbs may limit nectar and pollen resources needed by pollinators even as it benefits certain grasses. Without naming the species or guilds at issue, specifying the habitat attributes that matter to them, and identifying the scales at which those attributes should persist, plan components become too vague to apply consistently in project design and too imprecise to evaluate in monitoring. The result is a document that signals broad intent but provides little meaningful direction to managers. Additionally, because the plan broadly refers to "wildlife" and "habitat" in such a general manner, it does not give the species-specific clarity needed to avoid tradeoffs that inadvertently degrade the very values it seeks to protect.

Accordingly, because the Draft Plan relies on vague, undefined, and imprecise language, many plan components fail to meet the clarity and specificity required to guide management or support defensible consistency determinations and monitoring. In the absence of plainly defined subjects, indicators, scales, thresholds, and geographic applicability, the Plan cannot credibly measure progress toward desired conditions or ensure consistent implementation, rendering it inconsistent with the Planning Rule's component requirements and the Handbook's drafting criteria (36 C.F.R. § 219.7(e); FSH 1909.12, ch. 20, § 22.1).

Desired Conditions lack clarity

Desired conditions are keystone plan components and are essential for determining the consistency of management actions with the Plan, providing the end-state toward which all other plan components (objectives, standards, guidelines) are directed. (FSH 1909.12, ch. 20, § 22.11) Without well-defined and clearly articulated desired conditions, project screening becomes subjective, monitoring cannot credibly assess movement toward outcomes, and management risks become aimless, counterproductive, and inefficient. For this reason, desired conditions must describe a specific social, economic, and/or ecological characteristic in terms that are specific enough to allow progress toward their achievement to be determined. (36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11). The FSH outlines several essential and functional attributes of ideal desired conditions. (FSH 1909.12, ch. 20, § 22.11). Notably, desired conditions must describe what is desired for ecosystem integrity, be written with enough detail so the condition of on-the-ground achievement is clear and progress toward their achievement can be measured or evaluated, and should be expressed in a way that helps managers determine if actions are consistent with desired conditions. *Id.*

Across the wildlife provisions, the desired conditions relating to wildlife lack many of the essential and functional characteristics outlined in the FSH. Many desired conditions rely on qualitative phrases—such as "adequate quality," "resilient," "mosaic," or "designed to enable connectivity"—without defining the species or guilds concerned, the habitat attributes that matter (e.g., cover, structure, permeability, hydroperiod), the spatial scale for evaluation, or quantitative thresholds that would indicate whether a given area is moving towards the desired condition. Absent clear, measurable benchmarks (for example, occupancy or productivity targets, patch-size distributions, functional road/barrier densities, snag/down-wood minima by

PVG, or pollinator resource indices by season), these statements provide little meaningful direction for project design, prioritization, or monitoring. As a result, the Plan does not provide the actionable end-states necessary to guide management toward outcomes that maintain or restore ecological integrity for wildlife, and many of the desired conditions are inconsistent with the Planning Rule and FSH.

The Draft Plan often fails to clearly articulate what the subject of the desired condition is or how the condition is assessed. Terms like "wildlife," "habitat," "ecological integrity," and "connectivity" are invoked without identifying the particular species, guilds, habitat conditions at issue (e.g., canopy structure, snag and down-wood levels, hydroperiod, thermal refugia, forage/cover balance, passage/barrier status), or the spatial units at which those elements should exist (e.g., corridors, watersheds, seasonal ranges). Where the subject is stated clearly, the Plan still does not establish how its condition should be assessed or what precisely the desired condition is for that subject. Desired conditions rarely include quantifiable endpoints, objectives tally activities rather than outcomes, and standards/guidelines seldom supply the thresholds, triggers, or sideboards needed for consistent implementation and monitoring. Measurable criteria—such as occupancy or productivity targets, patch-size distributions, minimum canopy/snags/down wood, flora densities and riparian shade targets, open-road and barrier-density limits, corridor width and permeability metrics, or crossing performance standards—are not specified, nor are monitoring indicators that would demonstrate progress. Emblematic of these issues is FW-CON-DC-01 (pg.35):

> Ecological integrity provides the key characteristics, conditions, and functionality of native ecological systems, and provides for the habitat needs of diverse plant and animal species in the plan area. These ecosystems are resilient and provide social and economic benefits derived from observing, fishing, hunting, foraging, and other recreational pursuits of fish, wildlife, fungi, and plant species.

Here, it is unclear precisely what is being assessed and how it can or should be assessed. Ecological integrity is defined as "The quality or condition of an ecosystem" and thus describes a specific condition an ecosystem can be in. However, CON-DC-01 fails to identify the particular ecosystem. Moreover, the "key characteristics, conditions, and functionality" are left undefined and given no objective criteria for assessment, thus leaving the desired condition of an unidentified ecosystem a mystery. Without these fundamental characteristics defined or, at a minimum, articulated in a measurable way, managers cannot determine what direction management should be directed.

The Plan states that "Each desired condition includes a scale, or a range of appropriate scales, to identify the relevant portion of the plan area applicable to the resource desired condition," however, the descriptions are often so broad that they provide little insight into the actual or intended applicability. The "scale" and "geographic applicability" overlap in their function, leading to confusion as to how they interact. For example, the "geographic applicability" for CON is Forest-Wide, but the Scale for the SPRSK-DCs apply "Forest wide to specific ecological niche depending on the species habitat characteristics involved." (Pg.59). Moreover, the Scale should be individualized to each desired condition to maintain consistency in plan implementation and consistency determinations. A consistency determination made at one scale may be considerably different from a determination made at another scale and may even conflict with previous determinations. For example, at the Forest-wide scale, monitoring may show that total acres of late-spring snow-persistent habitat and mapped alpine refugia across the plan area are stable or slightly increasing. Thus, a proposal to add limited over-snow vehicle (OSV) grooming miles does not measurably change those forest-wide acreage indicators.

A consistency review conducted at the Forest-Wide scale, therefore, finds the action consistent with FW-SPRSK-DC-05 (alpine habitat provides wolverine denning and refugia). However, at the ecological-niche scale (species-specific microrefugia), the same project may be inconsistent. For example, within two denning basins known to hold wolverine microrefugia (late-season snow, cold microclimates), the added grooming compacts snow and increases disturbance along the only low-risk travel routes between denning patches. Niche-relevant indicators (e.g., proportion of denning habitat free from repeated compaction within 1 km, permeability between core patches) fall below target levels, undermining den security. A consistency review at the ecological-niche scale may find the same action inconsistent with FW-SPRSK-DC-05. Without specific scale-DC designations, a project can appear consistent with a desired condition yet be inconsistent when evaluated at another.

Accordingly, imprecise or ill-defined desired conditions reverberate through the entire planning framework: they obscure what end state management is aiming for, sever the necessary linkage to outcome-based objectives, render standards and guidelines difficult to apply, and deprive the monitoring program of clear questions, indicators, scales, and thresholds. Because desired conditions anchor consistency determinations and drive objectives, standards, guidelines, and monitoring (36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11), weak desired conditions produce cascading failures—subjective project screening, non-comparable monitoring results, and ad hoc adaptive management—leaving wildlife conservation and ecological integrity vulnerable to drift rather than directed, measurable progress.

Wildlife-related objectives are not tied to Desired Conditions or outcomes

Objectives are supposed to express a concise, measurable, time-specific rate of progress toward desired conditions. (36 C.F.R. § 219.7(e)(1)(ii); FSH 1909.12, ch. 20, § 22.12). The FSH explicitly states that Objectives must be designed to make progress toward attaining desired conditions, help set the basis for priority areas or activities, be clearly stated in measurable terms with specific timeframes (by either an end date ("by 2020") or by a period of time from an identified start point (within 5 years of plan approval."), and should be expressed in terms of outcomes, not actions.

In the Draft Plan, many wildlife-related objectives tally actions (e.g., number of "projects per decade," acres treated, fences removed) rather than outcomes linked to the wildlife desired conditions (e.g., increases in occupied habitat meeting defined criteria, reduced barrier or open-road density in mapped linkages, improved occupancy/productivity for focal species). They are also not explicitly tied to particular Desired Conditions, lack baseline references and indicators, and often provide no time-bound performance targets. Without an objective-to-DC linkage and outcome metrics, these statements do not demonstrate progress toward the desired conditions and cannot credibly guide prioritization, budgeting, or adaptive management for wildlife. Additionally, many plan sections include objectives that only relate to one aspect of a larger topic. For example, the objectives under CON only relate to fence removal and replacement, despite being one of many factors that influence connectivity.

Objectives that tally activities instead of articulating measurable, time-specific outcomes sever the essential linkage to desired conditions and weaken the entire planning framework. Because objectives must express a concise, measurable, time-specific rate of progress toward desired conditions, action-count objectives without baselines, indicators, or explicit ties to specific desired conditions cannot demonstrate progress, prioritize investments, or support adaptive management. (36 C.F.R. § 219.7(e)(1)(ii); FSH 1909.12, ch. 20, § 22.12). In practice, this erodes accountability, obscures whether the Plan is effective, and prevents a clear demonstration that management is improving wildlife conditions over time.

Wildlife standards and guidelines are inadequate, one-dimensional, or missing

In some sections, the only standard(s) cover narrow topics while core constraints are relegated to under-specified guidelines or omitted entirely. Absent measurable standards and well-formed guidelines tied to clear purposes and application conditions, departures cannot be evaluated for consistency with the overall purpose of the Guideline, and the Plan cannot reliably protect wildlife or advance its desired conditions. By rule, guidelines must state a clear purpose and the circumstances and manner in which they apply (36 C.F.R. § 219.7(e)(1)(iv); FSH 1909.12, ch. 20, § 22.14). While many guidelines state a purpose, that purpose is broad and susceptible to many interpretations, some of which may even conflict. For example, many guidelines generically apply to "habitat" or "wildlife" without specific consideration of individual species, or guidance on how they are to apply to different habitat types.

Project consistency then turns on whether any departure still meets the guideline's purpose with equal effectiveness (36 C.F.R. § 219.15(d)(3)(ii)). Here, generic phrases (e.g., "retain connected areas," "where ecologically appropriate," "wildlife-friendly") lack meaningfully specific purposes, triggers, scales, and sideboards (distances, seasons, thresholds). As a result, departures cannot be judged for "equal effectiveness," implementers receive no operational direction, and monitoring lacks indicators to verify compliance—rendering the guideline framework too flexible to provide meaningful protection or progress toward desired conditions. *Id*.

Inconsistency in Draft Plan components and a lack of an adequate monitoring program undermine the entire Plan

Because the monitoring program lacks clear questions, appropriate indicators, and focal species tied to the wildlife plan components, it cannot credibly evaluate progress toward desired conditions or the effectiveness of constraints, as contemplated by 36 C.F.R. § 219.12. Additionally, because the Plan's core components lack specificity, internal alignment, and measurable indicators—and the monitoring program lacks clear questions, indicators, and evaluation scales to test their effectiveness—the Plan cannot reliably demonstrate progress toward desired conditions or guide adaptive management, thereby undermining both its legal sufficiency and practical utility.

The Draft Plan does not present explicit monitoring questions keyed to the Species at Risk or Species Diversity plan components. Under the Planning Rule, monitoring questions and associated indicators must be designed to evaluate whether plan direction is maintaining or restoring ecological conditions and making progress toward desired conditions and objectives. (36 C.F.R. § 219.12(a)–(b)). Absent component-specific questions, biennial evaluations cannot determine effectiveness, and the plan ultimately cannot provide for species viability. Additionally, only four desired conditions are included in the Ecological Integrity monitoring program, and focus only on the effectiveness of vegetation management actions on forested vegetation. Though forested vegetation provides habitat for wildlife, the plan provides no explanation on how the monitoring program will link forested or non-forested vegetation to wildlife habitat. Effective wildlife monitoring needs objective, outcome-based questions and indicators such as: Occupancy/productivity or trend metrics for focal taxa; Structural/functional habitat indicators by PVG (e.g., snag and down-wood floors, canopy/connectivity thresholds, patch-size distributions). Without such indicators, the program cannot answer whether conditions are moving toward desired states, as required by 36 C.F.R. § 219.12(a)(1), (a)(5).

The Rule requires monitoring "the status of select focal species to assess the ecological conditions required under § 219.9" (36 C.F.R. § 219.12(a)(5)(iii)–(iv)). The Plan does not identify focal species, nor does it establish how species will be selected to represent key ecosystem conditions or stressors. The absence of focal species severs a primary line of evidence for whether ecological conditions necessary for species persistence are being provided. Additionally, the Plan states that "Evaluations of plan components for species diversity and species at risk occur through monitoring their habitat," but the monitoring program includes no questions or indicators explicitly linked to Species Diversity or Species at Risk. In fact, the monitoring program for Ecological Integrity does not include Species Diversity and only monitors for ecosystem integrity for aquatic species at risk. Worse yet, the only resource category and monitoring question that explicitly mentions habitat only applies to Non-Forested Vegetation (VEGNF). The monitoring question for VEGNF tracks what management actions have occurred to achieve objectives, and the indicator tracks project characteristics, not outcomes. In total, the monitoring program does not contemplate a single desired condition for CON, SPDIV, or SPRSK.

Without SPRSK/SPDIV-specific questions, outcome-oriented indicators of habitat condition and species response, designated focal species, and stated evaluation scales, the monitoring program cannot perform its core function under 36 C.F.R. § 219.12: testing whether plan components are effective and whether conditions are trending toward the Plan's desired wildlife outcomes.

Connectivity is not adequately provided for

The Draft Plan does not meaningfully provide desired conditions, objectives, standards, or guidelines that will ensure ecological connectivity. Although several provisions reference “connectivity” in general terms (e.g., FW-CON-DC-03, 04, 05), they do not specify where, to what degree, or by what metrics connectivity will be measured, achieved, or maintained. Desired conditions must be “specific enough to allow progress toward their achievement to be determined” (36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11). Here, terms such as “facilitate connectivity,” “mosaic,” and “designed to enable movement” lack measurable endpoints or monitoring indicators. Without measurable benchmarks, project consistency cannot be determined, and monitoring cannot demonstrate whether connectivity is improving, degrading, or whether the desired conditions have been achieved. Similarly, there is no monitoring program to assess connectivity, and connectivity objectives are not tied to desired conditions. Monitoring connectivity is crucial because it impacts all wildlife within an area and contributes to broad-scale ecological health. The only listed objective, FW-CON-OBJ-01, singularly emphasizes fence removal or modification independent of any connectivity outcomes. While fence removal is valuable, it is only one of several major determinants of landscape permeability. For example, roads, logging, and public use fragment habitat at much larger spatial scales and are accompanied by additional negative environmental effects.

Moreover, FW-CON-OBJ-01 counts actions (miles of fence treated) without linking them to outcomes. For example, increases in successful crossings at mapped pinch points, or measured improvements in functional permeability across priority linkages. Absent a stated connection to connectivity DCs and outcome metrics (e.g., a targeted percentage increase in permeable fencelines within designated corridors by year 10), the fencing objective does not provide a meaningful way to measure progress toward the desired conditions.

A core omission is the absence of meaningful standards and guidelines that address the most significant, unit-wide sources of fragmentation: roads and motorized access, and logging or vegetation management. Connectivity is strongly governed by open road density (ORD), total route density, traffic volume/speed, edge density, and the size and spacing of vegetation treatment projects. Yet the Plan contains no standards or guidelines that set maximum ORD in linkage areas, limit new route authorizations that would fragment key corridors, or require crossing designs (e.g., culverts, bridges, fencing-and-funneling) that meet species-relevant criteria. Additionally, the only limitation that addresses fragmentation from vegetation treatment, FW-CON-GDL-02, states only that “connected areas should be retained” without elaboration on how or to what degree connectivity should exist post-treatment. Similarly, FW-CON-GDL-01 states that new fences should have “wildlife” friendly specifications, but provides no description of what “wildlife” those specifications should be “friendly” to or what specific species should be considered or prioritized.

Species Diversity is not adequately provided for

The Species Diversity section states that “species with specific needs are addressed here,” but the desired conditions remain largely generic and imprecise. Only a handful of taxa are named—pollinators (DC-03), beaver (DC-05), elk (DC-06), and amphibians (DC-07)—and even for these, the Plan does not define the habitat attributes, indicators, scales, or thresholds that would allow managers to interpret consistency or evaluate attainment. Phrases such as "ecological integrity," "adequate quality, distribution, and abundance," "resilient and sustainable," and "habitat conditions" are used without specifying *what* is being measured (e.g., occupancy, productivity, canopy structure, snag and down-wood levels, hydroperiod, microclimate, forage/cover balance) or *where* and *at what scale* those attributes must occur (e.g., species analysis units, watersheds, seasonal ranges). As written, FW-SPDIV-DC-01 through -04 describe vague aspirations rather than the detailed on-the-ground end states that desired conditions must articulate to be operational. Likewise, the species-referencing DCs (beaver, elk, amphibians) lack quantifiable benchmarks—e.g., beaver colony/complex density or occupancy targets; elk distribution tied to habitat effectiveness metrics and open-road density; amphibian breeding and upland habitat criteria (hydroperiod, connectivity, sediment/temperature thresholds). The Draft Plan also contains no Species Diversity components specifically aimed at maintaining the viability of species with a specific need for large tree habitat, such as many primary cavity excavators, Pileated woodpecker, American goshawk, and Pacific marten. Without defined subjects and measurable attributes, consistency determinations are largely subjective, and progress toward the Plan's diversity outcomes cannot be credibly demonstrated through monitoring.

This problem is reinforced by the Species Diversity Objectives, which fail to provide a reliable monitoring mechanism. The Objectives track actions instead of outcomes. FW-SPDIV-OBJ-01 ("10 projects per decade" per forest) is not tied to any particular desired condition and does not express a concise, measurable, time-specific rate of progress toward a defined biological endpoint (e.g., percent of priority habitat brought to target condition; occupancy or productivity increases for focal species; reductions in stressors such as barrier or open-road density). As written, SPDIV-OBJ-01 only requires completion of projects that are *designed* to maintain or restore habitat for one or more species and sets no minimum size or objective design criteria. This goal emphasizes the design aspects of a project without considering its ultimate impact, the actual restoration or maintenance of a given habitat. Furthermore, the objectives should promote species diversity and recognize that projects have an impact on a diverse range of species. SPDIV-OBJ-01 only requires that projects are designed (independent of their ultimate impact) to maintain or restore habitat for "one or more" species, but does not stipulate to what extent, scale, or type of maintenance or restoration. For example, a project may be nominally *designed* to maintain elk habitat by extensively thinning an area to allow for greater access to forage, but may be done in an area rarely used by Elk. This project would count towards SPDIV-OBJ-01 despite the minimal impact on Elk populations and the lack of consideration of any other species. Because the objective is satisfied regardless of outcomes, there is the possibility that species diversity could be harmed by projects that count towards SPDIV-OBJ-01. Absent explicit linkage to the DCs and outcome metrics, activity tallies cannot demonstrate movement toward species diversity goals and, at worst, may work against those goals.

The two standards within SPDIV are narrow in scope relative to the breadth of species diversity (apiary prohibition; use of native/appropriate plant materials) and provide little constraint on the principal factors that influence wildlife outcomes. Several guidelines offer sound intentions (e.g., retain oldest/largest trees and habitat-feature trees; salting setbacks; seasonal timing around nesting/roosting), but they are phrased as general advice and lack well-defined triggers, thresholds, and implementation criteria needed to guide project design or to justify departures. Key terms are undefined ("healthy plant communities," "resilient habitat," "sufficient quality and distribution"), and without distances, seasons, structural floors, or quantitative criteria, implementers and reviewers cannot reliably determine consistency.

Finally, species-specific needs identified in assessments are not translated into measurable plan direction. Old-forest-associated species require continuity of large trees and complex structure; cavity nesters depend on snag density and size classes; amphibians and riparian specialists require intact hydroperiods, riparian shade, and low sediment inputs; pollinators need seasonal floral resources and host plants; wide-ranging mammals need secure interior patches and permeable links with low open-road density. The current text does not set the structural and functional thresholds for these needs, nor does it map the scales at which they must be achieved and maintained. Without these specifics, project-level tradeoffs can repeatedly fall against the very conditions diversity depends on, while still appearing "consistent" with high-level statements.

Species at risk are not adequately protected

In general, Species at Risk plan components appropriately identify listed species and species of conservation concern, and gesture toward key themes (aquatic prey base, habitat access, pollinators, alpine refugia, whitebark/limber pine, bighorn disease risk, cross-connected patches). However, many plan components are too general for the public to understand or for managers to implement or evaluate. Desired conditions lack meaningful detail; the single objective counts activities rather than outcomes; guidelines are directionally sound but under-specified; and the lone standard is vague and difficult to apply. Collectively, these shortcomings do not satisfy the Planning Rule's requirements that plan components be specific, measurable, and operational or that the plan provide the ecological conditions necessary for the persistence of native species.

FW-SPRSK-OBJ-01 tallies actions rather than outcomes and is not explicitly tied to any desired condition, and fails to meaningfully gauge progress towards any outcomes related to species at risk. Given the stakes for listed species, additional precise, mandatory standards are warranted where failure would predictably impair recovery or persistence. Much of the SPRSK management approach text provides the right practices (e.g., early data collection, pollinator protection, wolf conflict-reduction, bighorn BMPs, marten cover/connectivity) but would benefit from the enforceability of being classified as a Standard. Because these species, by the Plan's own definition, are at risk, they require durable, enforceable direction; the most consequential limitations and management approaches should be elevated and recast as standards. Species at risk are the most vulnerable species on National Forest lands and thus deserve, and require, the greatest protection. Standards are essential for providing durable, enforceable guidance.

Wolves and large carnivores

The Forest Service stop killing large carnivores and other native wildlife on public lands. The Blue Mountains Forest Plan Revisions should provide the strongest possible standards to protect them.

The Blue Mountains encompass unique and important connectivity corridors and wildlife habitats that support species such as wolves, moose, wolverine, and more. These animals require and deserve protection and places to roam and exist. Wolves, large carnivores, and other native species evolved with and are integral to the ecosystems in which they evolved. For example, recent research has shown that wolf reintroduction in Yellowstone has allowed aspen trees to recover, and supported increased biodiversity and habitat diversity.

Native wildlife, including large carnivores, should not be killed on public land in order to favor private interests in cattle or other domesticated livestock on National Forests in the Blue Mountains. Unfortunately, federal agencies continue to use taxpayer dollars to mount a systemic campaign to kill huge numbers of large carnivores and other native animals, including on public lands.

From 2020 to 2024, Oregon Department of Fish and Wildlife killed 41 wolves, and 6 were shot by ranchers. Another 34 have been illegally poached by poisoning or shooting. Wolf and livestock conflicts continue to exist on federal public lands– particularly in eastside forests where livestock grazing is ubiquitous on National Forests and cattle and sheep are left unattended in remote forests. You can read more about the recent increases in poisoning of wolves in this news article.

In 2024 alone, the federal agency named "Wildlife Services" killed 8,353 native animals in Oregon, including intentional killing of 197 beavers, 196 bears, 2,166 coyotes, 108 cougars, 20 bobcats, 111 foxes, 93 badgers. Hundreds of burrows and dens were also removed, killing an unknown number of young. Methods for killing include neck snares, leg and body traps, shooting, baiting and dogs, and other inhumane methods. The number of animals killed in 2024 are similar to those in other recent years.

Across the US in 20024, Wildlife Services reported killing 391,091 native animals– including the intentional killing of 2,020 foxes (red and grey foxes, kits, and an arctic fox), 368 bobcats, 57,884 coyotes, 317 wolves, 232 mountain lions, 345 black bears and 6 grizzly bears, 258 badgers, 23,691 beaver, and thousands of other animals. Hundreds of dens and burrows were additionally removed, with an unknown number of pups, kits, and other young killed.

You can see the report on Wildlife Service's webpage (under the "pdr G" dropdown), or in the spreadsheet we created from the report here. In 2023, similar numbers of animals were killed (you can see Project Coyote's summary here).

Widespread poaching poses a widespread threat to large carnivores and other animals. Research suggests that state-authorized killing of wolves may *decrease* social acceptance of wolves.

Outcomes such as horrific torture of wolves– such as the recent incident in Wyoming where a wolf was run down with a snowmobile, tortured, and shown off at a bar– may be more likely to occur when the lives of wild animals are devalued and "lethal control" is the norm–

particularly when National Forests and other places that should be providing habitat and refuge are instead viewed primarily as providing places for livestock to roam and forage.

Research has also shown that authorized killing of wolves and cougars can, in many cases, *increase* the number of depredations on cattle. You can see Dr. Wielgus talking about his research on wolves here and on cougars here. Additionally, you can see his talk and other experts discussing their wolf-focused work and research here.

Given the widespread killing and poaching of wildlife across the nation and in our region, it is all the more important that National Forests should be a place of refuge for wildlife, where strong protections for species and their habitats are prioritized.

The Species of Conservation Concern list must be expanded given current threats to wildlife on the Blue Mountains National Forests

Appendix C of the Draft Plan contains the Preliminary Species of Conservation Concern ("SCC") list. Several of the SCC identified for the Blue Mountains planning area demonstrates some consistent patterns of threats resulting from Forest Service-authorized activities and land conditions, including livestock grazing, timber harvest, water diversions, and road construction and maintenance. Many of these threats are exacerbated by climate change, which puts even more emphasis on the need to address these threats through management actions consistent with updated plan language. **Exhibit 0023.** These threats are well documented in the SCC Evaluations and underscore the need for the revised plan to include concrete, enforceable plan components that directly address the ecological needs of these species.

Further issues arise when considering the species omitted from the SCC list, and therefore lack many or any protections in the Draft Plan. BMBP is greatly concerned at the omission of a great number of species from the SCC list like American goshawk, for example. The Forest Service declined to include the goshawk on the SCC list citing a lack of available information about threats and viability. How is it possible that the Forest Service does now have baseline data, given that the American goshawk is a current Management Indicator Species on some Blue Mountains National Forests? It is our understanding that goshawk nests discussed in one timber sale NEPA analysis after another have been reported to be abandoned and/or not used in numerous years. This would seem to suggest a population decline, representing a substantial concern about the species' (and many more) capability to persist in the Blue Mountains National Forests. 36 C.F.R. § 219.9(c).

The need to incorporate existing Management Indicator species in the Forest Plan revisions

The outdated Forest Plans also ignore the science behind the ongoing Sixth Mass Extinction, which is the first mass extinction caused by humans. Yet the current Forest Plans do not consider how to better protect biodiversity of wildlife and native plants, which are critical to the interconnected webs of ecological processes and functions, thus threatening the breakdown of forest ecosystems. Jettisoning designated Management Indicator species that represent the habitat requirements of many other species contribute to the Sixth Mass Extinction and loss of ecosystem functions and services for humans. The draft Forest Plan revisions are apparently only proposing "focal" species, which have no enforceable protections or clear path to protecting diverse habitats. The Forest Plan draft revisions give no consideration of Management Indicator species as being a much more useful system of protecting the forest ecosystem. Management Indicator species were selected for each Forest to represent forest habitat attributes that are associated with many forest wildlife species.

The revised Forest Plans need to address cause and effect from misguided and destructive management on a landscape scale that is currently swept under the rug as part of "existing conditions", which allow for continued ecologically destructive management actions. Historical revisionism or failure to consider how to avoid causing long-term ecological impacts and species extinctions obscure or eliminate adaptive management. Adaptive management should not be just something that sounds good but is not really practiced for avoiding significant environmental impacts, including species extirpations and extinctions and management-induced dismantling of ecosystem functions.

The Forest Plan revisions need to identify and protect Management Indicator species viability

There is no identification of Management Indicator species (MIS) or discussion regarding the need for and purpose of Management Indicator species. "Focal" species require no legally enforceable standards, which are required under the National Forest Management Act (NFMA). Wildlife species already selected for Management Indicators must be retained as a reasonable and important requirement of NFMA to compel the Forest Service to protect the viability of Management Indicator species, each of which represent suitable habitat requirements for many other wildlife species.

Without such legally enforceable standards, such as protecting the viability of MIS populations through protecting their habitat requirements, there would be substantial losses of biodiversity. Ultimately the forest ecosystem would fall apart, since the diversity of wildlife and plant species interact and connect with each other in ways that sustain ecological processes and functions.

For instance, Primary Cavity Excavator woodpeckers are critical to reducing defoliating insect epidemics. Denser forest with a mosaic of natural openings is necessary to retain elk populations that can feed indigenous people as their treaty rights and supply food also for other hunters.

Other Management Indicator species' viability sustains fishing people who are represented through fish species, including Redband trout. Other declining fish species have to have their populations sustained for treaty rights and to provide food. These fish species need to be protected also by the Endangered Species Act, including Chinook salmon, other salmon species, Threatened Mid-Columbia Steelhead trout, and Threatened Bull trout. People gather huckleberries, medicinal herbs, and many other edible plants such as roots, nettles, wild rose hips, Elderberries, wax currant berries, and edible and medicinal mushrooms. Protecting diverse wildlife habitats also protect the forest commons for people.

Wildlife Draft Plan Component-Specific Comments

Desired Conditions

FW-SPDIV-DC-01: Ecological integrity provides the key characteristics, conditions, and functionality of native ecological systems, and provides for the habitat needs of diverse plant and animal species in the plan area. These ecosystems are resilient and provide social and economic benefits derived from observing, fishing, hunting, foraging, and other recreational pursuits of fish, wildlife, fungi, and plant species.

Issue: Desired Condition Inconsistent with 36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11

Comment: FW-SPDIV-DC-01 is inconsistent with 36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11 because it is not written with enough detail so the condition of on-the-ground achievement is clear, allow measurement or evaluation of progress toward its achievement to be made, or expressed in a way that helps managers determine if a use is suitable or whether a management action is consistent with the plan. SPDIV-DC-01 states broadly that the desired condition is one where an ecosystem provides the "key characteristics, conditions and functionality of native ecological systems, and…for habitat needs of diverse plant and animal species" without defining what those characteristics and conditions include and how they contribute to the functionality of native ecological systems. Without defining these terms, SPDIV-DC-01 fails to provide a way for its achievement to be determined. Because it lacks any measurable criteria, it also fails to provide managers a clear target towards which management actions can be compared or directed.

Recommendation: Add measurable endpoints (e.g., condition classes for key ecological systems; indicators such as percent native cover, habitat suitability indices, or integrity metrics).

FW-SPDIV-DC-02: The range of habitats for native and desired non-native species is of adequate quality, distribution, and abundance to provide for viable populations. This includes the ability of species and individuals to interact and disperse within habitats in the plan area. See also FW-WF-DC, FW-INSDIS-DC, FW-FOR-CMP-DC, FW-FOR-STR-DC, FW-FOR-DEN- DC, FW-FOR-OLD-DC, and FW-SNAG-DC.

Issue: Desired Condition Inconsistent with 36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11, Desired Condition inadequate to support healthy species diversity.

Comment: FW-SPDIV-DC-02 is inconsistent with 36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11, because it is not written with enough detail so the condition of on-the-ground achievement is clear and to allow progress toward its achievement to be measured or evaluated. Phrases like "adequate quality, distribution, and abundance to provide for viable populations" and "ability… to interact and disperse" lack quantitative habitat, distribution, or connectivity metrics and do not identify a clear scale for evaluation. The standards of "adequate" and "viable" are undefined and lack describable metrics for assessments. Moreover, a desired condition which only envisions habitat of "adequate quality, distribution and abundance," which needs only support “viable” populations of native and desirable non-native species, represents a condition which must only support the bare minimum species diversity. For example, so long as a population is able to exist within an ecosystem, it could be considered “viable” even though its abundance is low. SPDIV-DC-02 only outlines a desired condition that applies to the habitat of species, but does not actually envision the diversity of the species that rely on them.

Recommendation: Specify habitat quantity/quality targets (e.g., minimum acres or percent by seral stage/structure), connectivity thresholds (e.g., road or barrier density; corridor width; least-cost permeability), and species viability indicators by scale. Shift the subject of the desired condition to species instead of habitat, where the condition is one that envisions a rich diversity of species. Change the “adequate” and “viable” thresholds.

FW-SPDIV-DC-03: Healthy plant communities provide native floral resources and conditions that support diverse native pollinator communities. In turn, pollinators provide effective pollination that sustains native plant communities, symbiotically contributing to the overall ecological integrity of plant and animal communities.

Issue: Desired Condition Inconsistent with 36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11

Comment: FW-SPDIV-DC-03 is inconsistent with 36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11, because it is not written with enough detail so the condition of on-the-ground achievement is clear and to allow progress toward its achievement to be measured or evaluated. “Healthy plant communities provide native floral resources… that support diverse native pollinator communities” does not include measurable metrics (e.g., pollinator diversity/abundance targets). Key thresholds like “healthy”, “provide,” and “support” are undefined and provide little direction to managers because they are subjective and lack assessment indices.

Recommendation: Add targets for native flowering plant richness/cover by season, foraging/overwintering habitat availability, and pollinator diversity/abundance indices; identify scales and monitoring indicators. Describe the characteristics of a healthy plant community and what conditions they should provide to native pollinator communities.

FW-SPDIV-DC-04: Habitat conditions are resilient and sustainable, considering shifting or changing temperatures, precipitation patterns, and more frequent and intense fire regimes.

Issue: Desired Condition Inconsistent with 36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11

Comment: FW-SPDIV-DC-04 is inconsistent with 36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11, because it is not written with enough detail so the condition of on-the-ground achievement is clear, or to allow progress toward its achievement to be measured or evaluated, and it largely restates SPDIV-DC-01. Similar to SPDIV-DC-01, SPDIV-DC-04 does not define or describe key terms like "habitat conditions" and "sustainable." These terms are vague and lack measurable or observable criteria, such that progress towards their achievement can be measured or the overall achievement can be determined.

FW-SPDIV-DC-05: Beaver habitat conditions enable beaver populations to persist at levels and distribution sufficient to modify the aquatic and riparian ecosystems to increase water holding capacity, expand the wetted surface area, and increase the complexity and connectivity of the aquatic and riparian ecosystems, which provides resiliency to these ecosystems.

Issue: Desired Condition Inconsistent with 36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11

Comment: FW-SPDIV-DC-05 is inconsistent with 36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11 because it is not written with enough detail so the condition of on-the-ground achievement is clear or to allow progress toward its achievement to be measured or evaluated. SPDIV-DC-05 does not describe how beaver habitat conditions will be assessed or what population levels are considered sufficient to meet the Desired Condition.

FW-SPDIV-DC-06: Forest vegetation and use support a broad distribution of elk on National Forest Lands based on their seasonal needs, providing for healthy elk populations, and contributing to social and economic benefits.

Issue: Desired Condition Inconsistent with 36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11

Comment: FW-SPDIV-DC-06 is inconsistent with 36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11, because it is not written with enough detail so the condition of on-the-ground achievement is clear or to allow progress toward its achievement to be measured or evaluated. SPDIV-DC-06 lacks benchmarks for elk distribution or population. Additionally, SPDIV-DC-06 lacks a meaningful connection to species diversity because it links forest vegetation and use only to Elk distribution and populations. Furthermore, there is no indication of what SPDIV-DC-06 considers "forest vegetation and use" and how its support for Elk will be linked to their seasonal needs.

FW-SPDIV-DC-07: Amphibian breeding, rearing, and upland habitat is of sufficient quality and distribution to support all life stages.

Issue: Desired Condition Inconsistent with 36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11

Comment: FW-SPDIV-DC-07 is inconsistent with 36 C.F.R. § 219.7(e)(1)(i); FSH 1909.12, ch. 20, § 22.11, because it is not written with enough detail so the condition of on-the-ground achievement is clear and to allow progress toward its achievement to be measured or evaluated.

"Sufficient quality and distribution to support all life stages" lacks explicit habitat criteria such as temperature range and connectivity among breeding/upland habitats. Additionally, the threshold of "sufficient" represents only the minimum conditions necessary and thus lacks meaningful direction to managers.

Recommendation: Define breeding/rearing habitat metrics (e.g., minimum hydroperiod, depth/temperature, riparian shade, barrier-free connectivity distances) and set occupancy/productivity targets.

Objectives (SPDIV)

FW-SPDIV-OBJ-01: Complete projects that are designed to maintain or restore habitat for one or more wildlife species.

Malheur NF: 10 projects per decade

Umatilla NF: 10 projects per decade Wallowa-Whitman NF: 10 projects per decade

Issue: Objective Inconsistent with 36 C.F.R. § 219.7(e)(1)(ii); FSH 1909.12, ch. 20, § 22.12

Comment: FW-SPDIV-OBJ-01 is inconsistent with 36 C.F.R. § 219.7(e)(1)(ii); FSH 1909.12, ch. 20, § 22.12, because it does not state the objectives in terms of outcomes, nor is it tied to a desired condition. Counting "projects per decade" does not express outcomes linked to the species DCs and does not specify measurable habitat or species improvements. As currently written, SPDIV-OBJ-01 only requires that projects "designed to maintain or restore" habitat be completed within the timeframe, but does not contemplate actual habitat or species diversity outcomes. Additionally, SPDIV-OBJ-01 only requires a project to either maintain or restore habitat without defining when or how habitats will be prioritized. Moreover, without a clear link to a desired condition, SPDIV-OBJ-01 only requires habitat for "one or more" wildlife species to be maintained or restored without specifying or defining which species' habitat must be prioritized.

Recommendation: Convert to outcome-based, time-specific targets tied to DCs. Objectives should address specific species, particularly SCC, and require projects to address the maintenance and restoration of habitat.

Guidelines (SPDIV)

FW-SPDIV-GDL-01: To achieve desired conditions for large trees and old trees (See FW-FOR-OLD-DC) and to promote high-quality nesting and denning habitat for old-forest (See FW-FOR-STR- DC) associated species, thinning to increase heterogeneity and resilience should retain the oldest and largest trees and large trees with habitat features (such as deformities, broken tops, large branches, and cavities) that benefit these wildlife species.

Issue: N/A

Comment: GDL-01 should be a standard. The retention of old and large trees must be required to provide for species viability, particularly in the context of climate change and the historic loss of old-growth habitat. This is particularly important for Species of Conservation Concern that rely on old and large trees.

FW-SPDIV-GDL-02: To reduce localized impacts resulting from concentrated livestock use, salt and supplements should not be placed within 1⁄4 mile of water developments, groundwater-dependent ecosystems, streams, aspen stands, occupied habitat of botanical species at risk, and other unique habitats (defined in FW-VEGNF introduction) that are susceptible to livestock trampling or compaction, unless the topography or other physical features prevent such impacts within a shorter distance of the salting location.

Issue: N/A

Comment: GDL-02 should be a standard. Given predictable trampling/compaction and water-quality risks, a flexible guideline does not provide the durable constraint needed to help maintain desired conditions or conserve species at risk. Furthermore, monitoring of livestock and livestock-related impacts is difficult and inconsistent, and thus any departure from the guideline will likely be inadequate.

FW-SPDIV-GDL-03: To reduce wildlife drowning in water developments that use smooth-sided materials to hold or store water, devices should be in place that provide traction for small animals to escape.

Issue: N/A

Comment: Should be a standard. Devices such as these should be standard practice on all water developments.

FW-SPDIV-GDL-04: To protect rare plant species, species of conservation concern, or state-protected species, collection permits should not be authorized if the species cannot withstand collection or if the collection would result in significant negative impacts to populations on the Forest. Exceptions may be authorized for research that demonstrates benefit for the species or forest management, or for traditional tribal uses.

Issue: Guideline should be a standard, Objective inconsistent with 36 C.F.R. 219.7(e)(1)(iv); FSH 1909.12, Ch. 20, § 22.14

Comment: FW-CON-GDL-04 is inconsistent with 36 C.F.R. 219.7(e)(1)(iv); FSH 1909.12, Ch. 20, § 22.14 because it does not describe the criteria used to determine whether a rare plant species can or cannot withstand collection or what is considered “significant negative impacts.” without clear triggers or thresholds CON-GDL-04 is difficult to apply and lacks meaningful management guidance. Alternatively, CON-GDL-04 should be a standard that includes the stipulated exception.

Soils

We support the retention of Desired Conditions of 01, 02, and 03. See the Preliminary Draft Forest Plan Revision on pp. 24-25. However, there are existing loopholes: Instead of just a desired condition for volcanic ash soils, there needs to be a legally enforceable standard of no displacement of ash soils. These ash soils are irreplaceable and highly productive, with “high water and nutrient holding capacity”, which will be critical to retain under extreme, uncontrolled climate change droughts and heat waves—for wildlife, plants, and humans. So the associated standard should be “No steep logging on ash soils and no heavy equipment use on ash soils, regardless of slope.”

There is also the impairment of water quality by excess fine sediment displaced by ash soils near riparian areas, as this excess fine sediment tends to choke out the fish through their gills. Displaced ash soil can also increase turbidity (cloudiness) in the water, preventing fish from being able to see their prey. So there should also be a standard of “No allowance of heavy equipment use within RHCAs, adjacent to RHCAs, and upslope above RHCA stream drainages or above rivers or lakes. There are recent science findings showing that logging adjacent to RHCAs still affect RHCA riparian conditions, even by increasing water temperatures.

Another loophole: Re: Standard 02: Though the logging or other heavy equipment use should still retain “a minimum of 80 percent [of an] activity area in an acceptable soil quality condition.” (Draft Forest Plan Revision, p. 25) However, it can’t be guaranteed that project design criteria or subsequent “soil restoration activities”, which are usually only sub-soiling for compaction, will not necessarily “improve long-term soil condition” sufficiently to meet the standard, as sub-soiling or any other “soil restoration” method may not always be implemented by the contractor or due to lack of funds for the Forest Service, which will likely be the case soon. Further, Project Design Criteria and any “soil restoration” actions are usually not 100% effective for restoring the soil integrity, organic content, and/or preserving soil type horizons. Sub-soiling mixes the soil layers detrimentally.

Further, the Forest Service in practice is planning to leave “temporary” roads and re-opened closed roads “for storage” for the next timber sale, rather than decommissioning or restoring the excess or ecologically harmful roads used for the timber sales.

Thus, the Forest Plan revisions for the three Forests should incorporate a more effective standard that requires dropping any planned heavy equipment use (e.g. logging) in sale units that are likely to meet or exceed the detrimental soil impact limit of 20% of an activity area (e.g. a sale unit). We have been requesting this in our comments and objections for at least two decades. We find in the field that hardly any “temporary” or re-opened closed roads are ever fully decommissioned or restored to avoid long-term soil impacts. Even the re-closed road barriers are usually ineffective for achieving any passive restoration, as the norm is continued vehicle use of “temporary” roads, “closed” roads, and even skid trails, due to ineffective berms, merely signs or maps, post and pole barriers that are easily unscrewed or winched apart (both of which I've seen), or insufficient blockage of the roads by boulders or felled trees in the road way. This situation is chronic in the Malheur NF and likely on the Wallowa-Whitman NF, as well as on other Forests, such as the Ochoco NF.

Regarding soil standard 03, there should be specific examples of updated "best management practices for water quality and soil design features...to maintain soil productivity." (p. 25). Without examples of better management practices based on the science and specific descriptions of these more effective methods, the updated "best management practices" will probably not be used, with poor results. There has been scientific controversy over the effectiveness of "best management practices", which the Forest Service has largely ignored in practice.

Regarding soil guidelines: Another loophole: #01: Retain the language of "To reduce...steeper slopes" (p. 25). However, the next language nullifies the reduction of detrimental soil impacts by basing this on "site-specific...function." (See p . 25) Delete this big loophole for log trucks to drive through at the expense of soil productivity and function, which is the basis for functioning vibrant forest ecosystems, including tree resistance to stress, and plant and wildlife diversity in abundance. "Sustained steep slopes" need to be defined by distance and slope degrees or percent, although everyone else measures slope in degrees.

Re: standard 02: For retention of organic matter and down wood at natural, never logged levels, the Forest Plan revisions should put limits on logging and "fuel" (biomass) breaks re: removal of biomass, including all organic matter and down wood, by abandoning high intensity logging. These types of logging include clearcutting (including "Seed tree", "Shelterwood", "Patch cuts", and "Partial Retention") and virtual clearcutting to very low basal area retention such as 20 to 70 square feet of basal area (live tree) retention per acre.

Further, there should be no more logging of any acres that have never been logged and areas that only had very limited logging (e.g. past high-grading for one tree species only) and appear recovering to apparently natural forest. Never logged forest provides the best structural complexity and old growth structure for wildlife, including MIS Pileated woodpecker, Primary Cavity Excavators, Pacific marten, American goshawk, and Sensitive declining woodpecker species such as Lewis' woodpecker and White-headed woodpecker, as well as increasingly rare Northern Three-toed woodpecker, which is especially dependent on old growth Lodgepole pine and Subalpine fir.

Updated best available science is needed to determine natural levels of organic matter in soil content and down wood, by assessing conditions in never logged forest types. It's quite clear that the recommended "acceptable amounts" are either not implemented or fail to represent natural never logged levels of organic matter and down wood. Instead, this guideline has failed to keep enough organic matter and down wood to perpetuate fertile and productive soils.

Re: Guideline 03: While we agree that to "minimize soil disturbance, existing or past disturbed areas should be utilized before new soil disturbance for all ground disturbing activities." Yet again, the following loophole removes the teeth of the restriction, rendering it easily and often violated by "case-by-case exceptions" with no limits, and in addition to scrapping these exceptions, there should be no allowance for "the creation of new soil disturbance" by deeming it "the environmentally preferred option." (p. 25) This is a farce. The Forest Service should be improving ecological protections, not just reiterating outdated massive deference to the timber industry at the expense of a stable climate, biodiversity, and flourishing forest ecosystems.

Re: 04: There should be the updated science consensus that post-fire "salvage" logging is extremely detrimental, from removing high biodiversity, especially regarding micro-fauna and plants directly enhanced by wildfire—including stand replacement severity fire. So far "post wildland fire vegetation management activities" have failed "to avoid permanent soil impairment and accelerated erosion on verified moderate and high soil burn severity areas" as most post-fire "salvage" logging is clearcutting, with no great sensitivity to avoid removal of unnatural levels of organic matter and down wood. As a legally enforceable standard, there should be no post-fire logging, based on a strong scientific consensus that there should be no more post-fire logging. Most Blue Mountains wildlife and plant species evolved with wildfire and are adapted to wildfire occurrence, including by wild fires creating unique habitat niches for many wild animal and plant species. Logging destroys these habitat niches that retain and increase native biodiversity.

Guideline 05: Every soil guideline incorporates significant loopholes that can readily be used to avoid soil protection restrictions. Logically, it makes no sense to log, construct roads, or use heavy equipment "on soils prone to mass wasting", which is a large landslide event that leaves soils greatly impaired for up to thousands of years. Thus, the protection of areas such as the "Big Sink" near Jubilee Lake on the Umatilla NF. Drop the exceptions stated.

Wilderness, Wild and Scenic Rivers, and other landscape-level protections

Designation of all the eligible Wild, Scenic and Recreational Rivers:

The Forest Plan revisions should advocate for designating all the eligible Wild, Scenic, and Recreational Rivers not yet designated, including all of the mapped eligible rivers or river segments in the river map attachments for the Preliminary Draft Forest Plan Revision, for the Umatilla, Malheur, and Wallowa-Whitman National Forests.

Rivers are the ecological backbone for sustaining the viability of Threatened and Sensitive fish species, as well as for Sensitive or Threatened listed mussel species; snail species; salamander species; frog species, Pacific lamprey and macroinvertebrates that are critical fish prey. There are also many terrestrial wildlife species dependent on rivers or partially aquatic, such as otters; mink; muskrats; beavers; herons; Belted kingfishers; Harlequin ducks; Merganser ducks; Bald eagles; Osprey; and many other bird species, bat species, and insect species, including Dragon flies and Damsel flies.

Further, people are greatly attracted to rivers for recreational and cultural uses such as rafting; kayaking; canoeing; paddle boarding; fishing; camping; hiking; bird watching; horseback riding; picnicking; family gatherings and making willow baskets, Tule mats, and medicinal and edible plant gathering. Rivers also hold great cultural significance for indigenous peoples, as well as for forests and other wild lands.

If rivers are allowed to dry out by logging, livestock grazing, roads, or agricultural irrigation water diversions, or to be polluted by excess sedimentation or chemicals, the rivers are not likely to survive in their historic (pre-European colonization) flows and water quality if they are not protected. The rivers will still have to survive the effects of climate change through high ambient temperatures, unprecedented heat waves, and prolonged droughts. So we need to protect ecosystems such as rivers more than ever until anthropogenic global warming can be reversed, which could take decades to centuries.

<u>Protect all Potential Wilderness Areas as Wilderness</u>:

We support the protection of all Potential Wilderness Areas and all never logged or roaded areas, including Inventoried Roadless Areas and areas with other values, as in map attachments for the Forest Plan revisions. Protect all the areas of "Other Features of Value Present" from logging and road construction or road re-opening, consistent with Potential Wilderness Areas or with Inventoried Roadless Areas under the Roadless Area Rule. Potential Wilderness Areas need to be fully protected from logging and roading in order to remain eligible as potential Wilderness Areas when Congress may designate full Wilderness Area status to eligible Potential Wilderness Areas.

<u>All Inventoried Roadless Areas need to be fully protected from any logging and roading</u>:

All Inventoried Roadless Areas in their entirety, as designated, must be fully protected from any logging and road construction or road re-opening. All Inventoried Roadless Areas that meet the requirements of Potential Wilderness Areas or Wilderness Area additions or extensions should be protected as Wilderness Areas, pending until Congressional designation in the future. There are many eligible Potential Wilderness Areas within Inventoried Roadless Areas and adjacent to existing Wilderness Areas. Most of these areas would be too expensive and difficult to manage. Without the full extent of Inventoried Roadless Areas, Potential Wilderness Areas, and all other never logged forest, many wide-ranging wildlife species in recovery or rare where they used to flourish may not be able to survive the combination of extreme climate change effects in combination with logging, roading, or other management.

We support continuing to follow the Inventoried Roadless Area rule by not doing commercial logging or constructing roads in the Inventoried Roadless Areas. We also support the proposed protection of eligible Potential Wilderness Areas until Congress has confirmed them as Wilderness Areas, and those mapped areas that have other values, or have never been logged or roaded. Many declining far ranging wildlife species are dependent on not only Wilderness Areas, but also Inventoried Roadless Areas, Potential Wilderness Areas, and other never logged or roaded areas that form core wildlife security habitat and critical wildlife connectivity corridors—including those areas within planned timber sales. Conservation biologists have long confirmed that many far-ranging predators and native ungulates cannot survive as future generations without wild areas beyond designated Wilderness Areas. These wildlife species include: recovering Endangered and Sensitive gray wolves; rare recovering Grizzly bears; Threatened Canada lynx; Threatened Wolverine; Sensitive Pacific fisher; Oregon Vulnerable ranked Pacific marten; and far ranging or migrating native ungulates, including moose; Mountain goats; Bighorn sheep; elk and Mule deer and Columbia White-tailed deer. The Forest Plan revisions need to rely on Conservation Biologists' scientific guidance, including their mapping of core wildlife habitat migratory and dispersal corridors and their advised protection. Otherwise, without wild never logged and never roaded habitat protected, there will be federal uplisting of these species and population extirpations leading to extinction of these iconic wildlife species. These wildlife species also play key roles in ecosystem processes and functions, including American beaver, Clark's nutcracker and a multitude of bird species, salmon and trout species, amphibians, insects, reptiles, and many others. Our grandchildren should be able to experience now declining wildlife species and functioning wild ecosystems.

Wilderness Areas alone are not large enough or not enough suitable habitat to support many Threatened, Sensitive, and rare wildlife species, based on Conservation biology. This applies to all three of the National Forests under Forest Plan revisions.

<u>Municipal Watersheds need to be fully protected from logging and roading</u>:

Municipal Watersheds usually overlap Inventoried Roadless Areas, which should not be logged or roaded. Further, most Municipal Watersheds in the Blue Mountains National Forests have stayed intact from their inception from the early years of the 20th century or perhaps even the late 19th century—by <u>not</u> logging it. The Municipal Watersheds are usually located in high elevation moist mixed conifer forest that have very infrequent wildfire, up to 100, 250, or more years between any major fires. This is due to very moist or wet conditions, as in the Baker City Municipal Watershed and the very wet Mill Creek Municipal Watershed. A live tree in the Baker City Municipal Watershed is about 400 years old. It is thought that the Mill Creek Municipal Watershed might be as old forest as 600 years or more. This is plausible, given that the planned Tiger Mill sale has many tall, large old growth live trees and big old growth snags and logs.

It's ridiculous to use fire risk reduction as the guise for logging Municipal Watersheds, as they are far less likely to burn in any major fire compared to low elevation, hot, dry forest types such as Ponderosa pine dominant stands. The Municipal Watersheds are usually designated in headwater forests for downstream fish and to supply local communities with abundant, high quality water. Moist mixed conifer forest at high elevations are usually dominated by Grand fir or Englemann spruce, with some Douglas fir and Western larch.

Grand fir are able to store water in their roots and trunk and survive droughts or Spruce budworm epidemics. During a spruce budworm epidemic (which is normal in cycles), the Grand firs dropped all their needles from Spruce budworm defoliation in the Flat Iron sale on the Heppner District of the Umatilla NF. After one successive wet winter, as documented in a science study, the seemingly dead Grand firs were able to develop full green crowns again. Thus, what was considered salvage of dead trees resulted in felled live Grand firs with full green crowns and sap running from the stumps.

The Municipal Watersheds tend to be so wet that any lightning strike or most human ignitions may not start a fire that will spread very far, given the alder groves with high water tables in openings and the plentiful riparian areas throughout the Municipal Watersheds, with perennial streams, springs, seeps, and seasonal runoff.

Not all tree species need to be fire resistant due to the very infrequent fire regimes and the much higher precipitation and bigger, slow melting snow packs than that of the lower elevation forests. When we were field surveying the commercial logging sale units and camping for weeks within the Tiger Mill timber sale over two summers, we observed that while the city of Walla Walla had no precipitation and daily temperatures around 95 degrees, we were experiencing 60 to 70 degrees in the daytime and down to 40 degrees at night. Further, we experienced days of heavy rain, along with thunder storms and lightning—yet no fires were ignited. We also noticed multiple live mature Engelmann spruce trees that had lightning scars from crowns to the base of their trunks, with no significant scorching of the trunk and branches and no mortality.

Moist mixed conifer forests are naturally denser due to high productivity with lots of water retention and ashy or loamy soils. When the old growth groves develop, the big trees shade out the smaller trees, beneficially self-thinning and creating an open understory, variable density, and more natural levels of abundant snags and logs for wildlife habitat and carbon storage. Ironically, the never logged forest and old growth forest develop what the Forest Service claims as their “desired condition”, with abundant large and old trees, large snags and logs, variable density, and open understory. Logging mature and large trees, along with high intensity clearcutting or very low basal area retention does not create these “desired” conditions at all—especially not for moist mixed conifer or cold, high elevation subalpine forest.

Logging moist mixed conifer eliminates denser forest with higher canopy closure and abundant snags and logs needed for elk, marten, Pileated woodpecker, American goshawk, and Primary Cavity Excavators—all of which are currently Management Indicator species. Many other wildlife species also select for denser forest for hiding cover from predators and hunters.

Municipal Watersheds retain much more moisture if <u>not</u> logged, grow larger and older trees that are far more fire-resistant, create variable density and open understories, provide abundant snags and logs for wildlife, and sustain downstream fish and communities with abundant high-quality water. Obviously, it makes far more sense to leave the Municipal Watersheds alone to continue retaining high moisture to supply downstream uses. Municipal Watersheds also provide refuge to wildlife and humans in the context of lower elevation unprecedented heat waves, prolonged droughts, and more intense and extensive wild fires. The Forest Plan revisions need to protect from logging and roading: all of the Municipal Watersheds, all the Inventoried Roadless Areas, all the Potential Wilderness Areas, and all the other typically higher elevation, moist, cool forest that shares these values of the Municipal Watersheds. Never logged and never roaded forest also provides for the highest quality wildlife habitat, which is encompassed in these non-management areas.

Wildfire

Regarding wildfire:

The introduction fails to mention that decades of Forest Service and other wild fire suppression has caused the perceived need for "strategic vegetation treatments over time [to] create fuel and habitat conditions leading to desired fire behavior outcomes." What is needed is allowing more wildfires to burn as managed wildfires as much as possible. Prescribed fire mimics frequent, low intensity fire, yet it is not a replacement for naturally occurring wildfire, and it is not appropriate for infrequent, more severe fires natural to higher elevation moist mixed conifer and cold "dry" Lodgepole pine and Subalpine fir. What's not needed or natural is the logging, theoretically to reduce fire "risk", except immediately adjacent to lower elevation residential communities and cities. Whenever the Forest Service invokes "desired fire behavior outcomes" that is the desire of the Forest Service, which is intrinsically biased by logging being one of their biggest funding sources—even though the timber industry is no longer such a major percentage of Oregon's and Washington's economy. Apparently, Oregon's timber industry is now only about 3% or less of Oregon's economy, yet is the highest greenhouse gas producing industry in the state. **Exhibit 22.** The Forest Service needs a paradigm shift away from logging and toward ecologically sound restoration of all the degradation caused by past and current mismanagement of the forest ecosystem.

While prescribed burning can contribute to fire resilience, commercial logging increases fire risk by removing the most fire-resistant tree sizes—mature and large, with thicker bark at the base and higher live crowns. Commercial logging also opens stands significantly, increasing wind speeds through the stands and increasing fire intensity. Logging also removes most of the overstory and much of the midstory, allowing more sunlight to stimulate dense regeneration of seedlings and saplings that are much more flammable than mature and large trees. Further, when logging is done in higher elevation moist mixed conifer forest, removal of forest density and removal of higher canopy closure dries out the site. Removing forest canopy that maintains shading and cooling of micro-climate conditions greatly reduces moisture retention, increasing the risk of high intensity fire and faster spread of fire where most of an area is logged, such as planned for the Tiger Mill and Mottet timber sales planned.

The Forest Service has long been ignoring the scientific controversy over their use of "fire regimes" and "condition class". The Forest Service has been systematically ignoring this scientific controversy and others as inconvenient truths that get in their way for maximizing commercial logging. We have included "Failure to Disclose Scientific Controversy" in our objections for most timber sales since the agency seized on the public fear of fire to rationalize logging.

Most fire and "fuel" specialists in the Forest Service share our preference to use fire to address past wildfire suppression, instead of logging. The Forest Service is now trying to liquidate the Forests through logging on a landscape scale, under the rubric of reducing fire "risk" based on the simplistic rationale that wood burns, even as it is clear to anyone using a wood stove that small wood starts the fire, not big logs. The most intense fires, such as in the Camp Fire in Paradise, California, were exacerbated in intensity by exploding propane tanks, gas in cars exploding, and cement buildings reduced to rubble, such as gas stations, a motel, and a Safeway grocery store, likely due to coolants or other gases. Meanwhile, homes only left with a standing brick chimney and/or a concrete basement, were still surrounded by live trees and snags still with every branch and even twigs. Also, the Camp Fire was preceded by extensive logging all around the town of Paradise that was billed as fire risk reduction. The logging apparently increased the intensity and speed of the fire, which was also driven by climate change. The fire was fueled by slash and small trees, open stands with faster winds, and explosive gases in the town itself.

Please read and use the updated science articles cited in the book, Smokescreen, Debunking Wildfire Myths to Save Our Forests and Our Climate by Chad T. Hanson, a research ecologist.

The Forest Plan revisions need to incorporate and plan for managing wild fires:

The adaptive management strategy that saves money and that mimics natural ecological disturbances and reduces fire "risk" is managed wildfire, which restores fire on the landscape to counteract decades of wildfire suppression. Managed wildfires allow wildfire to burn where they are not threatening residential communities—which are generally at lower elevations in dry forest types. Managed wildfires are only suppressed when it starts to move in the direction or proximity of communities. Managing wildfire avoids wildfire suppression as much as possible, especially in the back country. Managing wildfire rather than suppressing it is based on a strong consensus of best available science. Managed wildfire is more natural in its effects by creating a mosaic of unburned, lightly underburned, mid severity, and high severity burns. Managed fire helps catch up with a back log of planned prescribed burning. So far we are aware of successful managed wildfires on the Heppner District of the Umatilla NF and on the Malheur NF. The Upper Bear Lake timber sale adjacent to the Strawberry Mountain Wilderness Area was planned by staff to incorporate the use of managed wildfire, with approximate acreage of managed fire that may replace prescribed burning.

The Forest Plan revisions need to stop ignoring the benefits of wildfire, based on updated science, and to instead incorporate managed fire instead of logging and prescribed burning to better reduce fire intensity.

The Forest Service needs to incorporate and use updated science regarding wildfire and logging:

For example, the Forest Plan revisions should incorporate updated fire and logging science citations in our fact sheet "Logging is a False Solution to Wildfire and Community

Safety". The Forest Service needs to switch from using the public's fear of fire to rationalize logging in the back country to honestly and factually acknowledge that: *logging in the back country will not make communities safer; *the primary threat to homes is from grass fires, not forest fires; *most homes are burned by large, fast moving fires that comprise less than 3% of all U.S. fire events; *large, fast-moving wildfires are primarily driven by climate; *the majority of fire ignitions that cross jurisdictional boundaries start on private lands, not public lands; *most fires are started by human activity; *protecting forests from logging does not increase their fire risk; and *logging increases carbon emissions compared to unlogged forests and compared to wildfires.

The Forest Service should base more effective and efficient management on updated science, including the science articles cited and described in the book, Smokescreen, Debunking Wildfire Myths to Save Our Forests and Our Climate by research ecologist, Chad T. Hanson, with the John Muir Project.

The Blue Mountains National Forests have been violating the National Forest Management Act (NFMA) by not revising the Forest Plans on schedule every 10-15 years, thus failing to incorporate updated best available science. If these Forest Plan revisions do not comply with NFMA and incorporate new scientific findings and realities since 1980 or 1990, such as climate change and landscape scale forest liquidation by logging without protecting other Forest Plan values, these Forest Plan revisions will violate NFMA.

Moist Mixed Conifer and Grand Fir Forest Types

The Forest Service's Preliminary Draft Proposed Malheur, Umatilla, and Wallowa-Whitman National Forest Land Management Plans ("Draft Plan") does not include forest plan components that can reasonably be expected to provide protections for or adequate representation of moist mixed conifer and Grand fir forest types across the Blue Mountains National Forest. These forest types, apart from the vital role they play in maintaining, provide invaluable wildlife habitat that is rare compared to historical levels across the landscape. And yet, the only Draft Plan component aimed at preserving and managing this forest type is the vague—and therefore likely illegal under the 2012 Planning Rule—Desired Condition FW-CON-DC-02.

This Desired Condition calls for "small to large patches" of "low density forests, high density forest, young forest, [and] old forest," leaving readers wondering exactly what conditions the Forest Service is managing for. Desired Conditions are intended to be specific enough to allow for their achievement, 36 C.F.R. § 219.7(e)(1)(i), but this one is vague that it's plausible to say that a few patches of moist forest existing anywhere across the three National Forests at issue would satisfy this condition. Moreover, despite the acknowledgment that landscape patterns and connectivity directly influence the movement and distribution of wildlife in the region, there is no plan component that directly acknowledges and manages for the importance of moist forests for wildlife populations. The Draft Plan should include Desired Conditions—as well as Objectives and Standards designed to meet the Desired Conditions—

that tie the health and abundance of these forest types to wildlife species viability. Or, at the very least, to some metric against which progress can actually be measured.

Grand fir trees of all sizes play an important ecological role in mixed-conifer forests in the region, including by providing dense forest habitats many species depend upon (**Exhibit 008; Exhibit 010**). Grand fir trees are important to the biodiversity of many eastside forests, providing habitat for species such as American marten, Canada lynx, Rocky Mountain elk, flying squirrel, Vaux Swift, American Goshawk, Pacific tree frog and many others**. Exhibit 008**; **Exhibit 009**. In many eastside forests, grand fir and western larch comprise the majority of the hollow trees used by wildlife. **Exhibit 009.** The relatively soft wood of grand fir trees creates ideal wildlife habitat by providing natural hollows, cavities, and unusual growth forms that wildlife use for shelter, nesting, and foraging (**Exhibit 004**; **Exhibit 010**). "No artificial means to create or encourage the formation of a hollow tree structure has been found, so retaining such trees … is essential to providing habitat for the species that depend on them." **Exhibit 010.**

Young and mature fir are also needed for future recruitment of old and large fir. Bull et al. 1997 highlights the importance of large fir with cavities, as well as the importance and rarity of the multilayer stands that produce this habitat. **Exhibit 010.** The authors note: ***"In northeastern Oregon, grand fir and western larch make up most of the hollow trees used by wildlife.*** *Bull et al. 1997 goes on to note that "[l]arge, hollow trees are uncommon in managed landscapes and typically are found only in late- and old-seral stands of grand fir and western redcedar. Although isolated hollow trees in young stands have significant value to wildlife, these young stands cannot reproduce this type of structure for at least 150 to 200 years.* ***The late-seral, multilayer stands that produce hollow trees comprise less than 3 percent of the forested landscape in the interior Columbia River basin****."*

The Forest Service Region 6's Response to Blue Mountains Biodiversity Project's Freedom of Information Act request (2016-FS-R6-001106-F) included the "Eastside Screens Enclosure; Recent Science Findings and Practical Experience: Implications for the Eastside Screens September 2015". This Enclosure also recognizes the importance and rarity of large hollow firs. The Enclosure noted (emphases added): *"Implementation of the Screens has substantial species management implications. For example, the white-headed woodpecker, Lewis's woodpecker and several species of bats are Regional Forester's Sensitive Species that rely on large snags and defective trees for part of their life history.* ***Large, defective grand fir trees and snags provide critical roosting and denning habitat for black bears, Vaux's swifts, pileated woodpeckers, American marten, and bats*** *(Bull et al., 1997).* ***These legacy trees, especially large, hollow grand fir, are rare on the landscape and have declined from historical conditions on the eastside of Oregon and Washington".*** *The enclosure also states: "These findings reinforce the importance of retaining and recruiting large, old trees in dry, mesic and moist mixed conifer forests on the eastside of the Region. It is critical that silvicultural prescriptions provide for* ***large*** *snags and defective trees in adequate numbers through time….* ***[L]arge, hollow grand firs take 150 to 200 years to develop (Bull et al. 1997); adequate numbers of smaller trees need to be left to allow for the processes that create replacement hollow trees."***

Given the urgent need to address the biodiversity and climate crises, which includes species and habitats in the Blue Mountains, the Forest Service must prioritize protecting wildlife, clean water, high-quality habitat, and ecosystem integrity in the Blue Mountains Forest Plans Revisions. This requires adopting Forest Plan components that provide enforceable protections for and wide availability of structural components and forest types including moist mixed-conifer forests, fir dominant or codominant forests, and mature and late old structure forests.

This cannot be achieved while the Forest Service is still targeting large Grand fir in an effort to log larger trees across the landscape. The Draft Plan specifically singles out Grand fir in its definition of large trees, Draft Plan at 46 & 142, increasing what is considered a "large" grand fir to 30 inches DBH, which inevitably allows for the increased logging of large Grand fir. The Forest Service's reliance on guidelines in the Draft Plan does not offer effective or enforceable protections for large trees of any species. Due to the lack of protections, the spatial footprint of logging on the ground would also increase, increasing fragmentation and cumulative effects across the Blue Mountains National Forests. In areas where logging was previously not economically viable, logging would become more profitable due to the authorization to log larger trees. The increased profits associated with logging large trees will allow for auctioning of sale units which previously did not contain adequate board feet to be profitable. Also, the increased profits associated with logging large trees will allow for additional road building and reopening in order to access forests that were previously inaccessible for logging.

The Forest Service needs to stop making management decisions based on the implicit assumption that all forest and LOS density is undesirable, regardless of the forest type, moisture regime, elevation, slope aspect and soil type, which in Eastern Oregon largely determine the historic and current natural range of productivity, tree species composition, and density. The Blue Mountains National Forests are incredibly heterogeneous in plant associations and forest types based on varied topography, elevation, moisture retention, slope aspect, and soil type. All of these wonderful natural nuances that make Eastern Oregon very biodiverse are ignored by the Forest Service in the interest of maximizing individual tree growth of timber industry preferred tree species—i.e. managing the National Forests like private land tree farms but logging them on even faster timber sale rotations and on larger scale timber sale.

The Forest Service has been trying to get rid of most Grand fir in the forest since at least 1910, based on historical records. In those days, the agency was far more blatant about their true motives—that it was considered a "weed"-like tree to be eradicated since it is not a timber industry preferred tree species. The Forest Service has been 'managing' for (i.e. replacing other tree species with) Ponderosa pine due to its higher commercial value for many decades. Thus, the incremental and steady conversion of complex, multi-species, biodiverse moist mixed conifer forest often dominated historically by late successional old growth Grand fir to even age monoculture Ponderosa pine plantations on the East side of the Cascades.

This history informs the Forest Service current policies of managing for "early seral" tree species (Ponderosa pine and Western larch) instead of "late seral" (late successional) species for moist mixed conifer forests that were historically dominated by Grand fir, with Engelmann spruce, Douglas fir, and Western larch components, as well as White pine and Lodgepole pine.

This history explains the Forest Service's strong desire to greatly reduce Grand fir in particular, which they now try to pass off with public relations rhetoric implying that all or most of the Eastside forests were historically dominated by Ponderosa pine. The Forest Service also identifies Ponderosa pine and Western larch as the most fire-resistant trees even though large Douglas fir is also notorious for having incredibly thick, fire resistant bark and high crowns and large Grand firs also have thicker, more fire-resistant bark and higher crowns and do survive fires, with fire scars to prove it.

What is most noteworthy about this Draft Plan is everything it is omitting. The current science that strongly supports retention and protection of large and old trees, relevant Forest Service and timber industry history that reveals the economic interests behind this push to log large trees—especially firs, and the foreseeable unprecedented scale and intensity of environmental impacts cascading through the ecosystem from removing already low levels of remaining large trees, exacerbated by the cumulative effects from global warming, the greatest global crisis of our times. **Exhibit 30**.

Grand fir trees play an outsized ecological role in providing important wildlife habitat in a landscape experiencing a significant deficit of large trees. Further, large grand fir trees are relatively fire resistant and resilient, **(Exhibit 011),** play an essential role in regulating climate extremes, and seldom intermix with large ponderosa pine and larch trees in Oregon and Washington. **Exhibit 031**. The Forest Service must include plan components specifically aimed at protecting the rare remaining large Grand fir on the landscape. For these reasons, Forest Service plans for large-scale removal of large grand fir trees is not supported by science or logic.

Birds rely on moist conifer forests and large Grand fir

In recent years, numerous studies have raised alarms regarding habitat loss, climate change, and decline of fauna and biodiversity across the planet. Warnings have been sounded by scientists regarding the declining bird populations we are seeing, and the projections of far greater losses to come. For example, the Rosenberg et al. (2019) study *Decline of the North American Avifauna* reported a *"staggering decline of bird populations, and found "wide-spread population declines of birds over the past half-century, resulting in the cumulative loss of billions of breeding individuals across a wide range of species and habitats. They show that declines are not restricted to rare and threatened species—those once considered common and wide-spread are also diminished. These results have major implications for ecosystem integrity, the conservation of wildlife more broadly, and policies associated with the protection of birds and native ecosystems on which they depend."* **Exhibit 032.**

Birds are an integral part of forested ecosystems on the Blue Mountains, and are not adequately considered in Forest Service planning. Many of the birds are associated with mature forests, old growth forests, mixed-conifer forests, and/or Grand fir or Doug fir during a key portion of their life history. These include: Harlequin duck; Bufflehead; Barrow's goldeneye; Hooded merganser; Wood duck; Red crossbill; White-winged crossbill; Brown creeper; Vaux's swift; Evening grosbeak; Pine grosbeak; Hermit thrush; Swainson's thrush; Varied thrush; Pine siskin; Cordilleran flycatcher; Golden-crowned kinglet; Ruby-crowned kinglet; Black-capped chickadee; Chestnut-backed chickadee; Mountain chickadee; MacGillivray's warbler;

Townsend's warbler; Yellow-rumped warbler; Mountain bluebird; Calliope hummingbird; Rufous hummingbird; Red-breasted nuthatch; American three-toed woodpecker; Black-backed woodpecker; Downy woodpecker, Hairy woodpecker, Lewis' woodpecker; Pileated woodpecker, Williamson's sapsucker; American kestrel, Winter Wren, Western Tanager, Hammond's flycatcher, Boreal owl; Flammulated owl; Great grey owl; Long-eared owl; Northern saw-whet owl; Northern pygmy owl, Bald eagle; Golden eagle; Osprey; Merlin, Peregrine falcon, and Northern goshawk. (**Exhibit 34**; **Exhibit 35; Exhibit 008**; Miller 2020 personal communications).

Birds that have also seen declining populations according to the BBS, and/or are considered climate endangered or climate threatened by Langham et al. (2015) include: Bufflehead; Barrow's goldeneye; Hooded merganser; Wood duck; Red crossbill; Brown creeper; Vaux's swift; Pileated woodpecker; American three-toed woodpecker; Black-backed woodpecker; Lewis' woodpecker; Williamson's sapsucker; Great grey owl; Boreal owl; Long-eared owl; Flammulated owl; Northern saw-whet owl; Bald eagles; Golden eagles; and Osprey.

Langham et al. (2015), *Conservation Status of North American Birds in the Face of Future Climate Change,* identified 314 birds at risk of losing more than half of their current geographic ranges under climate change scenarios. **Exhibit 36.** In addition, 126 of these are not expected to see gains in their geographic ranges. The authors note: *"Our results demonstrate the need to include climate sensitivity into current conservation planning and to develop adaptive management strategies that accommodate shrinking and shifting geographic ranges. The persistence of many North American birds will depend on their ability to colonize climatically suitable areas outside of current ranges and management actions that target climate adaptation."* The authors also note: "*We suggest that the 126 species in this category be considered by conservation entities for immediate monitoring beyond existing programs such as BBS and CBC."*

The habitat requirements of birds imperiled by declining populations and/or climate change are regularly ignored or downplayed by the Forest Service. The Forest Service cannot protect the viability of these species without analyzing the effects of this proposal on their habitats, ranges, connectivity, and needed forest components and structures.

Thomas (1979) also highlights several wildlife species that rely on mixed-conifer, mature and old forests, and Grand fir for at least part of their life histories (such as reproduction and feeding) include: Canada lynx, bobcat, Snowshoe hare, White-tailed deer, Northern flying squirrel, numerous bats, Rubber boa, Malheur shrew, Vagrant shrew, Dusky shrew, Heather vole, Long-tailed vole, Gapper red-backed vole, Black bear, Short-tailed weasel, Jumping mouse, and mule deer.

Through the lens of species presence and evolutionary history

Mixed-severity fires (including high severity fires) create habitat that is necessary for species across eastern Oregon, suggesting that high severity fires are natural and historically present, as well as necessary. High severity fires create important habitat that is very high in biodiversity, and are rare compared to historic norms.

The evolutionary history and very existence of Black-backed woodpeckers suggests that large high-severity fires must regularly occur within their range. We are concerned that current fire suppression efforts (including thinning) through the region will continue to exclude high-severity wildfires and threaten the viability of Black-backed woodpeckers and other species that depend on high-severity wildfire. Hutto et al. (2008) noted that:

> **"Without embracing an evolutionary perspective, we run the risk of creating restoration targets that do not mimic evolutionarily meaningful historical conditions, and that bear little resemblance to the conditions needed to maintain populations of native species***, as mandated by law (e.g., National Forest Management Act of 1976)."*
>
> *"The degree to which the black-backed woodpecker is restricted to burned forest conditions in the intermountain west is truly remarkable. Although this species has been detected outside burned forest conditions, particularly in unburned, beetle-killed forests, the numbers therein are small, and nest success therein is substantially lower than in burned forests (Saab et al. 2005). Neither Powell (2000) nor Morrissey et al. (2008), for example, found any black-backed woodpeckers in surveys of mountain pine beetle-infested mixed-conifer forests even though they located northern flickers and three-toed, hairy, downy, and pileated woodpeckers. Similarly, a regionwide bird survey across a series of unburned, beetle-infested conifer forests within the Forest Service Northern Region (Cilimburg et al. 2006) yielded only two black-backed woodpecker detections (0.46 % of 433 point counts). This is less than one-tenth of the frequency of detection in forests burned 6 yr (Saab et al. 2007), so the probability of a severe fire occurring somewhere within an entire watershed in any given 6-year window is very high. Thus, when viewed on a landscape scale, it becomes easy to imagine that a sufficiently mobile plant or animal species (e.g., fire morel [Morchella angusticeps]; jewel beetle, Buprestidae; blackbacked woodpecker) could become specialized to use a burned forest condition that is ephemeral on a local scale but always present somewhere in the larger landscape."*
>
> *"…[T]he patterns of distribution and abundance for several other bird species (black-backed woodpecker [Picoides arcticus], buff-breasted flycatcher [Empidonax fulvifrons], Lewis' woodpecker [Melanerpes lewis], northern hawk owl [Surnia ulula], and Kirtland's warbler [Dendroica kirtlandii]) suggest that severe fire has been an important component of the fire regimes with which they evolved.* **Patterns of habitat use by the latter species indicate that severe fires are important components not only of higher-elevation and high-latitude conifer forest types, which are known to be dominated by such fires, but also of mid-elevation and even low-elevation conifer forest types that are not normally assumed to have had high-severity fire as an integral part of their natural fire regimes.** *Because plant and animal adaptations can serve as reliable sources of information about what constitutes a natural fire regime, it might be wise to supplement traditional historical methods with careful consideration of*

information related to plant and animal adaptations when attempting to restore what are thought to be natural regimes."

"In addition, two lines of evidence suggest that it is the more severe fires that are needed to create conditions most suitable for this fire specialist: (1) not only is the black-backed woodpecker restricted to burned forests, but its distribution within burned forests is also relatively restricted to the more severely burned conditions (Kotliar et al. 2002, Smucker et al. 2005, Russell et al. 2007, Hutto 2008); (2) black-backed woodpecker nest sites occur in locations that harbor significantly larger and more numerous trees than occur around randomly selected sites within a burn (Saab and Dudley 1998, Kotliar et al. 2002, Russell et al. 2007). **Such nesting locations would be difficult to find in forests maintained as low-density, open, park-like stands due to frequent, low-severity fire."**

"How could a species evolve to depend on a condition that occurs only infrequently? The answer lies with the distribution and abundance of such fires across space and time. **The return interval for severe fire in one location may be several hundred years, but black-backed woodpecker populations persist in a particular fire for >6 yr (Saab et al. 2007), so the probability of a severe fire occurring somewhere within an entire watershed in any given 6-year window is very high.** *Thus, when viewed on a landscape scale, it becomes easy to imagine that a sufficiently mobile plant or animal species (e.g., re morel [Morchella angusticeps]; jewel beetle, Buprestidae; black-backed woodpecker) could become specialized to use a burned forest condition that is ephemeral on a local scale but always present somewhere in the larger landscape."*

Exhibit 37.

The Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin and Portions of the Klamath and Great Basin (Quigley et al. 1996) includes summaries of their finding. **Exhibit 38.** The "Highlighted Findings" note that **there has been a 27 percent decline in multi-story old forest structures** (Chapter 8, Findings, pg. 181). Given the extensive portion of forests that have already been logged on the landscape, mature and old forests (and the trees, snags, and logs within them) often provide some of the last high-quality wildlife habitat and connectivity corridors in and adjacent to timber sale areas.

Draft Plan Prescribes Increased Logging and Post-Fire Salvage Logging

The current scale, pace, and intensity of commercial logging is unsustainable ecologically, economically, and socially. The Draft Plan contains components that would allow the Forest Service to increase its Timber Sale Program volume, Draft Plan at 78, Tables 8, 9, & 10, despite the known widespread ecological devastation such industrial scale logging entails.

For instance, logging at high intensity on a landscape scale and on short timber sale rotations is clearly not sustainable and needs to be changed to ecologically sound restoration as the Forest Service's mission. If this logging trend continues, this is forest liquidation, with no protection of other Forest values that have been previously respected and supported, such as recreational infrastructure, wildlife habitat protection, and intact riparian ecosystems.

We have damning photographs of the aftermath of recent timber sales on the Malheur, the Umatilla, and the Ochoco National Forests, which is basically clearcutting, although called "commercial thinning," "vegetation management" or "forest restoration." Notably, the Forest Service needs to be honest to the public, as the words "logging" and "timber sales" are now no longer used in timber sale Environmental Assessments and Environmental Impact Statements, as well as Categorical Exclusion scoping letters.

The current scale of logging is unprecedented and devastating for wildlife habitat, forest carbon storage, recreational values, and sustainable cultural uses of the land. Forest productivity is being diminished due to widespread and long-term soil damage, including loss of organic nutrients, and soil displacement—especially from steep slope logging on irreplaceable ash soils. Repeated timber sales on short rotations of about 30 years combine existing detrimental soil impacts with new detrimental soil impacts, causing long-term soil damage due to inadequate time between timber sales for soil recovery.

Forest Plan Revisions must address long-term and repeated management negative effects from commercial logging, road construction and use, rampant livestock overgrazing in many allotments, and heavy equipment use, along with an unprecedented scale of ground disturbance, inevitably increasing exotic invasive plant introduction and dispersal, which compete with native plants. The revised Forest Plans must not only acknowledge the extensive degradation of the forest ecosystems from past and current Forest Service management (which I've witnessed over 33 years of field surveying proposed and logged timber sales) but also must change the course of systematic management mistakes by using adaptive management strategies that prevent or avoid the ecologically damaging practices. In most cases, what is needed is far less extraction and far more ecologically sound restoration, which provides jobs and resources while restoring ecosystem processes and functions.

Post-Fire Logging

The Blue Mountains Forest Plan Revision should include strict standards prohibiting post-fire ("salvage") logging. The EIS should include analyze this prohibition and adopt it as it's preferred course of action.

The wealth of scientific studies done on post-fire logging have come to an overwhelming consensus that post-fire logging has extremely negative impacts on numerous species, sensitive ecosystems, snags and downed wood (both very important for wildlife habitats), water quality, and forest regeneration. Richard Hutto, in his study Towards Meaningful Snag-Management Guidelines for Postfire Salvage Logging in North American Conifer Forests (2006) goes so far as to state: ***"I am hard pressed to find any other example in wildlife biology where the effect of a particular land-use activity is as close to 100% negative as the typical postfire salvage-logging operation tends to be."*** **Exhibit 39.**

In an Open Letter to Members of Congress from 250 Scientists Concerned about Post-fire Logging (2013), scientists state that ***"Post-fire habitats created by fire, including patches of severe fire, are ecological treasures rather than ecological catastrophes, and that post-fire logging does far more harm than good to the nation's public lands."*** **Exhibit 40.**

Burned areas are best left to their own natural recovery processes. Several studies also showed that post-fire logging decreases the abundance and diversity of native plant recruitment. Post-fire logging and post-fire replanting can negatively impact forests' ability to regenerate, which can facilitate non-native species establishment and spread by creating spatial and ecological openings (Donato et al. 2006, Lindenmayer & Noss 2006, Titus et al. 2007). **Exhibit 41, Exhibit 42, Exhibit43.** Titus et al. (2007) looked at vegetation in salvage-logged and replanted plots vs. vegetation in non-salvaged logged and unplanted plots in the blast zone of the Mount St. Helens eruption. They found that salvaged logged and replanted areas had lower herb and shrub diversity and richness, and more bare areas and moss than un-salvaged areas. Post-fire logging can also exhaust the natural replacement seed banks if plants begin to germinate following fire but then are destroyed by logging activity (Donato et al. 2006, Lindenmayer & Noss 2006). This is particularly true in areas where the remaining slash is burned (Keeley 2006, **Exhibit 44**), or when regeneration burns are used to promote the germination of particular varieties of commercial tree species (Lindenmayer & Noss 2006).

The current science points to post-fire replanting hindering natural recovery as well as potentially setting forests on an unnatural trajectory, and asserts that there are no ecological benefits to salvage logging.

Donato et al. (2009) found that "high-intensity re-burn [high-intensity fire occurring 15 years after a previous high-intensity fire] had the highest plant species richness and total plant cover, relative to high-intensity fire alone [no re-burn] and unburned mature/old forest; and the high-intensity fire re-burn area had over 1,000 seedlings/saplings per hectare of natural conifer regeneration". **Exhibit 45.** An example of the importance of post-fire areas occurring after high intensity fires include these Donato et al. (2009) findings:

> *"[S]evere fires are typically expected to be deleterious to forest flora and development; however, these results indicate that in systems characterized by highly variable natural disturbances (e.g. mixed-severity fire regime), native biota possess functional traits lending resilience to recurrent severe fire. Compound disturbance resulted in a distinct early seral assemblage (i.e. interval- dependent fire effects), thus contributing to the landscape heterogeneity inherent to mixed-severity fire regimes. Process-oriented ecosystem management incorporating variable natural disturbances, including 'extreme' events such as SI severe fires, would likely perpetuate a diversity of habitats and successional pathways on the landscape."*

The August 2017 "Science Findings" from the PNW Research Station (**Exhibit 46)** note that mixed-severity fire, including high-severity fire is necessary for many species:

- In dry forests, a mixed-severity fire that kills trees is an important but underappreciated strategy for providing enough snags for cavity-dependent species. Low-severity prescribed fires may not provide enough snags for these species.

- Suitable snags are limited, such that snag availability drives landscape-level habitat selection by some species. For example, white-headed woodpeckers selected severely burned patches for nesting, which was initially puzzling because this species does not characteristically forage in burns.
- Within burns used by at-risk woodpeckers, the majority (86 to 96 percent) of seemingly suitable trees contained unsuitably hard wood; wood hardness limits nest site availability for these declining species.
  - This suggests that past studies that did not measure wood hardness counted many sites as available to cavity-excavating birds when actually they were unsuitable. *"By not accounting for wood hardness, managers may be overestimating the amount of suitable habitat for cavity-excavating bird species, some of which are at risk,"* Lorenz says.

"Based on their results, Lorenz and her colleagues see the critical role that mixed-severity fires play in providing enough snags for cavity-dependent species. Low-severity prescribed fires often do not kill trees and create snags for the birds. "I think humans find low-severity fires a more palatable idea. Unfortunately or fortunately, these birds are all attracted to high-severity burns," Lorenz says. "The devastating fires that we sometimes have in the West almost always attract these species of birds in relatively large numbers." Many studies have shown that a severely burned forest is a natural part of western forest ecosystems. Snags from these fires attract insects that love to burrow beneath charcoal bark. And where there are insects, there are birds that love eating these insects. Lorenz and her colleagues stress that providing snags that woodpeckers can excavate is crucial for forest ecosystem health in the Pacific Northwest, where more than 50 wildlife species use woodpecker-excavated cavities for nesting or roosting."

"Currently, the best solution we can recommend is to provide large numbers of snags for the birds, which can be difficult without fire," According to the researchers' calculations, if one of every 20 snags (approximately 4 percent) has suitable wood, and there are five to seven species of woodpeckers nesting in a given patch, approximately 100 snags may be needed each year for nesting sites alone. This does not account for other nuances, like the fact that most species are territorial and will not tolerate close neighbors while nesting, or the fact that species like the black-backed woodpecker need more foraging options. Overall, more snags are needed than other studies have previously recommended."

The alteration of unique and crucial post-fire habitat may result in the degradation of destruction of characteristics necessary for species that depend on post-fire habitat. The repeated and widespread loss of this type of habitat may have a negative effect on population trends and habitats for a number of listed, sensitive, at-risk species, MIS, or other special status species. This may include species such as: Townsend's big-eared bats and other bat species; Peregrine falcon; wolverine; Canada lynx; Pacific fisher; American marten; Bald eagle; Lewis's woodpecker; Black-backed woodpecker; Three-toed woodpecker; special-status owls; Neotropical songbirds; Bull trout; Redband trout, steelhead, Chinook salmon; Columbia spotted frogs. For example, Black-backed woodpeckers are negatively affected through cumulative impacts from post-fire logging. They may also be negatively affected by the alteration of tree species composition and future quality of habitat from replanting. Black-backed woodpeckers rely on dense snag habitats that have been recently burned and on the Bark beetles that move in afterwards. In addition, species such as Pacific fishers that rely on complex mature forests have also evolved in the presence of fire-created habitats and have been found to utilize them extensively.

There is no scientific evidence to justify salvage logging on an ecological basis, and projects on public lands should focus on truly restorative activities, such as road removal. Numerous scientific studies point to a suite of possible long-term problems caused by post-fire logging, including erosion, increased sedimentation, soil compaction, and negative impacts to wildlife and hydrology. Post-fire logging can also increase future fire risk. Donato et al. (2006) found that post-fire logging actually increases the risk of future high intensity fires, particularly when slash is left on the ground. Thompson & Spies (2010) found that areas that had previously experienced burning and "salvage" logging after the 1987 Silver Fire in southwestern Oregon had more extensive crown damage during the 2002 Biscuit fire than areas that had not been "salvage" logged after the Silver Fire. **Exhibit 47.** Post-fire logging can also negatively affect forests' ability to regenerate, which can facilitate non-native plant species' establishment and spread. Post-fire logging can also exacerbate or create problems with invasive species through other mechanisms, such as logging equipment spreading invasive plant seeds.

The Forest Service needs to do away with post-fire ("salvage") logging on all National Forests. Post-fire logging is an outdated, ecologically destructive practice that harms important and delicate habitats.

Post-fire areas are too ecologically valuable to sacrifice for marginal economic benefit to a few individuals and corporations while the public pays for the costs of ecological degradation. **Post-fire logging needs to be eliminated on public lands.**

Grazing

The plan should include a credible and transparent analysis of grazing suitability as required by NFMA. To meet legal requirements related to grazing suitability, sustainability, and ecological integrity, the plan should limit grazing to protect soil, water quality, riparian and watershed integrity, prevent weeds, vegetation functions and plant reproduction, conserve viable populations of fish & wildlife, retain and increase carbon both above and below ground, etc.

The plan should allow for voluntary permit relinquishment, with dedication of allotments to multiple use purposes such as conservation of soil, water, fish & wildlife, carbon, recreation, etc. The plan should include quantitative riparian management standards. The plan should explicitly plan for co-existence with large carnivores, emphasizing non-lethal control of predators, and excluding livestock from areas of known predator activity.

Livestock Grazing Management Requirements on National Forest System Lands

The legal foundation for livestock grazing on National Forest System lands begins with the Multiple-Use Sustained-Yield Act of 1960, which directs the national forests to be managed for multiple uses—including "range"—and to balance those uses for the long-term health and productivity of the land. This mandate frames grazing as one use among many (such as recreation, timber, watershed, wildlife and fish) and requires consideration of the relative values of resources rather than maximizing a single output.

Authority to issue grazing permits rests with the Secretary of Agriculture under the Granger-Thye Act of 1950, which authorizes permits for periods not exceeding 10 years, subject to renewal. The Forest Service implements this authority in 36 CFR Part 222, which defines permit types, eligibility concepts (such as "base property"), and administrative actions. The regulations establish procedures for issuing term permits (generally 10 years, with priority for renewal), temporary permits, and special permits such as association or on-and-off permits.

Every grazing authorization and on-the-ground decision must be consistent with the applicable land management plan (forest plan). The National Forest Management Act of 1976 requires that resource plans, permits, and other instruments for the use of NFS lands be consistent with forest plans and adjusted as necessary when plans are revised. Under the 2012 Planning Rule (36 CFR Part 219), forest plans must include components—desired conditions, objectives, standards, and guidelines—that integrate range management into broader multiple-use objectives.

At the project and permit level, the Forest Service administers grazing through the range regulations at 36 CFR Part 222 and its directives system: FSM 2200 (Range Management), FSH 2209.13 (Grazing Permit Administration), and FSH 2209.16 (Allotment Management). These directives describe permit issuance, terms and conditions, annual operating instructions (AOIs), monitoring requirements, non-compliance procedures, and coordination responsibilities. Allotment Management Plans (AMPs), developed in consultation with permittees and other affected interests, guide allotment-specific grazing practices in the western states pursuant to the Public Rangelands Improvement Act of 1978 (PRIA).

The National Environmental Policy Act (NEPA) applies to grazing decisions, including issuance or modification of permits, adjustments to numbers, season, or kind of livestock, and construction of range improvements. Forest Service NEPA procedures at 36 CFR Part 220 require scoping and appropriate documentation through categorical exclusions, environmental assessments, or environmental impact statements. The level of analysis depends on the potential environmental effects of the grazing action.

Permit administration requires annual operating instructions that translate permit terms and NEPA decisions into specific direction for the grazing season—such as livestock numbers, pasture rotations, utilization standards, and triggers for management adjustments. The Forest Service monitors compliance and resource conditions and may modify, suspend, or cancel a permit under 36 CFR §222.4 if standards are not met.

Range improvements such as fences and water developments may be authorized by the Forest Service, with recognition of permittee interests in permanent "improvements." The Range Betterment Fund, funded by a portion of grazing receipts from western states, is reserved for on-the-ground "improvements" such as seeding, fencing, and water development, as well as rangeland rehabilitation and weed control.

Grazing fees are mandatory and established annually under 36 CFR Part 222, Subpart C. The Department of Agriculture publishes the uniform grazing fee for both Forest Service and

Bureau of Land Management lands each year. Fees are assessed based on permitted use, and penalties apply for excess or unauthorized use.

Grazing management must also comply with cross-cutting environmental laws. Under the Endangered Species Act (ESA), the Forest Service must consult with the U.S. Fish and Wildlife Service or NOAA Fisheries if grazing may affect listed species or critical habitat, and incorporate terms and conditions resulting from consultation. Under the Clean Water Act (CWA), federal facilities must comply with state water quality standards, and the Forest Service applies best management practices to control nonpoint source pollution from grazing. Under the National Historic Preservation Act (NHPA), the agency must consider effects on historic properties and consult with State Historic Preservation Officers, Tribes, and other parties before approving grazing-related actions such as new range improvements.

Livestock Grazing Under the 2012 Planning Rule (36 CFR part 219)

A revised or new forest plan must treat grazing as one of the multiple uses to be provided "within Forest Service authority and the inherent capability of the plan area." Plans are required to include enforceable plan components—standards and/or guidelines—so that range use is integrated with other resources rather than planned in isolation. In developing these components, the responsible official must explicitly consider "grazing and rangelands," along with habitat, water, recreation, infrastructure, and other factors.

From the outset, the responsible official must use the best available scientific information to inform the assessment, plan development or revision, and the monitoring program, and must document what was selected as "best available," why, and how it was applied. For grazing, this typically means synthesizing peer-reviewed range science, riparian management literature, and local monitoring records to shape plan components and the monitoring program.

During the assessment, the agency must identify and evaluate existing information relevant to the plan area—including range conditions, trends, stressors, and social–economic context—drawing on governmental and non-governmental sources. The Forest Service's planning directives maintain topic pages for "assessing range," underscoring that rangeland status and contributions are part of the assessment baseline that informs plan direction.

Public participation and intergovernmental coordination are mandatory "early and throughout" the process. The responsible official must engage Tribes, permittees and other publics, and coordinate with State and local governments and other Federal agencies. For a plan revision, the forest must review relevant Tribal, State, and local land-use policies and display the results in the plan EIS—important for aligning grazing direction across boundaries and jurisdictions.

Every plan must contain the full set of required plan components: desired conditions, objectives, standards, guidelines, and suitability of lands. Applied to grazing, desired conditions describe ecological and social outcomes for rangelands (e.g., vegetation composition, riparian resilience, forage availability); standards and guidelines constrain how and where grazing may occur to achieve those outcomes (e.g., seasonal restrictions, utilization limits, stubble heights, trailing constraints); and suitability determinations identify where grazing is generally appropriate or not, given desired conditions. The rule states that suitability must be identified for various uses, though not necessarily for every use, and requires that lands not suitable for timber be identified; forests commonly also display grazing suitability.

Multiple-use integration requirements shape grazing direction. When crafting plan components, the forest must consider a comprehensive list that includes forage, “grazing and rangelands,” wildlife habitat and connectivity, water quality, recreation settings and access, infrastructure placement (e.g., fences, water developments), cross-boundary coordination opportunities, climate change and other stressors, public water supplies, and opportunities to connect people with nature. In practice, grazing standards/guidelines must be compatible with these broader considerations.

Sustainability provisions require plan components to maintain or restore ecological integrity of terrestrial and aquatic ecosystems and to protect air, soils, and water. Of particular relevance to grazing, plans must include riparian-specific standards/guidelines, must establish riparian management zone (RMZ) widths around streams, lakes, and wetlands, and must ensure that “no management practices” that cause detrimental temperature/chemistry changes, course blockages, or sediment deposits that seriously and adversely affect water conditions or fish habitat occur in RMZs. Plans must also ensure implementation of the Forest Service’s national best management practices for water quality. These provisions form binding sideboards for grazing activities near waters.

The diversity and wildlife section requires plan components that provide the ecological conditions necessary to maintain or restore habitat diversity and to support viability of species of conservation concern, while contributing to recovery of listed species where applicable. Where grazing may affect habitats or species, the plan must include ecosystem-based and, if needed, species-specific standards/guidelines (e.g., seasonal use, infrastructure placement, or residual vegetation thresholds) sufficient to meet these obligations.

Plan development must also “identify the suitability of areas for the appropriate integration of resource management and uses.” While all plans must identify lands not suitable for timber production, the same suitability framework is commonly applied to grazing—identifying places where livestock use is generally compatible with desired conditions and places where it is not (for example, small high-value wetlands, post-fire recovery areas, or key sensitive habitats)—so that project-level allotment decisions are made within clear programmatic sideboards.

Monitoring is not optional. Each plan must include a plan monitoring program with questions and associated indicators designed to test assumptions, track change, and evaluate management effectiveness. For grazing, forests typically monitor indicators such as riparian vegetation condition, streambank stability, stubble height or utilization, soil cover/compaction, invasive plants, and key habitat attributes for at-risk species. The responsible official must complete a written, public biennial evaluation of monitoring information and use it to inform adaptive management, including whether plan amendments or other changes are warranted.

Beyond plan components and monitoring, plans must identify priority watersheds for restoration or maintenance and describe the plan area’s distinctive roles and contributions in the broader landscape—both of which can influence where grazing emphasis, restoration, or protective direction is focused. Plans may also include “management approaches,” a non-binding section commonly used to explain how allotment-level NEPA decisions, annual operating instructions, range improvements, or coordination with permittees will be used to achieve desired conditions and comply with standards/guidelines.

It is essential to distinguish plan-level direction from project-level authorization. A forest plan does not allocate AUMs or authorize grazing on specific allotments; those decisions occur through subsequent, site-specific NEPA and permit administration. The plan's role—required by the 2012 rule—is to set the scientifically informed, publicly developed, enforceable framework (desired conditions, standards/guidelines, suitability, and monitoring) within which allotment-level decisions must fit, ensuring grazing contributes to social and economic sustainability while maintaining or restoring ecological integrity and meeting water and wildlife requirements.

The Forest Service should base all of its decisions as to the level of allowable grazing on a robust and current carrying capacity analysis to ensure that it has not authorized more forage than can be grazed without unduly damaging public resources, as a quantified analysis often reveals. This should follow a valid capability and suitability analysis. *See* 36 C.F.R. § 219.1(g), 219.20. The EIS needs to clearly explain the process of determining capable and suitable acres, and carrying capacity. Under NFMA, the Forest Service must "determine . . . the availability of lands and their suitability for resource management." 16 U.S.C. § 1604(e). NFMA further provides that the forest planning regulations shall include: "specifying guidelines which[] require the identification of the suitability of lands for resource management." *Id*. § 1604(g)(2)(A).

In turn, the planning rules provide that:

> [T]he suitability and potential capability of National Forest System lands for producing forage for grazing animals…shall be determined as provided in [] this section. Lands so identified shall be managed in accordance with direction established in forest plans.
>
> (a) Lands suitable for grazing and browsing shall be identified and their condition and trend shall be determined. The present and potential supply of forage for livestock … shall be estimated. The use of forage by grazing and browsing animals will be estimated. Lands in less than satisfactory condition shall be identified and appropriate action planned for their restoration.

36 C.F.R. § 219.20. Capability is "the potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity." 36 C.F.R. § 219.3. It "depends upon current resource conditions and site conditions such as climate, slope, landform, soils, and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease." *Id*. (emphasis added).

As a starting point, the agency should determine the average forage production values for lands across the planning area, verified by actual forage measurements, with those areas producing less than 200 lbs/acre excluded (Carter, Vasquez and Jones 2020). **Exhibit 48.** However, other factors that should be used to determine the capability and suitability of the allotment for livestock grazing, and ultimate stocking rate, include:

- Excluding private lands within the allotments (guidance refers to “national forest system lands”);
- Forage allocated to wildlife and conservation;
- Areas incapable of being grazed (e.g. mines, roads, quarries, etc.);
- Areas unsuitable for grazing due to conflicts with other uses like habitat and recreation;
- Areas unsuitable for grazing due to highly erosive soils;
- Distance to currently available water (must be within 1 mile);
- Slope (maximum of 30% for cattle);
- Forage demand of livestock based on weight of animals;
- Sustainable utilization levels including trampling, use by rodents and insects;
- Required residual vegetation heights (such as for sage-grouse nesting, and ESA streams);
- Season of use, regular rest, deferment of grazing during critical growth periods;
- Weather, including drought;
- Use mapping and actual use.

Here, the Preliminary Draft Proposed Plan mentions a suitability analysis, but not capability, as required. *See* Preliminary Draft Proposed Plan at 13 and 21. While the Draft at 83 includes an unenforceable guideline that “livestock should be managed within the inherent capability of the site,” this analysis must take place on a Forest- or Plan-wide level during the planning process. When the Forest Service fails to adequately explain how it uses capability criteria to reach a determination on acres capable for livestock grazing, and declines to share the data it uses, or show allotment-by-allotment capability, it violates NFMA, as well as NEPA’s “hard look” doctrine. *W. Watersheds Proj. v. U.S. Forest Serv.*, No. 05-cv-189-BLW, 2006 WL 292010, at *6–*7 (D. Idaho Feb.7, 2006); *see also* 40 C.F.R. § 1502.24 (agency must disclose methodology).

Measurable Use Standards for Livestock Grazing

Effective, measurable use standards for livestock grazing in a Forest Plan are those that establish clear, quantitative thresholds tied directly to ecological conditions. For riparian and streambank protection the plan should cap streambank alteration by livestock to not exceed 10 percent of bank length within any pasture during the grazing season, that livestock may not remove more than 30 percent of woody riparian browse leaders on current-year growth, and that livestock must be removed when stubble height of hydric sedges or other key riparian species declines below an average of six inches across a reach. *See* Goss and Roper (**Exhibit 49**); Bridger Teton (**Exhibit 50)**,

In upland areas, standards should specify that utilization of key forage species shall not exceed 30% of current year’s growth (Holecheck 2010, **Exhibit 51**) and that residual ground cover must average at least 70% across upland key areas at the end of the grazing season to protect soils from erosion. Soil protection can also be expressed through limits on disturbance, such as prohibiting livestock-caused trampling and pugging on more than 15 percent of ground surface in key areas, or requiring that at least 85 percent effective ground cover be maintained on erosive soils.

The Preliminary Draft proposes livestock grazing use levels that are much higher than those recommended to protect sensitive species; for example, 35-55% instead of 30%. FW-

RNG-GDL-06 and -07. Further, no mandatory use standards are proposed to protect riparian areas, including annual bank alteration, riparian woody browse, or riparian stubble height. Under the RMA section, the Draft provides a desired condition for riparian areas related to livestock grazing, MA3A-RMA-DC-05, and a Management Approach, but these use discretionary and indefinite language that does not guarantee this approach will be used. *See* MA3A-RM-MAPR-01 ("*consider* the following annual livestock use and disturbance indicators and approaches"). The Draft also makes clear that Management Approaches are optional and can be changed administratively. Draft at 19.

Further, apart from stubble height, the Management Approach only suggests applying indicators for streambank alteration and riparian woody browse utilization "as appropriate" without defining conditions or circumstances that would dictate their use. *Id*. And Clary and Webster (1996) found that 4" of residual riparian stubble height is not sufficiently protective of sensitive species and resources, which requires a minimum of 6" of residual stubble height. **Exhibit 52.** Kinney and Clary (1994) found that the difference between requiring only 4" of residual vegetation and 6" is large, suggesting that a range of 4-6" is not appropriate. **Exhibit 53**.

Standards tied to wildlife habitat ensure compliance with the Planning Rule's requirement to sustain species diversity and viability. Examples include maintaining residual grass heights of at least seven inches in sage-grouse lek and nesting habitat during the April through June nesting season or excluding grazing from amphibian breeding wetlands from March through mid-July to protect egg masses and tadpoles. Cattle should be excluded from all ESA fish-bearing streams. Here, the Draft provides only a weak standard: "avoid livestock trampling of federally-listed threatened or endangered fish redds." MA3A-RMA-STD-04. Seasonal restrictions are also effective, such as excluding livestock from riparian pastures prior to July 15 to allow regrowth of vegetation, or permitting fall grazing in uplands only after native bunchgrass species have produced viable seed.

Bighorn sheep

In the Draft at Appendix C, Bighorn sheep are listed as a Species of Conservation Concern. We agree and request that this designation be carried forward in the final plans.

Desired Condition FW-SPRSK-DC-07 states that bighorn sheep populations should be sustained or increased, with minimal disease transfer from permitted domestic sheep and goats. Draft at 59. Likewise, the Draft includes a management approach aimed at reducing spread of disease from domestic livestock to bighorn sheep. FW-SPRSK-MAPR-06. Both of these statements should be strengthened to make clear that all available action will be taken to prevent disease transmission to bighorn sheep from authorized livestock grazing on the Forests through effective separation of the species.

As an initial matter, the Forest Service should employ Risk-of-Contact Modeling in the EIS to determine the risk that domestic sheep authorized on the Forests pose to bighorn sheep. Then, all grazing allotments within the buffer that the Draft discusses (35 km) from bighorn sheep herds, should be designated as unsuitable for domestic sheep and goat grazing.

The Forest Service should follow the recommendations of the Western Association of Fish and Wildlife Agencies (WAFWA) for bighorn-domestic sheep interactions, which includes quantitatively assessing risk, and closing or converting domestic sheep and goat allotments within the foray distances of wild sheep habitat. **Exhibit 54**.

Water quality protections, another core requirement, should be written to prohibit any grazing practices that cause measurable increases in turbidity or sediment beyond state water quality standards, or to restrict livestock use within Riparian Management Zones unless stubble height and bank alteration thresholds are met.

Finally, adaptive, trigger-based standards make management responsive to conditions on the ground, for example requiring that livestock be moved within five days if residual vegetation in key riparian areas falls below six inches, or mandating stocking rate reductions the following year if utilization exceeds 30 percent in two consecutive years.

A Reduced Livestock Alternative Must Be Considered

The Preliminary Draft Proposed Plan emphasizes only increases in livestock grazing from current levels, while never analyzing the appropriateness of currently-authorized grazing, or providing for reductions in livestock. *See* Draft at 82-84 (FW-RNG-OBJ-01, FW-RNG-MAPR-03). The EIS must consider a reduced or no-grazing alternative. *See W. Watersheds Proj. v. Abbey*, 719 F.3d 1035, 1050 (9th Cir. 2013) (Environmental Assessment where each alternative allowed grazing at essentially the same pre-existing level violated NEPA); *W. Watersheds Proj. v. Salazar*, No. 4:08-cv-516-BLW, 2011 WL 4526746, at *13–*15 (D. Idaho Sept. 28, 2011) (BLM was required to consider reduced- grazing and no-grazing alternatives in Monument Plan EIS). This alternative serves as a baseline for the public to consider the impacts of continued grazing against. *Half Moon Bay Fisherman's Marketing Ass'n v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988) ("Without establishing the baseline conditions . . . there is simply no way to determine what effect the [action] will have on the environment, and consequently, no way to comply with NEPA"); *see also W. Watersheds Proj. v. Rosenkrance*, No. 09-cv-00298-EJL, 2011 WL 39651, at *9–*11 (D. Idaho January 5, 2011).

Under this alternative, permitted livestock use across the planning area would be reduced by approximately 25–40 percent from current authorized levels, depending on site capability and ecological conditions. Current ecological conditions should inform where reductions, or rest should be prioritized. All vacant and closed grazing allotments should maintain their current status. Grazing permit buyouts should be allowed. The reduction would be achieved through a combination of decreased permitted Animal Unit Months, shortened grazing seasons, and removal of livestock from the most ecologically sensitive areas.

Key Features of the Alternative:

- Permitted AUMs: Reduce total authorized AUMs by 30 percent relative to current management when permits are renewed. This reduction would be phased in over a 3- to 5-year period to allow permittees to adjust operations.
- Sensitive Areas: Grazing would be eliminated in Riparian Management Zones (RMZs), wetlands, and small meadows that are not capable of meeting stubble height, streambank stability, and water quality standards. Grazing would also be prohibited in areas identified as unsuitable for maintaining species of conservation concern habitat.

- Season-of-Use Adjustments: Grazing seasons would be shortened by 2–4 weeks in order to protect early season growth of upland bunchgrasses and late-season recovery of riparian vegetation.
- Habitat Protections: Livestock would be excluded from designated critical habitat for threatened and endangered fish species and from key sage-grouse breeding and nesting areas during the nesting season.
- Range Improvements: Emphasis would shift away from structural improvements designed primarily for livestock (such as new water developments or fences) toward restoration projects that enhance riparian resilience, soil stability, and wildlife habitat.
- Adaptive Management: If monitoring indicates that standards for riparian vegetation, stubble height, or bank stability are exceeded for two consecutive years, additional stocking reductions would be implemented.

Post-fire Rest from Livestock Grazing

The Plan must include defined minimum periods of rest from livestock grazing following disturbance including wildfire, with grazing only resuming after objective mandatory vegetation recovery standards have been reached. Here, the Draft includes a vague guideline that following fires, "unplanned burned areas should be evaluated to determine appropriate use and timing of livestock grazing re-entry." FW-RNG-GDL-03. In addition, FW-RNG-MAPR-01 requires only that the Forest Service "consider deferment or rest for one or more growing seasons following fire."

Instead, the minimum period of rest following any disturbance, including fire, should be two years,[21] but should extend until standards have been reached. *See* **Exhibit 57.**[22] These standards should reflect habitat needs of native wildlife and include criteria for establishment of grasses, forbs, and woody plants.

Livestock Contributions to Invasive Annual Grasses

The Preliminary Draft Proposed Plan contains both a Desired Condition and a Management Approach aimed at preventing establishment and spread of annual invasive grasses. Draft at 29, 31. Accordingly, the Forest Service must consider the best available science on the impacts to native bunchgrasses and soil crusts, and the attendant increases in invasive annual grasses, from livestock grazing. The literature indicates that livestock grazing is the most important cause of the introduction, persistence, and spread of cheatgrass, medusahead wildrye, *Ventenata dubia*, and other invasive annual grasses that have degraded the shrubbsteppe and other habitat in the Columbia Basin and across the West, and continue to spread.

Intact soil crusts provide an effective barrier to germination of annual grasses like cheatgrass. Similarly, the presence of native bunchgrasses inhibits germination and growth of cheatgrass (Reisner et al. 2013). **Exhibit 58.** Studies have found that intact sagebrush steppe habitat, with presence of shrubs, robust native grasses, and intact soil crusts, effectively deter establishment of cheatgrass and other native grasses (Condon and Pyke 2018). **Exhibit 59.**

---

[21] Longer periods of time are likely required. *See* **Exhibit 55** (recommending 4–5 years of rest following reseeding); **Exhibit 56** (recommending up to 4-6 years of rest depending on vegetation type).

[22] *See also* Pyke et al. 2017, (Exhibit 56)

However, both crusts and bunchgrasses are reduced by grazing pressure. Soil crusts are fragile and easily destroyed by heavy livestock and hooves. As a result, loss of soil crusts and native bunchgrasses allows cheatgrass to thrive (Reisner et al. 2013; Condon and Pyke 2018). Forest Service research has shown that rest from grazing can lead to "substantial recovery" of biological crusts (Kaltenecker et al. 1999). **Exhibit 60.**

Another study, Root et al. (2019), published in Ecological Applications, sampled random sites in Idaho's Snake River Plain, and measured biocrust communities and vegetation across low, medium, and high grazing intensities. **Exhibit 61.** They found biocrust cover and species richness negatively related to grazing intensity, with plots with the lowest grazing intensity having highest biocrust diversity and cover. Additionally, they found that exotic annual grasses were substantially more abundant in plots with higher grazing intensity. Their results indicated that reduction of biocrust cover and richness favored exotic annual grasses and disfavored perennial grasses, highlighting the importance of biocrust cover in maintaining site resistance to invasion by exotic annual grasses.

The Draft also suggests that livestock can be used to "target" and reduce cheatgrass, *see* FW-VEGNF-MAPR-03, but this is unsupported. Time-series data and results in Williamson et al. (2019) indicate that grazing corresponds with increased cheatgrass occurrence and prevalence regardless of variation in climate, topography, or community composition, and provide no support for the notion that contemporary grazing regimes or grazing in conjunction with fire can suppress cheatgrass. **Exhibit 62.**

Use of best available science

The 2012 Planning Rule requires the use of "the best available scientific information to inform the planning process." 36 C.F.R. § 219.3. The responsible official must document how the best available scientific information was determined to be the best available, explain the basis for that decision, and further explain how the information was applied to the issue considered. *Id.*

The Forest Plan revisions are needed for incorporation of updated science since the outdated Forest Plans of 1980 and 1990. The current Forest Plans should have been revised every 10 to 15 years under NFMA. Such lack of timely Forest Plan revisions are a violation of NFMA. Yet the Forest Service seems to have been playing devious games by taking up to 14 years for one Forest Plan revision, only to shelve the revision with no explanation. Then the Forest Service only consulted with County Commissioners and other economic interests, leaving most of the rest of the public outside of the process. Likewise, the prior Forest Plan revisions for the Blue Mountains were shelved with no explanation, even though those Forest Plan revisions had accurate, sound science as their foundation, with many organizations and other public input involved in the planning process. That was the Interior Columbia Basin Ecosystem Management Plan if I remember the name correctly. These long planning periods for Forest Plan revisions end up scrapped rather than being cooperatively negotiated. This seems to be in order for the Forest Service to not have to use more ecologically protective standards based on updated current science and to instead continue using outdated Forest Plans that allow for eventually logging all never logged areas outside of Wilderness Areas, Potential Wilderness Areas, and Inventoried Roadless Areas. This process avoids litigation over the

NFMA violation of not revising Forest Plans by pretending always to be revising the Forest Plans without actually finalizing Forest Plan revisions using updated science.

The outdated Forest Plans don't even address the reality of global warming and the extreme effects of uncontrolled climate change to Blue Mountains forest ecosystems and local communities. Notably, there does not seem to be any inclusion of a section of the Forest Plan revisions regarding climate change effects to the forests, wildlife, and communities and how management should restore water retention in riparian areas and moist headwaters forest, how to facilitate wildlife and plants (including tree species) migrating toward more suitable habitat, and how to retain and increase forest carbon storage to reduce climate change effects by retaining and increasing mature and old growth forest cover after about a century of over-logging the Blue Mountains Forests. Climate changed reality now includes more intense and extensive wildfires, based on unprecedented heat waves, prolonged droughts, and logging effects that increase flammability from logging slash and from the dense regeneration of seedlings and saplings. Logging, especially high intensity and extensive logging, increases wind speeds through the stands, intensifying the fires.

There has been widespread wildfire suppression in the region since the 1950's, with World War II military heavy equipment used to "fight" fires, which has made the forest, especially the lower elevation dry forest types, filled in with dense small trees, which is also aggravated by logging and heavy livestock grazing. Further, the most fire-resistant tree size classes—mature to large and old growth—have been mostly removed by high grading and clearcutting or other high intensity logging.

Livestock have also degraded riparian systems, including legacy damage, and there is the need to better manage livestock (which some permittees do) as well as to exclude livestock where necessary for riparian recovery.

The Forest Service road system is out of control, with more road mileage than the U.S. highway system and which could extend to the moon and back multiple times. The Forest Service has not been able to effectively block closed roads, "temporary" roads, and skid trails from continued use by motor vehicles, including ATVs. Travel management plans have not been finalized for some of the National Forests. Road use displaces elk and other wildlife due to human and vehicle disturbance. More roads lead to more poaching, more illegal firewood cutting, more introduction and dispersal of exotic invasive plants, as well as more fur trapping.

Examples of updated science that some Forest Service staff are already starting to use for adaptive management for better ecological outcomes

Rocky Mountain elk security core habitat blocks:

Forest Plan standards for Rocky Mountain elk are terribly inadequate. Starkey experiments show that elk are very vulnerable to human disturbance, such as moving away from hunters and roads, and other recent science findings that elk won't use areas within 300 feet of each side of a major access road or roads heavily used. Thus, on the Malheur National Forest, Forest Service staff are now purposefully creating core elk security habitat blocks, such as planned for the Austin timber sale, although it is unlikely to fully mitigate elk disturbance and displacement if the Austin sale is fully implemented.

The Oregon Hunters Association and the Oregon Department of Fish and Wildlife filed objections to the current Ellis sale on the Umatilla National Forest due to their concerns that the large scale timber sale would displace elk onto private ranches. Further, the Ellis sale proposes incredibly excessive "fuel" breaks for over 200 miles in length and including 500 feet on each side of the roads. Elk and deer hunters are also alarmed by the planned Mottet timber sale, which would eliminate most of the naturally denser great elk habitat all around Jubilee Lake and throughout the whole area. Elk would be displaced from the area if most or all of this intensive and extensive timber sale is implemented, even though the area is currently prime elk habitat. We saw multiple elk, including a herd, and many elk trails, elk beds, elk tracks, and elk wallows.

The Forest Service needs to stop prioritizing rampant high intensity logging and landscape scale timber sales which are destroying many other Forest values. The Forest Plan revisions need to stop the mass displacement of elk by protecting habitat for Management Indicator species, including Rocky Mountain elk.

The need to protect irreplaceable ash soils:

Another example of using updated science are the warnings of Forest Service scientists that ash soils are highly productive and water retentive and are being displaced—especially by steep slope logging and the use of heavy equipment on ash soils. These scientists point out that the region's ash soil layers and ash pockets were dispersed by the eruption of Mount Mazama, which created Crater Lake—7,000 years ago. This means that the ash soil layer could only be replenished over geologic time, and is thus irreplaceable. Soil scientists expressing these concerns include scientists with the Umatilla National Forest and the Wallowa-Whitman National Forest, in their analysis of potential environmental effects for at least two recent timber sale soil reports.

Thus, the ash soil loss must be prevented in the Forest Plan revisions to retain soil water retention and forest productivity, which are critical forest protections under extreme climate change heat waves, droughts, and fires. There should be no steep slope logging and no heavy equipment use on ash soil, which is easily displaced. Further, displaced ash soils can be blown away as excess fine sediment into stream systems, which can choke fish through their gills and cause turbidity, which can make it impossible to see their prey.

The need to protect high elevation moist mixed conifer forest and Subalpine fir/Lodgepole pine forest from logging:

Another missed chance for the Forest Service to use adaptive management was based on a consensus of Forest Service and other scientists at a Forest Service public meeting in Baker City years ago, where the scientists all agreed that fire risk reduction management should be prioritized for low elevation dry forest types in proximity to vulnerable residential communities. The scientists emphasized that high elevation moist mixed conifer should not be logged or otherwise managed for fire risk reduction. Yet the Forest Service continued to move timber sales into higher elevation moist, cool mixed conifer forest types even though the agency's scientists warned that these moist mixed conifer forests should not be logged, since these forest types are adapted to infrequent stand replacement severity fire, which also encompasses a mosaic from green or underburned to high severity fire. Infrequent fires could include long stretches of no major fires as long as up to 100 to 250 years or more.

Thus, the Municipal Watershed long-term protection for reliable community water supplies and downstream fish has long been by not logging them, which has worked. Retention of mature and old growth moist mixed conifer forest is far less flammable due to moisture retention from cooling canopy shade and from higher levels of precipitation, including longer-lasting snow packs. Logging the Municipal Watersheds have been proposed recently and usually rejected by the public. Logging would remove the most fire resistant mature and large trees, stimulate dense regeneration of highly flammable seedlings and saplings, remove large logs that retain moisture, leave flammable slash, and increase wind speeds and fire intensity through the stands.

Yet the Forest Service ignores these science findings by planning the Tiger Mill sale, which would log the high, wet Municipal Watershed, which supplies about 95% of the water supply for the city of Walla Walla. There would also be additional heavy logging throughout the never logged and old growth moist mixed conifer, which would become hotter, drier, and far more flammable if logged. While field surveying the Tiger Mill sale, we witnessed multiple live Englemann spruce with lightning scars from base to the crown which survived. While we were field surveying for weeks, Walla Walla was about 95 degrees Fahrenheit with no precipitation, while we experienced multiple days of constant rain, thunder and lightning—but no fires, and cooler temperatures of only up to 60 to 70 degrees in the daytime and as low as 40 degrees at night. These are all reasons why not to log high elevation moist mixed conifer and cold subalpine forest.

Likewise, the Mottet timber sale planned for all around Jubilee Lake on the Umatilla National Forest is naturally moist and naturally denser high elevation forest. Yet the entire area would be heavily logged—likely with various forms of clearcuts, such as Shelterwood cutting, Seed tree clearcutting, patch cuts, and partial retention. These would only leave small areas of old growth or original, never logged forest in wide open landscape scale clearcuts. Based on our field surveying, most of the commercial logging sale units were mostly never logged high quality old growth, and mostly moist mixed conifer forest with a high water table and numerous springs and streams and openings filled with alders.

The Forest Service needs to revise the Forest Plans to protect high elevation, moist mixed conifer—especially wherever the forest has never been logged or was never intensively logged, and/or is now old growth forest. Once these areas are logged, the old growth and never logged forest would never be the same, with severely degraded wildlife habitat and loss of recreational and cultural values over the long-term.

Past clearcuts turned into homogenous, even-age plantations should be restored to a natural state by making patch cuts and allowing for more diverse, native tree species to grow into the openings. Restoration efforts need to be gradual, not heavy handed or all at once.

Using Suzanne Simard's science discoveries to guide adaptive management:

The science regarding old tree carbon transfer to its seedlings and saplings just before the old trees die is based on Suzanne Simard's peer-reviewed science since the 1990's. It's time for the Forest Service to stop ignoring Suzanne Simard's ground-breaking body of science, including the critical inter-tree nutrient and carbon exchanges, even between different tree species. Thus, the proximity of trees to each other bolster the health and productivity of trees. Most tree species grow together in groups, including Redwoods, Ponderosa pine, and Douglas fir. Artificially widely spacing trees in basal area reduction (low tree retention). Planting trees in homogenous plantations causes extensive ground disturbance from high intensity logging, which breaks up mycorrhizal fungi communities that transfer nutrients and carbon to trees. Mycorrhizal fungi also enhance ecological forest health to alert trees in a stand to an impending defoliating insect epidemic so that the trees can use chemical defenses to limit the epidemic.

The Forest Plan revisions should incorporate and use for adaptive management strategies the science articles and findings in Suzanne Simard's book, <u>Finding the Mother Tree, Discovering the Wisdom of the Forest</u>. Simard's scientific discoveries are footnoted in the text, with full science article citations in an appendix in the back of the book.

Recovering beaver populations as adaptive management:

Another example of Forest Service staff moving forward based on new science includes reintroducing beavers as natural aquatic engineers that keep aquatic ecosystems with large, wet floodplains and abundant riparian hardwoods. The riparian hardwoods stabilize stream banks and shade waterways, keeping the water cool enough for fish species requiring colder temperatures. Riparian hardwoods also supply beavers with building materials and food for the winter, stored under the water. Riparian hardwoods also provide forage for elk and deer, especially in the winter. Riparian-associated warblers and Neotropical migratory songbirds depend on abundant riparian hardwood cover for concealment from predators, perches for foraging, and nesting structure. Beavers create braided stream channels and build dams to create large ponds, raising the water table and supporting lush plants across the flood plain. About 80% of wildlife species in the Blue Mountains depend on flourishing riparian areas, including major creeks, tributary streams, springs, lakes, and rivers, as well as fens. The Forest Plan revisions should incorporate goals, standards, and guidelines for reintroducing beavers to achieve riparian management objectives. There should be an enforceable standard not to allow beavers to be trapped on the National Forests or otherwise be killed.

<u>Aquatics</u>

<u>The 2012 planning rule and aquatic ecosystem protections</u>

The Blue Mountains encompass connectivity corridors regional importance, many of which follow closely and rely upon riparian corridors. The Blue Mountains also contain some of the longest free-flowing rivers in the United States. Rivers and streams in the region provide drinking water to many thousands of people, support unique and genetically important population of wild salmon and other imperiled species, provide world class fishing, support high-quality wildlife habitat for many species, and provide irreplaceable recreation opportunities.

For example, forested streams are part of complex and intricate ecosystems– ecosystems that need protection in order to continue to supply clean, cold water for humans and other species. A recent study from the Forest Service in 2022 found that approximately 90% of people in the West are served by public drinking water systems that rely on water from national forests and grasslands. The study also noted that "*a century of research has demonstrated unequivocally that forested lands provide the cleanest and most stable water supply compared to other land types*"

Another example: according to the Forest Service, national trends suggest that 42% of visitors list quiet recreation such as wildlife viewing, hiking, and fishing as their primary reason for visiting National Forests. The Deschutes NF alone receives eight million visitors annually. Preserving undeveloped and unroaded landscapes, core habitats, and aquatic connectivity is vital for ensuring that quiet recreation opportunities such as fishing continue to exist.

For these and many other reasons, the Eastside Screens and PACFISH/INFISH standards that protect stream and riparian ecosystems should be preserved and strengthened as part of the new Forest Plan revision. An alternative in the EIS should be included that preserves and strengthens standards such as RMOs, no-cut buffers in RHCAs, large tree protections, and other key ecosystem protections. We are opposed to any weakening or elimination of the PACFISH/INFISH standards that have been protecting stream ecosystems and clean, cold water for these past 30 years.

Strong, enforceable standards are needed to protect streams, fish, and water quality. A central component of any Forest Plan Revision for the Blue Mountains must include safeguards for fish and other aquatic and riparian species that depend on a sufficient quantity of clean, cold water in streams, rivers, tributaries, and wetlands.

The 2012 Planning Rule § 219.9 requires that Forest Plan components maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, and maintain and restore their structure, function, composition, and connectivity. The 2012 Planning Rule regulations go on to specify that the plan must include plan components that maintain or restore key characteristics associated with terrestrial and aquatic ecosystems, and rare aquatic and terrestrial plan and animal communities.

The draft Forest Plan is not adhering to the direction or regulations in the 2012 Planning Rules, as the draft Plan contains no requirements that define or protect the structure and composition of aquatic ecosystems. The draft Plan also does not include any mandatory standards to protect stream habitat components or water quality from logging, roading, and grazing—the primary threats which are most ubiquitously harmful to steam ecosystems and water quality across the landscape.

The draft Forest Plan contains only four standards for Riparian Management Areas. Three of those standards deal with issues such as herbicides, insecticides, and piscicides; mine waste; and aerial application of fire retardants, foams, and other fire suppression-related chemicals. The fourth standard states that livestock authorizations "shall be designed to avoid livestock trampling of federally-listed threatened or endangered fish redds."

None of the four standards for Riparian Management Areas (RMAs) include quantitative standards that define or protect specific stream habitat components or water quality. In addition, none of these standards address logging and activities associated with logging (such as road-related activities, hauling, skidding, landings, etc.). Logging and the associated road and log haul activities have many well-documented threats to stream habitat and water quality. The draft Plan's single standard for RMAs regarding livestock grazing contains no teeth for enforcement, and only includes direction to "avoid" livestock trampling of ESA-listed redds. "Avoid" is an extremely weak and subjective standard, and lacks any mechanism to ensure that livestock do not in fact trample redds—or salmonids at other life stages and other sensitive aquatic species.

Of the 18 guidelines proposed for RMAs in the draft Plan, 14 of the guidelines include language such as "*when feasible*", "*if practical*", "*avoid*", "*where physically feasible*", "*minimize*", and similar language that gives huge discretion to the Forest Service, contractors, and livestock holders. Guidelines are already near-impossible to enforce, and the additional loopholes and subjectivity the Forest Service has included render these gentle suggestions practically meaningless and utterly fail at protecting streams and water quality.

The draft Plan fails to comply with the 2012 Planning Rule direction to include standards and guidelines that will "*maintain or restore the ecological integrity of terrestrial and aquatic ecosystems in the watersheds in the plan area*." Unfortunately, the absence of clear, enforceable, and mandatory standards that protect streams from logging, roads, and livestock grazing will result in degraded ecosystems-- not in maintaining or restoring ecological integrity as required.

The 2012 Planning Rule also requires that Forest Plan components maintain or restore connectivity in terrestrial and aquatic ecosystems. The prioritization of vegetation management and silvicultural treatments (i.e., logging) within RMAs—especially in combination with the elimination of RMOs and other PACFISH/INFISH standards--will increase their fragmentation, and so is not in compliance with the direction of the 2012 Planning Rules to maintain or restore connectivity.

The Blue Mountains Forest Plan Revisions should include, in an alternatives analysis, the reserve system proposed in Law et al.'s peer-reviewed research Strategic reserves in Oregon's forests for biodiversity, water, and carbon to mitigate and adapt to climate change (**Exhibit 29**) and Strategic Forest Reserves can protect biodiversity in the western United States and Mitigate Climate Change (**Exhibit 63**). Such a reserve system would ensure the maintenance and restoration of aquatic and terrestrial connectivity and diversity, and protect key ecosystem components including those crucial to the structure, composition and function of aquatic ecosystems such as large wood, pool frequency and depth, base and peak flows, hyphorehic flows, and more.

Law et al. 2022 developed "*a regional framework to specifically identify at a fine resolution (30 m) high priority forestlands for preservation in Oregon, USA. We include a resilience metric that represents connectivity and topographic diversity, and identify areas within each ecoregion that are ranked high priority for carbon, biodiversity, resilience and drinking water. Oregon has less than 10% of its forestlands protected at the highest levels, yet its temperate forests are among those with the highest carbon densities in the world. Reserves for surface drinking water sources and forest habitat for birds, mammals, amphibians, and reptiles could increase to 50–70% protection at the highest levels by 2050. Protected aboveground biomass carbon could triple to 635 teragrams of carbon by 2050."*

The authors also noted in Law et al. 2023 that they: "*developed a framework that prioritizes forestlands for preservation using spatial metrics of biodiversity and/or carbon within each ecoregion. We show that meeting this preservation target would lead to greater protection of animal and tree species habitat, current carbon stocks, future carbon accumulation, and forests that are important for surface drinking water. The highest priority forestlands are primarily owned by the federal government, though substantial areas are also owned by private entities and state and tribal governments. Establishing Strategic Forest Reserves would help protect biodiversity and carbon for climate adaptation and mitigation.*" The Forest Reserve system they propose, which includes reserves in the Blue Mountains, should be analyzed and adopted as an alternative in the Blue Mountains Forest Plan Revision. Such a Reserve system would actually meet the intent, language, and direction of the 2012 Planning Rule, and would protect terrestrial and aquatic ecosystem integrity and diversity.

Further, work from Mildrexler et al. 2023 *Protect large trees for climate mitigation, biodiversity, and forest resilience* builds on this and other peer-reviewed work that is site-specific to the Blue Mountains. By adopting the recommendations in Mildrexler et al. 2023, streams and water quality would be protected through the retention of large trees, which are crucial for clean water, watershed hydrology, stream habitats and ecosystems, and aquatic and terrestrial diversity. Large trees comprise only 3% of trees on the landscape in the Blue Mountains, and should be protected from logging with strong standards.

Approximately 75% of eastside terrestrial species depend upon riparian habitats for their life cycle needs or use these habitats more than others (Henjum et al. 1994). Riparian and aquatic ecosystems are heavily reliant on large tree structure (including large living trees, large trees with cavities, large snags, large downed wood, and large woody debris in streams). Aquatic ecosystem integrity is intertwined with mature and old forests—and includes large *and* old trees, not *just* old trees.

Unfortunately, the Forest Service is instead proposing to further fragment forests and degrade ecosystem integrity by eliminating the strong, quantitative standards that have protected streams and water quality for the past 30 years. The current Forest Plan protections for stream habitat components and water quality under PACFISH/INFISH are based on the biological needs of native trout and salmonids. The Riparian Management Objectives that protect streams and cold, clean water include measurable, quantitative standards for stream habitat components such as water temperature, fine sediment/embeddedness, shade, pool frequency, width to depth ratios for pools, amounts of large woody debris in streams, bank stability, degree of cutbanks, and more. In addition, no-cut Riparian Habitat Conservation Areas (RHCAs) have served to protect many riparian forests and stream habitats for decades.

While the Forest Service has, in recent years, increasingly been logging within RHCAs, the strong and quantitative standards in PACFISH/IINFISH stopped or curtailed most logging within RHCAs for approximately 30 years. In the past several years the agency has, regrettably and increasingly, been working to skirt regulations and exploit loopholes, in order to ignore RMOs and PACFISH/INFISH buffers. The agency has increased logging, including commercial logging, within streamside buffers-- despite strong evidence that logging degrades or destroys stream habitat components, ecosystem integrity, and water quality. Conversely, there is a veritable mountain of research showing that protecting RHCAs from logging has helped streams and aquatic species move towards recovery. This includes evidence showing that the Eastside Screens and PACFISH/INFISH protections are key for the recovery of streams and ESA-listed and imperiled fish.

For example, the published study *Did changes in western federal land management policies improve salmonid habitat in streams on public lands within the Interior Columbia River Basin?* (Roper et al. 2019) examined stream habitat data in the Columbia Basin, including in National Forests in the Blue Mountains in eastern Oregon and southeastern Washington. **Exhibit 64.** The authors note that "***Historic management actions authorized or allowed by federal land management agencies have had a profound negative effect on salmon, trout, and char populations and their habitats"*** and that their findings ***"…support the hypothesis that changes made in management standards and guidelines in the 1990s are related to improved stream conditions."***

The Roper et al. 2019 authors evaluated "*the status and trends of ten stream habitat attributes; wood frequency, wood volume, residual pool depth, percent pool, pool frequency, pool tail fines (< 6 mm), median particle size, percent undercut banks, bank angle, and streambank stability in managed and reference catchments following changes in management policies."* The authors note that their research *"provides affirmation that reducing or altering how resource extraction efforts are conducted near streams has fostered the conservation of habitats that sensitive and ESA listed aquatic species require."*

The findings from the Roper et al. 2019 study regarding stream habitat components crucial for ESA-listed fish found that the:

> *trends towards increased median particle size and fewer pool tail fines in managed stream reaches suggest efforts to limit sediment inputs from timber harvest, road construction, improved road maintenance, and by decommissioning road segments have likely led to streambed substrate conditions in managed catchments that are more suitable to salmonids today than they were two decades ago (Furniss et al. 1991; Cristan et al. 2016). As streambed sediment size plays an important role in salmonid occupancy (Al-Chokhachy et al. 2010b) and spawning success (Chapman 1988; Buffington et al. 2004), the trends in these stream habitat metrics should*

ultimately increase the capacity of managed stream reaches to produce salmonids. Increases in wood frequency and wood volume further support the hypothesis that changes in land management policies have improved stream habitat conditions.

The Roper et al. 2019 authors also noted that:

managed streams had approximately a third less wood than reference streams at the beginning of this study (2004) likely reflects historic land management activities that had greatly reduced the amount of wood reaching and being maintained in managed streams (Ralphs et al. 1994; Kershner et al. 2004b; Steel et al. 2016).

This finding further bolsters evidence that logging degrades crucial stream habitat components.

The Roper et al. 2019 study concluded that

our analysis indicates the status and trends of stream conditions in a subset of managed catchments, as measured by their value to salmonids and compared to reference conditions, were generally improving within the study area. Improvements in stream conditions suggest the Forest Service and BLM are addressing their legal mandate to implement conservation actions that improve the habitat of ESA listed salmonid species. This improvement is likely in part due to more conservative riparian management standards implemented in federal land management plans in the Pacific Northwest (Boisjolie et al. 2017). In addition to limiting activities in 100 m wide riparian habitat conservation areas on both sides of fish bearing streams, federal managers have put in place best management practices to limit sediment input to streams from roads (Al-Chokhachy et al. 2016; Sosa-Pérez and MacDonald 2017), and have greatly reduced the amount of timber harvested from federal lands in the region (Adams et al. 2006). Given the conservative nature of these 20-year-old management plans, it should not be surprising that many stream conditions have responded positively to these changes over this timespan.

Roper et al. 2022 (**Exhibit 65**) notes that:

Less than half of the western wadable streams are considered to be in good condition (Faustini et al. 2009), and most large rivers have been substantially altered (Bond et al. 2019). We found that ***natural disturbance events tended to have a neutral or beneficial effect on stream conditions important to salmonids.*** *This suggests that federal managers should strive to maintain the ecosystem components that foster natural disturbances, such as vegetated riparian areas, natural stream flows, and beavers (Pollock et al. 2014; Justice et al. 2017; Roper et al. 2019). To do this,* ***public land managers must continue to address legacy conditions that constrain stream channel response, such as the loss of beaver, roads in the floodplain, and areas where the riparian zone has been harvested*** *(Obbard et al. 1987; Meredith et al. 2014; Yeung et al. 2017) while making progress towards aquatic systems that are more resilient to climate change (Jaeger et al. 2014; Gendaszek et al. 2020).* Roper et al. 2022 also note that *"Lastly, there* *appears to be a trend towards decreased stream flow in some channels (Zhang et al. 2021).* ***As stream channels in managed landscapes are more prone to diversion and are inherently drier than unmanaged catchments (especially those that are grazed; Table 1), they appear to be more susceptible to run dry at some point during the summer*** *(Jaeger et al. 2014).”*

The Holthuijzen 2021 study, *Passive Restoration of a small mountain stream in eastern Oregon* found that passive restoration of a small stream over 11 years resulted in substantially lower stream temperatures, increased shade, and increased trees and shrub cover over the stream. **Exhibit 66.** The author notes:

In this study, I documented the results of 11 years of passive restoration of a small mountain stream in northeastern Oregon. Removal of the main stressors on the system, grazing and agricultural practices, resulted in a strong recovery of the riparian vegetation over the middle two-thirds of the reach. Cover of trees and shrubs tripled, tree density increased sevenfold, and stream shading fourfold over the period 2007 through 2018. Average maximum daily stream temperature declined by 2.1 to 2.8 °C, and average maximum diurnal temperature range narrowed by 3.7 to 4.6 °C. Recolonizing American beavers (Castor canadensis) played an essential role in improving the condition of the streambed over 18% of the reach. Their dams and ponds initiated the process of streambed aggradation and transformed the single-thread, incised channel into a multi-thread configuration within beaver complexes. Vegetation expansion was much stronger in impounded than in un-impounded parts of the stream. Passive restoration was not effective in two sections, together comprising one-third of the reach. In the upper part of the stream, recovery stalled because of continued (unauthorized) trespass grazing during late summer and fall. The channelized lower section of the stream was too severely modified for measurable recovery to occur. I concluded that ***11 years of passive restoration improved the functionality of the stream from 24% to 32%, and within beaver complexes, up to 57% of its pre-disturbance condition.”***

The Roper et al. 2019, Roper et al. 2022, and Holthuizen 2021 studies, along with many others, bolsters existing evidence that protections from the Eastside Screens and PACFISH/INFISH, in greatly limiting upland logging and providing large no-cut buffers along streams, have been responsible for moving stream ecosystems towards recovery and helping to restore ecosystem integrity over the past 30 years. It is unconscionable that the Forest Service, with this Forest Plan Revision, is proposing to repeat the mistakes of the past by increasing both upland and streamside logging while simultaneously eliminating the PACFISH/INFISH quantitative standards put in place to protect stream habitat components, water quality, and imperiled fish and aquatic species. The Roper et al. 2019 and 2022 studies also add to a large body of research that shows that logging and road-related impacts harm stream habitats, aquatic ecosystems, and water quality.

In addition, the 2012 Planning Rule requires that, in order to maintain ecosystem diversity, Forest Plans must include components that maintain or restore key characteristics associated with terrestrial and aquatic ecosystem types. PACFISH/INFISH protections have been effective in protecting diversity because they include standards that protect the key characteristics of aquatic ecosystems such as large wood in streams, pool frequency, and other RMOs. The draft Plan, which eliminates standards for key ecosystem characteristics, does not comply with the requirements of the 2012 Planning Rule.

In the Draft Forest Plan Revision, the first objective listed for RMAs (Objectives (MA3A-RMA OBJ)) is to *"Maintain or restore riparian management area habitat conditions through active vegetation and floodplain management, such as planting, seeding, silvicultural thinning, use of fire, floodplain reconnection, changes to livestock distribution, or invasives species removal."*

Despite the scientific evidence showing that passive restoration has been responsible for moving streams towards recovery, the Forest Service is instead choosing to prioritize active vegetation management and silvicultural strategies (i.e., logging). While other active restoration methods are included, and often much less scientifically controversial, the Forest Service and the collaboratives have a long track record of being ahead of stated goals for logging, and lagging far behind on goals for other aquatic restoration methods such as culvert repair.

The Forest Service lumps logging in with other much less controversial restoration strategies, all under the "active restoration" banner. This is a disingenuous greenwashing tactic, and creates confusion for the public and in monitoring efforts.

We also note that restoration such as culvert repair and removal, road decommissioning, and road closures were not even mentioned in the Forest Service's examples of active restoration. Road-related impacts are likely the primary driver of water quality and stream habitat impairments on National Forests, yet the Forest Service has consistently failed to address or take decisive action on this issue.

In addition, the agency's attempts to replace the natural role of wildland fire with mechanical activities, such as reducing stand densities and fuel accumulations through logging and crushing fuels, will require regular active maintenance indefinitely. Strategies that require repeated stand entries to maintain reduced fuel loads in "restored" forest stands will further compact soil, reducing site productivity and aggravating erosion, while also severely damaging hydrological function, and will fail to restore landscape processes that are vital to resilient ecosystems. It is doubtful that restoring landscape conditions for vegetative composition, structural stage distribution, and stand structure & density distributions of pre-settlement forested ecosystems in the Blue Mountains will lead to increased forest resiliency in the face of changing climatic conditions and evolving disturbance regimes and ecosystem processes, or that such restoration strategies truly comprise restoration (Kauffman et al. 1997 [**Exhibit 67**], Langston 1999 [**Exhibit 68**], Millar and Woolfenden 1999 [**Exhibit 69**], Kauffman 2004 [**Exhibit 70**], Noss et al. 2006a [**Exhibit 71**]). For the forests of the Blue Mountains physiographic province to achieve the resiliency necessary to adapt to climate change and provide ecosystem services for social and economic needs, fire, as the primary disturbance agent and driver of ecological change in pre-settlement conditions under which these forests evolved, must be returned to its historic role in maintaining old forests and also in initiating new early seral ecosystems.

Fire is ecologically beneficial in low, mixed, and high severity regimes, and provides critical processes, such as nutrient cycling and creation of high-value patchy habitat mosaics (Agee 1998 [**Exhibit 72**], Franklin and Johnson 2012 [**Exhibit 73**], Hessburg et al. 2015 [**Exhibit 74**]), which cannot be fully replicated through mechanical treatments in either stand-level ecological effect or on landscape-level distribution (DellaSala et al. 1995 [**Exhibit 75**], Agee 2002 [**Exhibit 76**], Noss et al. 2006a). In direct contradiction to the silvicultural-focused strategies proposed in the draft Plan, research demonstrates that for restoration to be effective, it should focus on protecting ecosystem components and processes, rather than focusing on target stand structures or fire ratings (Reinhardt et al. 2008 [**Exhibit 77**]), and that managing for ecosystem processes can be far more cost-efficient and ecologically appropriate in managing dry western forests (Agee 2002, Noss et al. 2006a).

Roads and aquatic ecosystems

Road densities that exceed current standards are a regular problem in watersheds and across eastside forests. Existing road density in many areas of National Forests in the Blue Mountains is well above the 2-miles/square mile NOAA (1996) threshold for watersheds to be considered "properly functioning". **Exhibit 78.** NOAA (1996) notes: properly functioning: 2 miles/sq mile; at risk 2-3 mi/sq mi; not properly functioning >3mi/sq mile. The widespread, chronic negative impacts to watersheds and streams caused by the bloated, unsustainable, and badly managed road network across public lands must be addressed by the agency.

Furthermore, the Malheur and Wallowa-Whitman National Forests have not yet completed Travel Planning as required by the 2005 Final Rule for Travel Management. These Forests currently have existing road densities at levels that are recognized as threats to water quality, fish, and watershed health, and exceed Forest Plan standards for road density in many watersheds, including those designated for prioritizing the protection of water quality and fish. Wilderness and Roadless areas occupy a small percentage of National Forests in the Blue Mountains, and the excessive road density outside of these areas has serious and ongoing negative ecological consequences for the majority of watersheds on these forests. Wilderness areas, for example, occupy approximately 17.1 percent of the combined area of the Malheur and Wallowa Whitman National Forests, and only four percent of Oregon's total land area.

The bloated and sprawling road systems on National Forest lands, including the Malheur and Wallowa-Whitman National Forests, are fiscally burdensome as well as ecologically harmful. In discussing budget shortfalls, the Forest Service notes, for example, that on the Wallowa-Whitman National Forest, it would take approximately $64 million dollars to bring the entire road system back up to standard, and approximately $6.8 million dollars to keep it that way. (US Forest Service (2015). Malheur National Forest Forest-Wide Travel Analysis. Pg. 28.)

Across Oregon and Washington, the USFS manages approximately 90,000 miles of roads. The agency notes that it is "a challenge to maintain all roads to proper safety and environmental standards to increased use, aging infrastructure, and decreasing budgets. Many roads, built between 1950 and 1990, have exceeded their designated lifespan and require costly repairs. Unmaintained roads and infrastructure can impact water quality and wildlife habitat, especially fish-bearing streams. Backlog maintenance projects top $1.2 billion, and funds available for road maintenance are only about 15% of what is needed to fully maintain the current road system." (US Forest Service. Webpage. Accessed at: https://www.fs.usda.gov/detail/r6/landmanagement/?cid=fseprd485439])

The Malheur National Forest contains 7,033 miles of open roads and 2,637 miles of closed roads, for a total of 9,670 miles of existing inventoried roads. The Wallowa-Whitman has 4,633 miles of open roads and 4,486 miles of closed roads for a total of 9,119 miles of existing roads. One could drive from the northwestern tip of Washington state to the farthest northeastern tip of Maine, down to Miami, Florida, over to San Diego, California, and back up to the northwestern tip of Washington state, and still not have traveled as many road miles as are contained in either the Malheur or Wallowa-Whitman National Forests. The USFS notes that "of the 90,000 miles of Forest Service roads in Oregon and Washington, about 2/3 of those are currently open and maintained for both public and administrative uses." The USFS estimates that approximately 12% of the overall road network is "likely not needed", with many of these unneeded roads already being "closed or stored", and only about 20% or 2,000 miles being currently open to the public. (US Forest Service. Travel Analysis Report. Wallowa-Whitman National Forest. Table 3, page 19. Accessed online at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd486098.pdf)

What is the overarching plan with road access for such repeated management for this and other projects on the Malheur, Umatilla, and Wallowa-Whitman National Forests? Does the Forest Service intend to maintain the bloated and expensive road network that exists, which the FS has admitted it does not have the funding to maintain or fix? The agency has admitted the road networks on these Forests are causing detrimental impacts to fish and water quality, as well as negative impacts to species such as elk and other animals sensitive to roads. The Forest Plan Revisions must include the massive road system, and the widespread and often disastrous damage these roads are causing to streams, water quality, and imperiled aquatic species.

Repeatedly, managed watersheds suffering the effects of high road densities and other management impacts (such as those from logging and livestock grazing) have worse outcomes for water quality and imperiled fish. For example, a NOAA 5-Year Review of Snake River Salmonids (2011) found that:

> *Information from the [PACFISH Biological Opinion Monitoring Program] PIBO monitoring program indicates that* ***unmanaged or reference reaches (streams in watersheds with little or no impact from road building grazing, timber harvest, and mining) on Federal lands in the Interior Columbia basin (including the Snake River basin) are in better condition than managed streams*** *(Al-Chockhachy et al. 2010b).* ***In particular, managed watersheds with high road densities or livestock grazing tend to have stream reaches with worse habitat conditions than streams in reference watersheds. When roads and grazing both occur in the same watershed, the presence of grazing has an additional significant negative ffect on the relationship between road density and the condition of stream habitat*** *(Al-Chockhachy et al 2010b). These results indicate that legacy effects of historic management still are manifest in the current condition of streams on Federal lands in the Interior Columbia basin and ongoing management may still be affecting stream recovery rates."*

Exhibit 79.

The bloated road networks on National Forests lands threaten the long-term viability of imperiled and ESA-listed fish such as MCR steelhead and Bull trout, and other imperiled or sensitive aquatic species. The Forest Service notes (**Exhibit 80**) that "*[t]he most important road related environmental issue is the effects of roads on aquatic resources in general, and specifically Threatened, Endangered and Sensitive aquatic species (bull trout, mid-Columbia steelhead, and Columbia spotted frog).*"

Increased road densities have been correlated with low population levels and declines in bull trout and other aquatic species that rely on clean, cold waters. **Exhibit 81; Exhibit 82.** Of particular concern are roads that interact with stream channels. Such roads are likely to have disproportionately negative effects on water quality and sensitive fish. **Exhibit 83.** Sedimentation from roads is known to be one of the largest contributors for degradation to water quality as well as a source of degradation to fish habitat and spawning areas. Roads in disrepair create safety issues and conflicts with protection for natural resources, especially for those such as water quality, aquatic species, and functioning wetland processes.

Carnefix and Frissell (2009) (**Exhibit 84**) discussed impacts from roads, and show that significant negative impacts to sensitive aquatic species are present at road densities greater than one mile per square mile:

> *Multiple, convergent lines of empirical evidence summarized herein support two robust conclusions: 1) no truly "safe" threshold for road density exists, but rather negative impacts begin to accrue and be expressed with incursion of the very first road segment; and 2) highly significant impacts (e.g., threats of extirpation of sensitive species) are already apparent at road densities on the order of 0.6 km per square km (1 mile per square mile) or less. Therefore, restoration strategies prioritized to reduce road densities in areas of high aquatic resource value from low-to-moderately-low levels to zero-to-low densities (e.g., 1 mile per square mile, lower if attainable) are likely to be most efficient and effective in terms of both economic cost and ecological benefit. By strong inference from these empirical studies of systems and species sensitive to humans' environmental impact, with limited exceptions, investments that only reduce high road density to moderate road density are unlikely to produce any but small incremental improvements in abundance, and will not result in robust populations of sensitive species.*

National Forests have acknowledged the risks that roads and high road densities have on fish and water quality, not only when limited to roads directly within the RHCAs. For example, in the Upper Touchet sale on the Umatilla NF, the FEA states: "Road density is used as an indicator of potential for affects to hydrologic function (extension of the stream network) and water quality (sediment delivery to surface waters). Stream crossings are used as an indicator of the degree of connectivity between the road system and the drainage network. To the degree that roads are connected to the drainage network the risk of road sediment reaching surface waters is increased, the drainage network is lengthened and the potential for precipitation to drain more quickly, with less residence time in the watershed is increased. Roads have the potential to intercept surface and subsurface water, reducing infiltration and increasing the delivery of water to channels. Roads which are hydrologically connected are a risk to water quality.

Sedimentation may be increased by surface erosion from roads and the ability of road drainage to route sediment to channels."

Also from the Upper Touchet DEA:

Roads have the potential to intercept surface and subsurface water, reducing infiltration and speeding the delivery of water to channels. Sedimentation may be increased by surface erosion from roads and the ability of road drainage to route sediment to channels. Road density alone does not indicate slope position, another critical factor. Valley bottom roads have the most direct effect on streams and riparian areas because of accelerated erosion and loss of streamside shade. Mid-slope roads intercept subsurface runoff, extend channel networks and accelerate erosion, and ridge top roads can influence watershed hydrology by channeling flow into small headwater swales, which may accelerate channel development. McCammon (1993) assigned three watershed risk classes based on road density (mi/mi2) to assess the potential of road impacts to adversely affecting hydrologic function and water quality: low (< 3), moderate (3.1-4.5) and high (> 4.5). The Upper North Fork Touchet SWS road density is 1.4 mi/mi2."

Another example the USFS's Draft EA for the Mill Creek sale in the Ochoco NF*:*

"Roads are a major source of erosion and stream sedimentation on forested lands. Roads can increase erosion rates and turbidity three orders of magnitude greater than the undisturbed forest condition (Megahan 1974). Sediment eroded from the road prism can be delivered to a forest stream, resulting in increased turbidity, sediment loads, and degraded habitat for fish. Research has shown that roads have the greatest effect on erosion relative to other forest management practices (Megahan and King 2004)."

Aquatic species

The INFISH and PACFISH "no logging" buffers need to be retained, with further riparian buffering from logging and roads based on updated science showing that logging adjacent to Riparian Habitat Conservation Areas (RHCAs) or on steep slopes above RHCAs can raise the water temperature detrimentally in streams.

The Forest Service has a terrible record of destroying and degrading riparian ecological processes and functions through logging, roading, and livestock grazing within RHCAs. It makes no sense to continue to allow logging, roading, livestock grazing, and beaver trapping (except to relocate and reintroduce beavers to other riparian areas) within RHCAs, which is contradictory to achieving Riparian Management Objectives under INFISH and PACFISH and to building beaver analogs to restore riparian processes and functions.

The RHCA buffers need to be retained in the Forest Plan revisions as protective buffers with no allowed logging, tree removal, road construction or re-opening of closed roads, and no heavy equipment use in RHCAs, with the exception of culvert removal or replacement and aquatic restoration for beaver dam analogs or moving trees with root wads into the stream channels to create pools for fish and other aquatic life. Livestock such as cattle and sheep need to be kept out of the RHCAs. Some ranchers in at least two different areas of the Malheur National Forest are trying their best to keep the cattle out of the riparian areas—by using temporary electric fencing to keep them out of the meadows and streams while moving them and by horseback riders moving the cattle frequently (daily or within three days) away from the creeks and other riparian areas (around Murderer's Creek and Camp Creek). The fenced exclosure that keeps out cattle and wild horses around the Murderer's Creek wide floodplain is the best way to exclude livestock and wild horses long enough for the creek and the floodplain fully recover.

There needs to be more emphasis on protecting water ways and water retention through livestock exclusion from riparian areas, active herding of livestock, and beaver analog dams built for reintroduction of beavers. Water retention is more important than ever due to unprecedented heat waves, prolonged droughts and higher temperatures due to extreme climate change. The RHCA buffers under INFISH and PACFISH are still scientifically sound, with new science indicating the need for RHCA buffers adjacent to the established RHCAS. Ecologically sound aquatic restoration and retention of existing and larger RHCA buffers are needed to ensure the viability of Threatened Bull trout, Threatened Mid-Columbia Steelhead trout, Threatened salmon species such as Chinook salmon, and Sensitive Redband trout and Malheur Mottled Sculpin, as well as other aquatic species in decline, such as snail and mussel species, and Sensitive Columbia spotted frog and Rocky Mountain tailed frog.

A NOAA 5-Year Review of Middle Columbia River Steelhead (2011), **Exhibit 85**, states: ***"many ongoing threats to steelhead habitat could be ameliorated by strengthening existing regulatory mechanisms"***.

Fish stocks are stronger and better distributed in areas of little or no management and low road densities, even in fire suppressed areas, and even if severe fires occur. Numerous studies have implicated roads as a primary factor in altering watershed hydrology and/or declines in fish stocks, and show that many benefits are gained by leaving forests unroaded and to their own ecological processes (including processes involving fire, insects, and disease). (Bader 2000 [**Exhibit 86**]; Bradley et al. 2002 [**Exhibit 87**]; Carnefix and Frissell 2009 [**Exhibit 84**]; DellaSala et al. 2011 [**Exhibit 88**]; Frissell and Carnefix 2007 [**Exhibit 89**]; Rieman and Clayton 1997 [**Exhibit 90**], Rieman et al. 2000 [**Exhibit 91**], Thurow et al. 2001 [**Exhibit 92**]; Public Lands Initiative/Trout Unlimited 2004 [**Exhibit 93**]; Western Native Trout Campaign 2001 [**Exhibit 94**]; Quigley and Arbelbide 1997 [**Exhibit 95**]).

The Forest Service often downplays or ignores threats to fish and aquatic species from logging, roading, and livestock grazing—while simultaneously exaggerating the risk to ESA-listed fish from wildfire, despite research showing otherwise.

For example, the Forest Service's proposed Forest Plan Revision (2014) vol 2. pg 60 admitted that Redband trout will recolonize a stream relatively rapidly after experiencing severe fire: *"Redband trout and bull trout have been shown to recolonize severely burned drainages within two years, provided the drainages were physically accessible (i.e., no culvert barriers, and provided that other fish in unburned areas were close enough to discover and move back into the recently burned habitat"*.

In addition, Olson 2000, in her literature review for her master's thesis research on riparian forests in eastern Oregon noted: *"local extirpation of fishes is often patchy in the case of extensive high severity fires, and that recolonization is rapid."* **Exhibit 96.**

Similarly, the Forest Service study *Effects of Wildfire and Subsequent Hydrologic Events on Fish Distribution and Abundance in Tributaries of North Fork John Day River* by Howell (2006) looked at fish distribution after the Tower Fire in the Upper John Day Basin. **Exhibit 97.** Much of the Tower Fire burned at moderate to high severity. Howell's research found that fish populations, including steelhead and Chinook salmon, were highly resilient to wildfire and had rebounded to approximately pre-fire levels by four years. From the study:

> *"After the Tower Fire, "intense spring storms in 1997 and 1998 triggered large floods, landslides, and debris torrents that affected streams within and downstream of the fire." The authors investigated "the effects of the fire and ensuing floods on fish distribution and abundance in three streams immediately after the fire through 2003. Immediately after the fire, no fish were found in moderate- and high-intensity burn areas. Fish began to repopulate defaunated reaches the year after the fire, and within 4 years distribution of juvenile steelhead (anadromous rainbow trout Oncorhynchus mykiss) and resident rainbow trout was similar to that before the fire. Juvenile spring Chinook salmon O. tshawytscha also began to use lower reaches of one of the streams after the flood, which had eliminated a culvert near the mouth of the stream suspected to be a barrier. Densities in most burned reaches and in unburned reaches downstream of the fire have rebounded to levels similar to or greater than densities in reference streams outside of the fire. An isolated introduced population of brook trout Salvelinus fontinalis also recovered. Thus, despite the size and severity of the fire, postfire hydrologic events, and human-induced changes to watersheds, fish populations were highly resilient."*

> *"The appearance of juvenile Chinook salmon in Oriental Creek after elimination of the culvert at the mouth and the contribution of roads to flood effects in that drainage emphasize that there may be threats to aquatic species other than fire that warrant management attention. Restoring landscapes and disburbance patterns to more closely resemble what native species evolved with may also be beneficial (e.g., Rieman et al. 2000), to the extent that is possible, especially given current climate trajectories (Meyer and Pierce 2003; Whitlock et al. 2003; Pierce et al. 2004). Managers need to carefully consider the risks and justification for fire-related forest management as well as other actions that may be of more immediate or greater consequence for aquatic species. Understanding how fish respond to fire is an important step in assessing those risks."*

Additionally, research by Rosenberg et al. 2012 *Fish Life Histories, Wildfire, and Resilience—A Case Study of Rainbow Trout in the Boise River, Idaho*, **Exhibit 98**, found that rainbow trout are resilient to wildfire, except in very small and isolated habitats:

> *"Even without a steelhead life history present, freshwater resident rainbow trout appear resilient in the face of wildfire, except in the smallest and most isolated*

habitats, as would be expected in theory and from the few empirical data available for salmonid fishes (Dunham and others 2003). Resilience is shown in the ability of rainbow trout to rapidly recolonize habitats following disturbance, variable responses to changing environments (e.g., growth, age at maturity), and maintenance of large enough numbers of adults to avoid genetic drift in the face of disturbance. Lower resilience is evident when other constraints imposed by humans (e.g., movement barriers, nonnative trout) limit the species' ability to respond to disturbance (Bisson and others 2009; Healey 2009; Waples and others 2009; Greene and others 2010)."

"Wildfire can lead to a variety of changes in stream environments (Minshall 2003). In the Boise River, recent wildfires ranged from light to severe burns (Dunham and others 2007), leading to variable changes in riparian and hillslope vegetation, and in some cases initiation of major channel reorganizing events (Benda and others 2003; Miller and others 2003). These events often involved massive erosion of stream channels, sometimes throughout an entire tributary. In the latter case, local populations of rainbow trout were reduced to undetectable levels (Burton 2005). In others, a patchwork of wildfire appeared to eliminate rainbow trout from some reaches of stream, but not others (Rieman and others 1997). Following these wildfires, water temperatures remained elevated for several years, particularly for streams influenced by channel reorganization (Dunham and others 2007; Figure 1). In spite of these dramatic environmental changes, rainbow trout have remained widespread in streams within the Boise River (Dunham and others 2007). What characteristics of this species' biology have conferred resilience in the face of these massive disturbances? What constraints may limit resilience? One key to species resilience may be the expression of diverse and flexible life histories (Bisson and others 2009; Healey 2009; Waples and others 2009; Greene and others 2010). Our work on rainbow trout suggests the species is flexible in terms of how individuals and populations respond to variable environments, and that ***responses can be constrained by human influences that alter natural variability****. The two major constraints we focus on here* ***are invasions of nonnative trout (Neville and Dunham, in press) and loss of connectivity caused by stream culverts that block fish passage (Neville and others 2009)."***

In the peer-reviewed study *Loss of riparian forests from wildfire led to increased stream temperatures in summer, yet salmonid fish persisted* by Warren et al. 2022, the authors investigated salmon abundance after moderate and severe wildfire in Western Oregon. **Exhibit 99**. Contrary to the authors' expectations, they found that fish abundances persisted and even increased by more than threefold in both of the study reaches. The authors state:

"In the first summer following a severe wildfire in western Oregon, we observed the initial persistence of populations of O. clarkii clarkii (coastal cutthroat trout) and O. mykiss (rainbow/steelhead trout). The fire burned the entire catchment, including the riparian area (~76% of the watershed area burned at moderate or high severity), resulting in stream temperature that regularly exceeded 20C and represented increases of 6–7C relative to prefire conditions. However, the mechanisms enabling the persistence of cold-water fishes despite the dramatic

increases in stream temperature remain unclear and require further investigation."

In the Schwartz and Warren 2023 study *Wildfire in western Oregon increases stream temperatures, benthic biofilms, and juvenile coastal cutthroat trout size and densities with mixed effects on adult trout and coastal giant salamanders*, **Exhibit 100**, the authors found mixed results—including increased biomass, density, length, and weight of juvenile cutthroat trout in post-fire areas.

> *Our data support the suggestion that fish in these systems are resilient to this type of disturbance; however, temperature increases that are not accompanied by increased food availability may pose greater threats to aquatic vertebrate populations. The differential response of juvenile and adult fish seen here also suggests population-level resilience even if the adult fish are negatively affected in systems with large temperature increases.*
>
> *In contrast to adult fish, juvenile coastal cutthroat trout biomass, density, mean weight, and mean length increased post-fire (Fig. 6b). The increase in density is likely due to a number of factors including greater basal resource availability and earlier insect emergence (Malison and Baxter 2010; Harris et al. 2018).*
>
> *We evaluated wildfire impacts on aquatic ecosystems in a replicated Before-After Control-Impact study 1 year after a severe wildfire in western Oregon, U.S. Stream temperature, chlorophyll a accrual, and age-0 coastal cutthroat trout size, density, and biomass increased in all three burned streams relative to changes in three unburned references. When streams were evaluated collectively, fire did not have an effect on larger vertebrate density or biomass. However, considering streams individually, two severely burned sites had substantial temperature increases and declines in larger vertebrate density and biomass, but the moderately burned site had modest temperature increases and adult cutthroat trout and Pacific giant salamanders increased. The loss of riparian canopies post-fire increased temperature and algae, but fish responses varied with age class and larger vertebrate responses were inconsistent.*

Aquatic ecosystems in the Blue Mountains evolved with and are adapted to wildfires, including high-severity wildfires. Such disturbances are integral to the structure, function, composition, and dynamics of stream ecosystems. Logging cannot and does not mimic natural processes. Logging and roads have ubiquitous, long-term, and chronic detrimental impacts to watershed hydrology and aquatic ecosystems that these systems are not evolutionarily equipped to handle, and do not easily recover from. While wildfire may have variable and complex effects on imperiled fish and their habitats, they also benefit from wildfire. For example, wildfire is crucial for the creation of stream structures and habitats for aquatic and riparian species, ensuring habitat complexity and biodiversity, and more. While wildfire can have detrimental impacts on aquatic species, these effects are shown by research to be short-term. More negative and long-term negative impacts are generally associated with pre-fire habitat degradation and fragmentation, such as the presence of artificial fish passage barriers because of faulty culverts and stream crossings, heavy logging, degradation from livestock, and other such management.

Salmonids and other migratory fish are also facing dire and ongoing threats from dams, and the ever-increasing effects from climate change. Such threats make it all the more important for the Forest Service to ensure that the forested stream habitat available to salmon on National Forests are high-quality, well connected, and not blocked by artificial fish passage barriers. Salmon rely on forested streams for key portions of their life cycle needs, and require clean cold water and adequate spawning and rearing habitat. It is important that their spawning, rearing, and migratory habitat in forested landscapes is NOT exacerbating threats to these fish from dams, climate change, and worsening ocean conditions.

Unfortunately, across National Forests in the Blue Mountains and the PNW, past and ongoing logging, roading, and livestock grazing continues to cause habitat loss and degradation of water quality and stream habitats. High stream temperatures, elevated levels of excess fine sediments (turbidity, stream embeddedness) lack of large wood in streams, fewer and shallower pools, and other loss of habitat continue to negatively affect salmon and imperiled aquatic species and contribute to downward trends and a loss of viability in their populations.

The Nez Perce recently conducted the analysis: *Quasi-Extinction Threshold and Call to Action for Snake River Basin Chinook and Steelhead.* **Exhibit 101.** The analysis includes parts of Idaho as well as the Blues in eastern Oregon and southeastern Washington. A Nez Perce presentation, based on their 2022 report, showed that, for example, 42% of the populations they looked at are currently at or below the Quasi-extinction threshold of 50 spawners. 77% of populations are predicted to be at this threshold by 2025.

Rivers included in the analysis that are within the Blue Mountains Forest Plan Revision include rivers such as Wallowa River, Tucannon River, Grande Ronde River, Wenaha, Minam, Catherine, Lookingglass, Lostine, Big Sheep, Joseph Creek, Imnaha River, and Asotin Creek. The Tucannon, Asotin, Upper Grande Ronde, and Big Sheep were reported to already be at or below the quasi-extinction threshold of 50 spawners. The Wenaha, Minam, and Lostine have been at or below 50 spawners at least one year since 2017. Catherine and Lookingglass Creeks were predicted to be at or below 50 spawners by 2025.

The Idaho Statesman covered recent analysis by the Nez Perce Tribe in a series of articles, including Key salmon populations cross alarming threshold — and more are nearing that line by Eric Barker. **Exhibit 102**. The article includes quotes such as:

> *"Nearly half of the wild spring chinook populations in the Snake River Basin have crossed a critical threshold, signaling they are nearing extinction and without intervention may not persist, according to analysis by the Nez Perce Tribe.*
>
> *The river's steelhead populations, while doing better, also face alarming threats to their existence, according to the work.*

Modeling conducted by fisheries scientists at the tribe, and shared with other state, federal and tribal fisheries managers in the Columbia Basin, indicates if current trends continue, 77% of Snake River spring chinook populations and 44% of steelhead populations will be in a similar position within four years."

The tribe found 42% of Snake River spring chinook and 19% of steelhead have reached the quasi-extinction threshold — an analytical tool used by the federal government to assess the risk of extinction or measure the viability of fish populations. The threshold is tripped when a natural origin population of fish has 50 or fewer spawners return to natal streams for four consecutive years.

"It's a return, a series of returns, that demonstrates you better do something or you are going to lose your ability to do much of anything," said David Johnson, director of the Nez Perce Tribe's Department of Fisheries Resources Management.

Further modeling by the tribe shows Snake River spring chinook populations that are protected as threatened under the Endangered Species Act declined at a rate of 19% over the past 10 years and steelhead fell at an 18% clip during the same time period.

Jay Hesse, director of biological services for Nez Perce Tribal Fisheries, examined data from 31 of the basin's 32 native spring chinook populations that return to places like the Middle Fork of the Salmon River, Loon Creek, the Grande Ronde River and the Imnaha River. Of those, 13 already meet the threshold and more will soon follow, according to the analysis.

"If you take that 19% rate of decline and say going forward, where does that put us, and project out for five years, you end up with 24 of the 31 populations being below 50 natural origin spawners by 2025," he said.

Hesse analyzed 16 of the basin's wild steelhead populations. The sea-run rainbow trout also listed as threatened under the ESA are doing better than chinook, but have declined rapidly during the past five years or so because of poor ocean conditions. The fish have posted a 10-year downward trend of 18%, nearly identical to the nosedive by spring and summer chinook.

That trend projected forward puts seven of the 16 native steelhead populations analyzed by the tribe, or 44%, below the quasi-extinction threshold by 2025. The slide for the big B-run steelhead cherished by anglers is steeper — more like 23%.

"If this isn't a wake-up call, I'm not sure what folks would be looking for," said Tucker Jones, ocean and salmon program manager for the Oregon Department of Fish and Wildlife. "We think their analysis is cause for concern," said Bill Tweit, special assistant in the Washington Department of Fish and Wildlife's Fish Program.

"Anytime you have a total spawner abundance less than 50 fish, that really puts you in a bad spot," said Lance Hebdon, anadromous fish manager for the Idaho Department of Fish and Game.

Earlier this year, scientists with the agency's Northwest Fisheries Science Center published a paper projecting that climate change could cause already low survival rates for Snake River spring chinook to plummet by 90% and the fish could face extinction by 2060. The study, led by Lisa Crozier, said urgent actions are needed to counteract the fish-killing effects of warming oceans and reduced river flows brought on by climate change."

Commentary in the Idaho Capital Sun in August of 2025 by Pat Ford, who worked for the Save Our Wild Salmon Coalition for 22 years, also highlighted findings from the recent Nez Perce analyses (**Exhibit 103**):

"Most of these geographies hold from 50 to 150 miles of identified habitat for one or both fish. Thus, at the official 50 fish extinction threshold, one female or male Chinook, out of 25, must find a partner, also out of 25, in 50 to 150 miles of water.

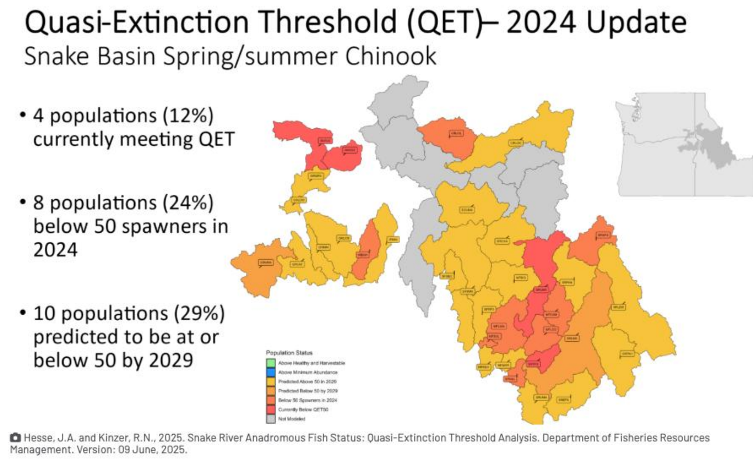
"That is just a terribly low number of salmon in so much river," Jay Hesse says.

A landslide or flood scour could destroy a few salmon redds (nests) and their overwintering eggs, when a few are all that exist. Some eagles, bears and humans will find some returning fish before the fish find each other to spawn.

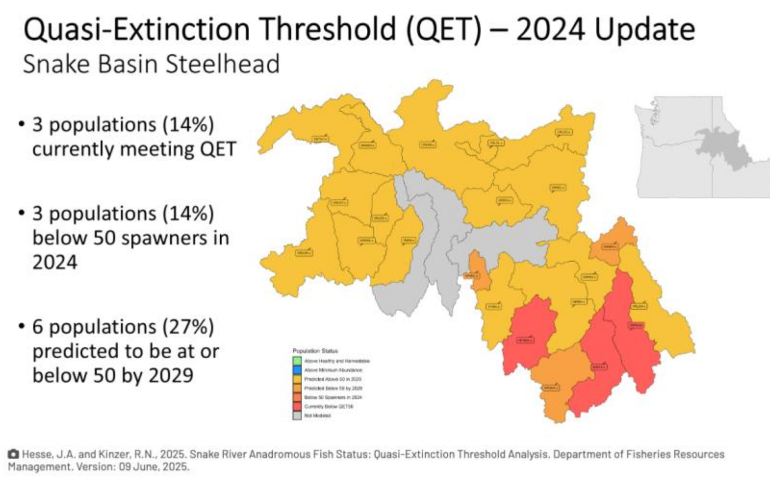
Such local events, of little harm to healthy populations, are major risks to those so near extinction. More destructive are recurring large-scale events – poor ocean conditions, low flows through reservoirs and dams, extended hot water during their long, obstructed upstream migration – that do outsized damage to populations already scraped so low.

The Oregon Department of Fish and Wildlife, and NOAA Fisheries, both make the main scientific point.

The department: The 50 fish or less threshold "is not a milestone on a linear path to extinction." It is "a tipping point into accelerated extinction risk," with a "higher likelihood populations will no longer be able to respond favorably to improved conditions."



The quasi-extinction threshold results are mapped in four colors: populations at or below the 50-fish extinction threshold four consecutive years; those at or below the 50-fish threshold in the most recent year; those predicted, on current trend, to be at the 50-fish line within five years; and those predicted to be above that threshold five years from now.



Crozier et al. 2021 also found alarming trends and predictions in their research paper *Climate change threatens Chinook salmon throughout their life cycle* (**Exhibit 104**)*:*

> *"Widespread declines in Atlantic and Pacific salmon (Salmo salar and Oncorhynchus spp.) have tracked recent climate changes, but managers still lack quantitative projections of the viability of any individual population in response to future climate change. To address this gap, we assembled a vast database of survival and other data for eight wild populations of threatened Chinook salmon (O. tshawytscha). For each population, we evaluated climate impacts at all life stages and modeled future trajectories forced by global climate model projections. Populations rapidly declined in response to increasing sea surface temperatures and other factors across diverse model assumptions and climate scenarios. Strong density dependence limited the number of salmon that survived early life stages, suggesting a potentially efficacious target for conservation effort. Other solutions require a better understanding of the factors that limit survival at sea.* ***We***

conclude that dramatic increases in smolt survival are needed to overcome the negative impacts of climate change for this threatened species."

Fish, amphibians, and macroinvertebrate communities—including ESA-listed salmon and trout-- may be negatively impacted logging and roads in forested watersheds, and the resulting excess fine sediment inputs into streams (Bryce et al. 2010 [**Exhibit 105**], Nietch et al. 2005 [**Exhibit 106**]). For example, Coho salmon egg survival and fry emergence were negatively correlated with embedded fines of greater than 10%. In addition, when fines exceeded 20%, average survival decreases dramatically (Cederholm 1980). **Exhibit 107**. Increases in fine sediment loading can cause simplification of 6 complex habitats and channel structure either through settling on or scouring out the streambed (Cover et al. 2008 [**Exhibit 108**], Nietch et al. 2005). As a result, habitats such as pools, riffles, and side channels required by stream organisms for egg laying, resting, hiding, and rearing of young may be degraded or eliminated (Bryce et al. 2010, USEPA 2006 [**Exhibit 109**]).

In addition, excess fine sediment loading, particularly in combination with the alteration of flow regimes and hydrologic processes, may negatively impact stream channel stability, limit hyporheic exchange, and alter groundwater inputs, potentially degrading conditions for stream organisms by further increasing sediment loading, decreasing necessary physical habitat, and altering stream water volume which can affect temperature and dissolved oxygen, and limit resources (Croke and Hairsine 2006 [**Exhibit 110**], Moore and Wondzell 2005 [**Exhibit 111**], Nietch et al. 2005, USEPA 2006).

Fine sediment inputs exceeding natural background levels may bury and smother fish and amphibian eggs or young, decrease dissolved oxygen (DO) levels, interfere with behaviors such as mating, feeding and predator avoidance, cause shifts in macroinvertebrate community structures, and increase macroinvertebrate drift rates (Bryce et al. 2010, Nietch et al. 2005, USEPA 2006). Macroinvertebrate drift rates increased significantly when exposed to suspended sediment concentrations of 8 mg/L for 5 hours, though ephemeroptera and plecoptera drift more rapidly upon exposure to sediments compared to those not exposed to sediments. Some ephemeroptera species, when exposed to concentrations of suspended sediments greater than 29mg/L for 30 days, 7 will disappear entirely. Longer exposure durations and smaller particle sizes caused increased rates of drift (IDEQ 2003). **Exhibit 112.**

In addition, dynamics between stream temperatures and sensitive aquatic species may be far more complex, and often more delicate, than agencies are taking into account—including for ESA-listed species. The study *Key findings for Stream Temperature Variability: Why It Matters To Salmon* by Steele and Beckman (2014), **Exhibit 113**, found that: *"Commonly used degree-day accumulation model is not sufficient to predict how organisms respond to stream temperatures. Changes in how the degree days are delivered have the potential to alter the timing of life history transitions in Chinook salmon and other organisms. Emerging from the gravel a few days earlier or later could directly affect their survival due to changes in available food resources, competition for feeding grounds, or strong currents"*.

We are extremely concerned that the elimination of strong protective standards for aquatic habitats in the draft plan, particularly in conjunction with widespread upslope logging and roading, will negatively affect ESA-listed aquatic fish and other species and their habitats, and cause downward population trends and jeopardize their species viability.

Bull trout are particularly vulnerable to logging, roading, and livestock grazing, as well as climate change. Since Bull trout are not anadromous, their responses to habitat loss and degradation can be used as an indicator of forest management on aquatic habitats and species. Despite Bull trout their crucial niche in aquatic ecosystems and their role as important indicators of the health of aquatic ecosystems and management actions effects on aquatic environments--the Forest Service barely mentions Bull trout in their SCC analysis or the draft Plan.

Bull trout are apex predators in aquatic ecosystems of the Blue Mountains, and so their continued viability and recovery is essential for ecosystem integrity and biodiversity in aquatic habitats. Despite their central role in ecosystem integrity and their declining population trends, the current draft Forest Plan Revision does not even mention Bull trout, much less provide for their habitat needs or continued viability.

Bull trout use National Forest lands in the Blue Mountains for spawning, rearing, or migrating, and have habitat needs that, if protected, would also serve as very effective umbrella protections for other aquatic species and for important stream habitat components that are essential for ecosystem integrity.

Also, evidence suggests that current BMPs and/or Project Design Criteria may not be sufficiently protective of sensitive aquatic species such as Bull trout. For example, the Fish and Wildlife Service Final Rule for Bull trout (Department of the Interior Fish and Wildlife Service 50 CFR part 17 2010), **Exhibit 114**, states that: *"Special management considerations or protection that may be needed include the implementation of best management practices specifically designed to reduce these impacts in streams with bull trout, particularly in spawning and rearing habitat. Such best management practices could require measures to ensure that road stream crossings do not impede fish migration or occur in or near spawning/rearing areas, or increase road surface drainage into streams."*

The negative effects of roads and stream sediments on stream integrity and aquatic habitats, as well as on imperiled fish such as Bull trout, Steelhead, and others are well recognized. The Federal Registrar, Department of the Interior Fish and Wildlife Service 50 CFR part 17 (2010) Final Rule for Revised Designation of Critical Habitat for Bull Trout also recognizes the ecological threats posed by roads to fish and water quality: *"Sedimentation negatively affects bull trout embryo survival and juvenile bull trout rearing densities (Shepard et al. 1984, p. 6; Pratt 1992, p. 6). An assessment of the interior Columbia Basin ecosystem revealed that increasing road densities were associated with declines in four nonanadromous salmonid species (bull trout, Yellowstone cutthroat trout (Oncorhyncus clarkii bouvieri), westslope cutthroat trout (O. c. lewisi), and redband trout (O. mykiss spp.)) within the Columbia River basin, likely through a variety of factors associated with roads. Bull trout were less likely to use highly roaded basins for spawning and rearing and, if present in such areas, were likely to be at lower population levels (Quigley and Arbelbide 1997, p. 1183). These activities can directly and immediately threaten the integrity of the essential physical or biological features described in PCEs 1 through 6."*

Even in areas with comparatively high numbers of ESA-listed fish such as Bull trout, current population numbers are still low when compared to historic norms and to numbers needed for successful recovery. The USFWS 2010 Bull Trout Final Rule notes that "*Over 30 years of research into wildlife population sizes required for long-term viability (avoiding extinction) suggests that a minimum number of 5,000 individuals (rather than 50 or 500) may be needed in light of rapidly changing environmental conditions, such as accelerated climate change (Traill et al. 2009, p. 3).*"

The Forest Service must take responsibility for their part in the continued viability of fish that use key habitats on national forest lands, rather than downplaying and refusing to acknowledge the impacts from Forest Service management, including logging, roading, and livestock grazing.

Unfortunately, logging, roading, and livestock grazing on National Forests in the Blue Mountains continues to cause ongoing negative affects to anadromous and resident fish populations that have important consequences for long-term trends and continued viability. Elimination of strong protective standards and increased logging, as proposed in the draft Plan, will greatly exacerbate these negative impacts to ESA-listed species, harm ESA-listed aquatic and riparian species, jeopardize their recoveries, cause downward trends in their populations, result in local extirpations or extinctions, and losses of viability.

The PNW Research Station Science Findings from July 2017, **Exhibit 115**, also notes that salmon thrive from complexity and natural disturbance, including wildfires. Highlights from the research:

> *Disturbances such as wildfire contribute soil, sediment, wood, and coarse material to stream channels as pulses, with periods of recovery between inputs. This characteristic of the natural disturbance regime allows for the development and maintenance of complex habitats needed for salmonids.*
>
> *Bull trout (Salvelinus confluentus) are even more vulnerable to habitat degradation, according to Gordon Reeves. Whereas salmon, in their long travels, experience and can live through a range of temperatures, bull trout need consistently colder waters. They're listed as a threatened species throughout the western United States mostly because of rising water temperatures and habitat fragmentation. Timber harvests, cattle grazing—both of which expose the water to more sunlight—and the warming climate are causing bull trout to seek refuge in higher elevation streams where they can find pockets of colder water.*
>
> *Their remaining strongholds occur in headwater tributaries. These colder bull trout streams are poorly connected with other cold-water streams because of the presence of roads, dams, and other barriers, so their habitat is isolated, and they have fewer places to go to find cold water.*
>
> *Fire can be beneficial for bull trout, just as it can be beneficial to salmon, Reeves says, because it changes the landscape—something he calls a "disturbance event." The computer modeling work he and Flitcroft did for the Wenatchee basin*

looked at possible ways fish habitat could be improved with different approaches to management. They found that approaches that allowed for the possibility of disturbance events could potentially enhance habitat.

"Pick any creature and it's going to need some level of habitat complexity," Flitcroft says.

Not only does greater complexity contribute to the food possibilities in streams, it stimulates the innate ability of salmon to thrive under new circumstances. This adaptive capacity has been a key to their survival throughout time. The human imprint on the environment today has simultaneously created more barriers than salmon have ever had to face, and has simplified that environment.

"Many of the things we've done to simplify habitats have reduced opportunities for individuals to express their natural adaptation to disturbance in complex systems," she says.

Reeves notes that disturbance events have commonly happened throughout history in all forest types. Why wouldn't native fish have become highly adapted to them? "Look at Yellowstone," he says, referring to the forest fires in 1988 that burned more than a third of the national park. "Many postfire areas are thriving. It's like a big reset."

We are also extremely concerned about other aquatic and riparian species, including but not limited to lamprey, Rocky Mountain tailed frogs, Columbia spotted frogs, Western ridged mussels, Pearl mussels, Blue Mountain snails, and other special status, sensitive, at-risk, and imperiled species.

Additionally, we have concerns about the Species of Conservation Concern analyses and selections for the draft Plan. It is not clear why Columbia spotted frogs do not meet the criteria for SCC on the Malheur NF. Please provide further clarification. Why are Tailed frogs only considered SCC on the Umatilla NF? The most sensitive aquatic species that rely on clean, cold water—such as Bull trout—are largely ignored in the entire draft Plan. These species should be the focus for special protection efforts, as it would provide umbrella protections for other species too.

Further, many species of birds and animals rely on riparian forests—particularly in relation to the presence of large trees, mixed-conifer forests, and mature and old forests. For example, logging large trees in mixed-conifer forests within and adjacent to in riparian corridors will negatively impact wildlife. Northern goshawk and other accipiter hawks, American marten, Great gray owls, Black-backed woodpeckers, Three-toed woodpeckers, Pileated woodpeckers, Olive-sided flycatchers, and other species that rely on denser forests, mature or old growth mixed conifer forests will be negatively affected by logging in riparian corridors. The primary threats and stressors to special-status and at-risk riparian and aquatic species on National Forests in eastern Oregon are livestock grazing, logging, and roads. These activities result in increased fine sediment inputs to streams, warming stream temperature, increased diurnal stream temperature fluctuations, stream bank instability, soil compaction and erosion, fish passage barriers, and other widespread problems. Potential impacts of increased logging of large trees to water quality, watershed hydrology, channel morphology, fish, and aquatic species were not adequately analyzed, or avoided. Please see our spreadsheet on birds and large trees in our addendum materials, as well as our list of animals associated with these habitats.

Watershed hydrology, water quality, and stream habitats

The most common water quality impairment in National Forest System lands is stream temperature. More than 1,240 stream miles on National Forest lands in the Blue Mountains are listed as not meeting water quality criteria. The most common water quality impairment on National Forest lands is stream temperature (Draft EIS for the Blue Mountains Forest Plan Revision (BMFPR), Vol. 1 pg. 272). This baseline figure from the BMFPR is almost certainly an underestimate-- the large volume of recent data submissions in 2019 from the Forest Service to ODEQ reflect even more widespread problems with stream temperature violations across the landscape. The Forest Service's 2018 data submissions were the first effort by the Forest Service to share a substantial portion of their data with ODEQ in over a decade.

Elevated stream temperatures are known to negatively impact fish stocks on National Forest lands in the Blue Mountains, including anadromous fish, and listed and at-risk fish such as Bull trout. Water quality standards for temperature, sediment, and other water quality parameters are not being met on hundreds of miles of streams on these National Forest lands.

Small streams are particularly vulnerable to increases in temperature, even with limited selective logging. There is evidence to suggest that ***wider*** buffer widths may be necessary to protect stream temperatures, particularly in intermittent and headwater streams, and particularly when logging within 100' of streams. Logging within RHCAs, removing shade, road-related impacts, and degrading hyporheic flow can increase stream temperatures in small intermittent streams. Parameters that influence stream temperatures include, stream shade, overland flow, groundwater and hyporheic flows, and groundwater storage. Alteration of these parameters can increase stream temperatures, especially in small streams. Logging alters these parameters, and degrades the ability of these parameters to support cold water, and is likely to increase stream temperatures. (Caissie 2006 [**Exhibit 116**]; Davies and Nelson 1994 [**Exhibit 117**]; DeWalle 2010 [**Exhibit 118**]; Kiffney et al. 2003 [**Exhibit 119**]; Groom et al. 2011 [**Exhibits 120 and 121**] ; Jones et al. 2006 [**Exhibit 122**]; Sweeney 2013 [**Exhibit 123**]; Pollock et al. 2009 [**Exhibit 124**]; Wigington et al. 2006 [**Exhibit 125**]; Poole et al. 2008 [**Exhibit 126**]; Poole and Berman 2001 [**Exhibit 127**]; Ebersole et al. 2015 [**Exhibit 128**]). Even in situations where logging within RHCAs is limited to thinning of smaller diameter trees, logging may compromise the ability of the RHCA buffer to protect streams or ameliorate the negative impacts from upland logging, including increased stream temperatures and the delivery of sediment and nutrients into waterways.

Headwater streams and non-fish bearing streams are particularly at risk and need more, not less, protection. In order to protect downstream fish bearing reaches, headwater streams need at least as much protection as larger downstream reaches (Rhodes et al., 1994 [**Exhibit 129**]; Erman et al., 1996 [**Exhibit 130**]; Espinosa et al., 1997 [**Exhibit 131**]). Both Erman et al., (1996) and Rhodes et al., (1994) concluded, based on review of available information, that intermittent and non-fish-bearing streams should receive stream buffers significantly *larger* than those afforded by PACFISH/INFISH. Headwater streams and small intermittent streams do not have buffer widths that are sufficient to protect water quality and stream habitats. Wider buffers are needed in order to prevent excess fine sediments and nutrients entering waterways. (Freeman et al. 2007 [**Exhibit 132**]; Gomi et al. 2005 [**Exhibit 133**]; Nieber et al. 2011 [**Exhibit 134**]; Sweeney and Newbold 2014 [**Exhibit 135**]). Negative impacts to upstream reaches, such as higher temperatures, increased sediment loading, down-cutting, and altered hydrographs also negatively affect downstream reaches.

Logging within RHCAs has well-documented and negative effects on stream temperatures, including increased water temperatures. For example, Guenther et al. (2012) found increases in stream temperature in relation to selective logging. **Exhibit 136**. The Guenther study found increases in bed temperatures and in stream daily maximum temperatures in relation to 50% removal of basal area in both upland and riparian areas. Increases in daily maximum temperatures varied within the harvest area from 1.6 to 3 degrees Celsius. Pollock et al. 2009 found that stream temperature was more closely associated with degree of logging within catchments than with streamside vegetation.

Studies have found selective logging may be associated with increases of instream fine sediments (Kreutzweiser et al. 2005 [**Exhibit 137**], Miserendino and Masi 2010 [**Exhibit 138**]). Upslope logging, particularly on steep slopes above streams, can increase fine sediment inputs into streams, contribute to stream temperature increases, cause increased variability in water quality and aquatic habitat parameters, and alter stream morphology and watershed hydrology. Additionally, logging on thin soils, ash soils, and rain-on-snow zones greatly increase the risk of soil damage, erosion, and excess fine sediments in streams. Zhang et al (2009) found long-term impacts to macroinvertebrate communities and streambed substrates. **Exhibit 139**. These impacts lasted for up to 40 years due to excess fine sediments associated with logging. Effects, such as changes to sediment loading and stream morphology, may not show up for many years after logging. (Beechie 2001 [**Exhibit 140**]; Beechie et al. 2005 [**Exhibit 141**]; Benda and Dunne 1997 [**Exhibit 142**]; Kelsey 1982 [**Exhibit 143**]; Madej and Ozaki 1996 [**Exhibit 144**]).

Logging can be associated with changes in macroinvertebrate community structure or metrics (Flaspohler et al. 2002 [**Exhibit 145**], Kreutzweiser et al. 2005), increases in stream temperatures (Guenther et al. 2012) and alterations in nutrient cycling and leaf litter decomposition rates (Lecerf and Richardson 2010 [**Exhibit 146**]). Flaspohler et al. (2002) noted that changes to biota associated with selective logging were found decades after logging. For example, the USFS's Draft Forest Plan Revision for the Blue Mountains (vol. 2 pg. 48) noted: *"Timber harvest can influence aquatic ecological condition via such activities as removal of trees in the riparian zone, removal of upslope trees, and associated understory or slash burning (Hicks et al. 1991). These activities can affect wood recruitment, stream temperatures, erosion potential, stream flow regime, and nutrient runoff, among others (Hicks et al. 1991). Effects of harvest are likely to be different at different scales. Hemstad and Newman (2006) found few effects of harvest at the site or reach scale, but found that harvest five to eight years earlier resulted in losses of habitat quality and species diversity at the scale of a stream segment (larger than a reach) or at the subwatershed level. Those losses were revealed in terms of increases in bank instability and fine sediment throughout the watershed and increased water temperatures and sediment problems throughout the channel segment. The cumulative effects of widespread harvest within a single drainage in a short period of time resulted in deterioration* *of the aquatic and riparian habitats, but evidence of effects lagged harvest by several years and different evidence of deterioration showed up at different spatial scales within the watershed".*

Logging, including upland logging, can cause decreases in summer baseflows in the long-term. Decreased canopy cover due to logging can cause more snow to accumulate in these more open areas, which alters the timing and magnitude of runoff from snow melt. This can also cause changes to peak flows (Harr and Coffin 1992). **Exhibit 147.** Logging creates more open canopies, increases solar radiation inputs, and so increases the amount of early snow melt. This, in turn, may further alter peak flows and groundwater recharge and the hyporheic cold water delivery downstream, including to perennial streams. (Caissie 2006; Harr and Coffin 1992).

Logging also increases surface runoff and overland flow, which delivers warmer water and excess sediments into streams quickly, can alter peak flows and increase flood risk, as well as increase stream temperatures. In addition, increased surface runoff and faster delivery of water into streams also means that less water becomes groundwater. This decreases groundwater storage, groundwater flows, and hyporheic flows. (Coutant 1999 [**Exhibit 148**]; Croke and Hairsine 2006; Jones and Grant 1996 [**Exhibit 149**]). Protecting groundwater storage, groundwater flows, and hyporheic flows associated with intermittent streams is crucial for protecting temperatures in larger downstream perennial streams. Cold water inputs from intermittent streams to downstream reaches are essential providing cold water refugia for special-status and imperiled aquatic organisms, including ESA-listed fish (Caissie, 2006; Ebersole et al. 2015; Groom 2011; Groom 2011; Jones and Grant, 1996; Pollock et al. 2009). Small and intermittent streams are crucial for downstream fish habitat. Ebersole et al. 2015 notes: "*Although these streams are fishless,* ***water temperature in these smaller streams is important for fish habitat because cold water inputs from tributaries provide thermal refugia, and intermittent streams can still provide cold groundwater inputs even after surface flow ceases****."* Patches of cold water refugia are crucial for fish. Shallow groundwater patterns can be important for influencing stream temperatures, (Poole et al. 2008) and so are likely vulnerable to upslope logging (Caissie 2006).

Logging alters microclimates, creating hotter, drier, and windier conditions that stretch beyond forests directly affected and into adjacent forests, sometimes for distances of hundreds of feet. Such microclimate edge affects could extend into the entirety of riparian buffers, especially in smaller headwater streams. (Chen et al. 1992 [**Exhibit 150**]; Chen et al. 1995 [**Exhibit 151**]; Brosofske et al. 1999 [**Exhibit 152**]).

Jones & Grant (1996) found that watersheds with drier conditions and more intense summer droughts were more sensitive to the effects of logging and roads on increased peak flows. Hicks et al. (1991) found base flows increased for 8 to 9 years after clearcut logging because rainfall is not intercepted, evaporated, and transpired by trees. **Exhibit 153.** Instead, most rainfall becomes surface, subsurface, or groundwater flow once the trees are removed, and therefore contributes to base flow increases. However, the author found that base flow rates declined to lower than normal volumes in areas of hardwood riparian re-growth for the following 18 of 19 years in their study.

Also, logging within RHCAs or forest wetlands can magnify water quality and hydrology impacts from upland logging. (Hicks et al. 1991; Moore and Wondzell 2005). Janisch et al. (2011 [**Exhibit 154**] and 2012 [**Exhibit 155**]) and Buttle et al. (2009) [**Exhibit 156**] found that wetlands associated with headwater and low order streams are more common and influential on stream hydrology and water quality than previously realized. Many of the wetlands associated with first order streams are small and fall below the size requirements for protection in relation to timber sales. Janisch et al.(2012) found streams in headwater catchments with wetlands had larger and more consistent increases in temperature in relation to adjacent logging than did the catchments that did not contain wetlands. The authors found that in streams with wetlands present in their catchments tended to have streams with finer sediments in their substrates.

Additional useful information regarding the Janisch et al. 2012 paper: *"....spatially intermittent streams with short surface-flowing extent above the monitoring station and usually characterized by coarse-textured streambed sediment tended to be thermally unresponsive. In contrast, streams with longer surface-flowing extent above the monitoring station and streams with substantial stream-adjacent wetlands, both of which were usually characterized by fine-textured streambed sediment, were thermally responsive."*

The Washington Department of Ecology provides a concise summary of the Janisch et al. 2012 research (https://apps.ecology.wa.gov/publications/SummaryPages/1203020.html):

> *"During approximately the past 50 years, stream temperature response to logging practices has been frequently studied. These studies have suggested that the amount of shade from stream-adjacent forest, as well as other variables such as elevation and aspect, can influence stream temperature when the streamside forest is removed by logging or otherwise disturbed.*
>
> *Results from these studies, however, have been variable, and the magnitude of stream temperature response has not always been predictable by the amount of stream-adjacent forest removed. Recent thought and research on this topic has thus tended to consider why, given similar logging treatments, some streams increase greatly in temperature after logging whereas temperatures of others increase only slightly, and why occasionally temperatures of yet other streams after logging have appeared to decline. Hyporheic flow and streambed sediment texture have been proposed as possible explanations.*
>
> *Recently, we observed that the temperature response of small forested headwater streams to logging were also highly variable. We further observed, however, that the degree of stream temperature response in the streams studied was strongly correlated with two landscape variables: cumulative surface area of small, stream-adjacent wetlands (0.93) and length of flowing surface water above our stream temperature monitoring stations (0.65). Additionally, stream sediment texture appeared important, with streams having coarse substrates being thermally unresponsive and streams having fine substrates being thermally responsive. Conversely, our measure of stream shade was not a strong predictor of stream thermal response.*

> *These results suggest that very small headwater streams may be fundamentally different than many larger streams because factors other than shade from the overstory tree canopy can have sufficient influence on stream energy budgets to strongly moderate stream temperatures even following complete removal of the overstory canopy. This raises the possibility that there are several types of very small headwater streams, some being thermally responsive and some not. Such a finding is potentially of importance to several fields of natural resource management. Confirming our observations, however, will take substantial additional work."*

The research cited here, as well as a plethora of other research, shows that the rollback and elimination of PACFISH/INFISH protections for streams and riparian forests will threaten the cold-water temperatures and refugia in streams that are important for ESA-listed aquatic species such as Bull trout, Snake River steelhead, Snake River Chinook, and other Sensitive and imperiled aquatic species. We are very concerned that the agency, in eliminating PACFISH/INFISH protections, including RMOs, as well as weakening or rolling back Eastside Screens protections, will have catastrophic effects on ESA-listed fish and other aquatic species.

Monitoring and baseline information

The 2012 Planning Rule requires the development of a monitoring program for the plan area. The monitoring requirement's purpose is to provide the responsible official with sufficient information to inform future forest planning decisions and amendments. This monitoring plan must include at least one monitoring question and associated indicators for each of the following; the status of select watershed conditions, the status of select ecological conditions, the status of focal species, the status of ecological conditions regarding the viability of species, the status of visitor use, changes related to climate change, progress towards meeting the desired condition, and the effects of each management system to determine they do not substantially impair productivity of the land.

The draft Plan has virtually no information on the status of selected watersheds, the status of focal species, what species will be selected as focal species, the status of ecological conditions or the viability of species, etc. Similarly, it has virtually no specifics on how monitoring will be conducted, what types of protocols will be used, what habitat parameters or species will be monitored, or what focal species will be included.

The Forest Service has repeatedly demonstrated that it does not have the ability to collect, organize, store, analyze, or share data and monitoring information in an effective, consistent, and transparent manner. The following are a few examples of problematic issues with the Forest Service's monitoring efforts:

- The Forest Service lacks the will or internal organization to share data with outside agencies, such as Oregon Department of Environmental Quality, on a regular basis. Until BMBP wrote letters to Forest Supervisors and ODEQ staff calling attention to this issue, the USFS had not shared the vast majority of their water quality data with ODEQ for over a decade. After we highlighted this issue during the last ODEQ 'call for data' in 2018, the Forest Service shared large amounts of data with ODEQ, finally. However, based on stream temperature data that BMBP received through FOIA, the Forest Service still has not provided ODEQ with existing stream temperature data for some streams, including streams in violation of water quality standards. BMBP had to appeal the first FOIA response we received from the Forest Service in order to finally get the bulk of the data we received.

- The agency is unwilling to be transparent with the public. The Forest Service has repeatedly made it difficult to obtain water quality information.
- The agency is unable to properly organize data storage or coordinate data sharing among staff members. For example, water temperature data does not generally seem to be housed in a central location in most instances. Submission of existing data into the centralized database is voluntary for staff members in charge of such data. Once it became clear that the Forest Service was planning to (finally) submit some of their data to ODEQ during the ODEQ 'call for data', it became clear that the Forest Service did not have an adequate internal system or protocol for data storage or organization. Much of this data was housed with individuals who were not required submit it to the centralized database for eventual submission to ODEQ.
- The Forest Service often does not have accurate or consistent water quality data in NEPA documents. We have documented this issue for numerous streams. For examples, please see our exhibit with our letter to the Malheur National Forest requesting an SEIS for the Camp Lick timber sale.
- The Forest Service does not conduct an adequate or statistically robust number of site visits to determine BMP and PDC effectiveness in timber sales. Such monitoring only happens for a handful (or less) of timber sale sites on each forest per year. While the Forest Service claims that BMP monitoring is effectively protecting water quality and aquatic habitats, in reality the agency does not have enough data to make this determination.
- The Forest Service is unable to follow through with monitoring plans and efforts (for example, stream temperature monitoring promises made and broken).
- The Forest Service sometimes uses very limited monitoring data in an inappropriate fashion. For example, the agency will sometimes collect a small number of tree cores without standardized protocols or scientifically accepted sampling design, not conduct appropriate analyses on the data, and then use the data to justify log large trees in timber sales (even when the diameter limits in the sales don't correspond to the data collected).
- The agency lacks an appropriate framework for adaptive management. In many cases, the agency lacks baseline data, which is a key component of an adaptive management framework.
- When designing monitoring goals, the agency will often narrowly focus on monitoring parameters relative to 'fuels', silvicultural questions, tree species composition, or some other aspect of measuring trees or wood. The Forest Service rarely focuses substantial or widespread effort to systematically or responsibly collect data on and monitor issues such as: water quality response to logging in a before/after upstream/downstream design; wildlife or fish response to logging or grazing; soil compaction; etc. Based on these and other issues with current monitoring, there is no reason to believe that the Forest Service is able to conduct an adequate or comprehensive monitoring program in relation to the logging of large trees. Furthermore, the monitoring that the Forest Service is narrowly focused on parameters that miss the mark for actually looking for indicators

of ecosystem response, or potential effects to wildlife, birds, water quality, riparian habitats, instream habitats, etc.

- The USFS does conduct subwatershed and watershed scale water temperature monitoring—these monitoring data often reflect high stream temperatures that are in violation of state water quality standards. The necessary follow-up work to figure out what is causing these widespread water quality issues and violations is lacking.
- The USFS, despite our persistent inquiries, has not been able to provide us with examples of or data from any before/after, control/impact (BACI) monitoring of logging projects in priority watersheds, including logging projects taking place within Riparian Habitat Conservation Areas. It seems that there *may* have been one or two projects that might have had such a targeted monitoring design, but the USFS has not been able to provide us with a location, name of stream, or any data. None of the dozens of USFS staff or specialists I've talked with have been able to say for sure if such monitoring has taken place, or tell me a location or stream where it will take place in the near future. The USFS does conduct subwatershed and watershed scale water temperature monitoring—these monitoring data often reflect high stream temperatures that are in violation of state water quality standards. The necessary follow-up work to figure out what is causing these widespread water quality issues and violations is lacking.

BMBP has major concerns that the draft Plan, as currently proposed, will significantly impair the attainment of water quality standards in eastern Oregon. When streams are impaired and, as a consequence, included on the 303d list—the agency is then required to ensure that actions such as logging and road-related activities do not raise stream temperatures by more than 0.1 degree Celsius. However, if the Forest Service does not regularly share stream temperature data with Oregon Department of Environmental Quality (ODEQ) then the USFS is improperly sidestepping such requirements, and sidestepping key regulatory oversight as well as the creation of TMDLs and restoration plans to bring streams back into compliance with Clean Water Act standards.

The Forest Service has a legal responsibility to uphold state water quality standards on the federal lands they manage. Their directives include adhering to "adaptive management" practices. We are very concerned that the Forest Service is not upholding water quality standards and not adequately tracking or sharing the results of their water quality monitoring with the public or ODEQ, and that they have failed to create a framework for adaptive management. For example, the Forest Service lacks data or evidence showing that recent logging activity and current logging proposals will not adversely affect or further degrade water quality, including in streams that are already in violation of state water quality standards for temperature or sediment.

Monitoring and accurate inclusion of water quality data into Oregon's Integrated Database are key components for ensuring that water quality standards are being upheld, and for protecting the viability of aquatic species, including ESA-listed species. Given the widespread logging on public lands across eastern Oregon, including the increasingly common practices of commercial and non-commercial logging within streamside RHCAs, inclusion of accurate water quality data in ODEQ's Integrated database is key for examining and assessing landscape scale data and for implementing adaptive management strategies.

In addition, TMDLs and WQRPs have not been developed in a timely fashion for many 303(d) listed basins. BMPs have not been adequately re-evaluated or adjusted to assure compliance with water quality parameters such as temperature. WQRPs plans and TMDLs often do not adequately deal with forest management activities, and monitoring is not always followed through on and lacks public transparency.

Furthermore, the Forest Service and other agencies do not have adequate baseline information on many ESA-listed, special status, and imperiled aquatic species including species such as Bull trout, Chinook salmon, and ESA-listed steelhead.

Again, baseline information is key to adaptive management. Restoration plans for stream habitat components, water quality, and imperiled aquatic species are extremely unlikely to be successful without adequate baseline data.

A timber sale case study: the Baker City Watershed sale in the Wallow Whitman National Forest

While the draft Forest Plan does not make any direct references to Olson 2000 or Harley et al. 2020, those are usually the studies that the Forest Service points to in order to justify logging within RHCAs. The draft Forest Plan removes protections from logging within streamside riparian corridors.

The USFS's response to comments notes that *"[p]roposed treatments in RHCA areas were not determined by fire history studies. See responses to comments L29.A1.C10-11.*" I was unable to find comment "L29.A1.C10-11. It is unclear what evidence or justification the USFS is relying on to log within RHCA buffers, or to create artificial "inner" and "outer" delineations within RHCA buffers.

Since fire scar analyses have been used in every other project we've commented on in the past 8 years that proposes logging within RHCA buffers, we are including the following concerns about the Olson 2000 and Harley et al. 2020, **Exhibit 157**, papers in the assumption that they are implicitly being used by the Forest Service (or similar papers are being used, with similar issues), in the justification for inner/outer zones and logging within RHCAs.

The Olson 2000 research mapped fire years for "every year there was clear evidence of fire scarring" (Olson 2000 Appendix E. pp. 181- 237), and show data from 1428 through 1972. In our review of the Olson 2000 maps, we note that there are substantial portions of these areas had no evidence of any fire, including the headwaters/upper watersheds of Mill, Marble, and Salmon Creeks. The Olson fire maps show a distinct absence of fire, and so suggest that these areas have infrequent (and likely high severity) fire with long return intervals, and have been acting as fire refugia for centuries. Such forests provide important habitat for species that rely on mature and old forests, and dense and complex canopy forests, and will be instrumental for providing habitat and connectivity in a changing climate. However, the complex mosaics of fire history become lumped together, essentially erasing the very real, on-the-ground results that depict an extremely variable landscape that includes very long fire return intervals.

We want to note some finer scale detail from those maps that we observed. ***Olson 2000 data shows <u>no evidence of fire</u> in higher elevation areas within the Baker study location, such as the upper portions of Mill, Marble, and Salmon watersheds portions of the study area:***

- There appears to be no evidence of fire scars shown on the maps for the upper portions of high elevation watersheds such as the Mill, Marble, and Salmon watersheds. The lack of fire scars suggests that these forests are likely to have experienced infrequent, high severity fires historically.
- The maps also show no evidence of fire for these more incised, steep watersheds between 1428-1529 (~100 years).
- Between 1529 and 1645, there are only isolated incidents of evidence of fire scars at single sites in these watersheds, with the exception of 1581 when there was a second location that had "probable" fire evidence. So, between 1428 and 1646 there was no evidence of more than one isolated small fire until 1646 for the three watersheds (~218 years), with the exception of the "probable" other single location.
- Mill Creek had only isolated evidence of fire scars at single sites, with two exceptions, one with 2 sites showing evidence and the other with five (in 1783 and the other in 1828, respectively). So, aside from single isolated locations showing evidence of fire scarring within Mill Creek, there was no evidence of fire in Mill Creek between 1428 and 1782 (352 years); between 1784 and 1827 (43 years); or between 1829 and 1972 (143 years).

Several of the locations in the Olson 2000 that show repeated fire included those along the mid and lower portions of Mill and Marble creeks appear to have very isolated and small-scale fire activity, possibly suggesting only extremely small fires such as those related to lighting strikes that burn less than one acre. I.e., it is likely that those locations are attracting repeated fire strikes at the same ridge tops and topographic high points.

We also note that the Harley et al. 2020 paper only sampled riparian plots at lower elevations in the Baker plots. The Harley et al. 2020 study notes: "At Dugout, we sampled riparian plots along the major streams throughout the extent of the upland plots. However, at Baker ***we only sampled riparian plots at low elevation along the major streams*** (below 1770 m) ***because visible fire scars did not occur at high elevations at this site."*** (Emphasis ours). Wouldn't those higher elevation sites with no apparent/visible fire scars indicate either fire refugia/no fire and/or stand replacement fire in those areas—contrary to how the agency has characterized them and based their plans for logging?

The Harley et al. 2020 paper goes on to state: "*All the riparian plots were installed more than 46 m and downslope from existing upland plots (range 49 - 939 m, mean = 316 m; Heyerdahl et al 2001)* ***where fire scars were visible on either lie or dead trees and within the riparian buffer.****"* (Emphasis ours). It would seem that the targeted selection of sampling plots within areas where both upland and riparian forests showed clear signs of fire scars potentially skew the results and/or bias the conclusions about widespread low intensity fire. I.e., if it was a randomized selection, would there not be more potential evidence for infrequent and high severity fires within the project area?

The only data collected in higher elevation riparian areas was from the Olson 2000 study, which—again-- shows no evidence of fire in significant portions of higher elevation areas within the project area. The authors of the Harley paper stated that they left out possible sites in riparian areas at higher elevation because no visible fire scars were not present. Of course, this biases their findings towards detecting low severity fire regimes, because they left out the very areas that lacked fire scars which would suggest infrequent and/or high severity fires.

The Harley et al. 2020 study also states: "As elevation increases and terrain becomes more dissected at Baker, ***longer and more variable fire intervals also occurred. This is likely a result of forest composition changes related to both topography and elevational changes in temperature, as well as aspect controls on varying insolation levels*** (Olson 2000); Heyerdahl et al. 2001). ***When forests occur within interaction zones of climate and topography, such that riparian forests contain greater variety in vegetation composition relative to upslope forests, then fire intervals differ, suggesting that forest composition is important as landscape dissection increases.*** Compared with Dugout, ***riparian valleys at Baker are more incised and therefore receive less insolation, resulting in a north-facing slope and riparian forest composition that is more mesic compared with adjacent south-facing upslope forests.***" (Emphasis ours).

We note that the authors found longer and more variable fire intervals DESPITE sampling at only lower elevation locations along major streams.

In addition, an overwhelming majority of sample sites in both the Dugout and Baker locations are predominantly on south or west facing slopes. The predominance of south or west facing slopes in the Harley et al. 2020 paper study may also have skewed the results towards more frequent and lower intensity fire being more common in riparian forests (and similar to uplands). If one is looking for statistical differences between riparian and uplands—then predominately choosing sample sites most likely to burn more frequently may dampen any statistical signals one might have found with a more robust sampling protocol. Any possible statistical signal from a small sample size with this composition is likely to be muted or overwhelmed by the larger number of sites that are drier, at lower elevations, and have more gentle and open topography. This is especially the case as the Harley study has an extremely small proportion of sample sites in locations that would be more likely to be more moist and have longer fire intervals (i.e., north, northeast, or east facing slopes; higher elevations; and more incised valleys and gulches).

- The Baker study area plots have a total of 35 upland sites. Twenty of those appear to be primarily on south-facing slopes. Of the 15 sites that have more of a northern or eastern slope orientation, five appear to also include strong southern or western influences, as they are somewhat northwest or southeast facing. Of the 35 upslope sites in the Baker study area, only 10 appear to be clearly on slopes that have a strong north, northeast, or east orientation.
- In the Dugout study area, there appear to be a total of approximately 75 upland sites. Only 12 of those sites appear to be on slopes with strong and predominant north, northeastern, or eastern facing. Of these, four are on ridgetops.
- Riparian sites are almost entirely situated all on the larger order streams within the study area, which tend to be less incised and more open. Only eight suites were situated on smaller tributaries, and only one of these sites faces N/NE.

Figure from the Harley paper:

Eastern Oregon riparian versus upland fires   *Int. J. Wildland Fire* 603

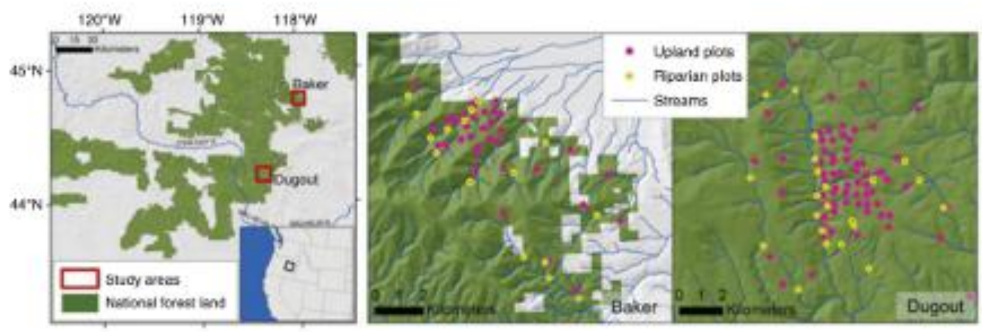


Fig. 1. Location of Baker and Dugout study areas and riparian and upland plots in the Blue Mountains of eastern Oregon, USA. Most of the riparian plots were sampled for this study and most of the upland plots were sampled for an existing study (Heyerdahl *et al.* 2001).

The Harley paper also states: *"[i]n the two study sites in the Blue Mountains of eastern Oregon during the period 1650–1900,* ***historical fires burned more frequently in upland forests compared with adjacent, downslope riparian forests.*** *However, the difference between riparian and upland fire intervals at both Baker (5 years) and Dugout (3 years) was not statistically significant (P . 0.10) and* ***likely not ecologically relevant."*** (Emphases added)

Lack of statistical significance does not necessarily mean lack of data patterns or trends. Lack of statistical significance can be due to a variety of factors, including small sample size. In this instance, the sample size for sites representing north/northeast facing sites was an even smaller proportion of an already small sample size, and seems to have constituted far less than half of the sample sites. While statistically significant differences were not found between upland and riparian forests, there was a clear trend pointing to a difference between the two--even with the small data sets in this one study. Choices and/or limitations in statistical analyses can also mute variation and complexity, especially when working with small sample sizes, large elevation gradients, and other confounding factors. The Forest Service's standard conclusion for timber sales across the region when applying this research is that most, if not all, forests are dry forests with historically low intensity and frequent fire regimes. This contradicts the data trends-- including the reality of very long fire intervals in large portions of the project area, such as the higher and mid elevation portions.

The Harley et al. 2020 authors also dismissed any ecological importance in the data trend of more frequent fire in uplands compared to the riparian areas (see quote from Harley et al. 2020 above). However, the authors provide no evidence to support this claim, and do not attempt to substantiate their declaration that this very important data trend would lack ecological importance.

The Harley et al. 2020 paper notes that an average of five trees (range 2 - 9 trees) were sampled per hectare by removing fire-scarred partial cross-sections. These cross sections were sanded and looked at with a microscope, and were used to assign calendar years to tree rings through cross dating and against existing ring-width chronologies. This small sample size of trees at each plot then means that the study's already small sample size in riparian forests, especially in the Baker location, is an even smaller sample size for areas most likely to have infrequent and/or stand replacement fire. If the smaller end of the sample range was present at the more northern/eastern slopes and/or in the higher elevations and more incised valleys– then this is potentially only a couple of handfuls of samples in these locations.

Also, evidence of fire at a specific location(s) does not necessarily mean that the fire was widespread, or part of a larger fire regime. For example, lightning strikes may result in only a very small area burning, sometimes even one to several trees. Lightning can and does tend to strike certain ridges and areas repeatedly, also an important factor to consider. In addition, a relatively few trees were sampled at any sample site, potentially leaving room for misinterpretation of fire scars. I.e., some small fires may have been from lightning strikes (not widespread low intensity fires). It could also be the case that some of these fire scars were the result of high severity fire mosaic patterns that include low intensity fire within the fire perimeter.

The Harley et al. 2020 authors also state that for smaller fire years that *"[s]maller fires were likely characterized by a mosaic of varied fuel dryness across the study area. Hence, fuel moisture levels may have varied enough within and between riparian forests and upslope forests, resulting in smaller fires and greater variations in burn severity."* This suggests that there was at least some mixed or high severity fire within riparian zones. High severity fire has specific dynamics and processes that are crucial for certain species and for the ecological integrity of forests that evolved with it. Managing the mixed-conifer forests-- especially those on north/northeast/east facing slopes and at higher elevations-- for a frequent and low-severity fire regime artificially homogenizes them, and degrades or entirely destroys the wildlife habitat and connectivity they provide, as well as greatly impairs their ability to support clean and cold water for fish and people.

The actual data from both the Olson and Harley studies suggest that the topographically and ecologically diverse areas than are recognized by the Forest Service, and are actually more varied in terms of fire intensity and frequency than the usual FS claims. The statistical conclusions of the Harley et al. 2020 paper are based on analyses of sample sites that are more likely to have frequent and low severity fires (lower elevation, west and/or south facing locations, gentle and open topography, etc.). Areas with less frequent and higher intensity fire were sampled in only a handful of locations, or excluded entirely (as with higher elevation sites at Baker in the Harley paper). These sampling biases, as well as the lumping in of data from higher elevations, steep and incised valleys, and N/NE/E facing slopes with data from lower elevations, open topography, and S/SW/W facing slopes— are very likely to have overwhelmed any possible statistical signals of variation, and skewed results towards overgeneralizations of frequent and low severity fire regimes. Lumping all forests in the area together as "*dry forests adapted with low severity fire"* reflects the agency's failure to take a hard look at the data, and the potential limitations of sampling, methodology, and analyses. The data from the Olson thesis fire maps clearly reflects very, very long fire return intervals (and/or stand replacement fire) in the upper and mid elevations of the project area.

Fire scar analysis

Use of composite fire intervals tend to shorten the time between fires and give a false interpretation of the past fire history. For example, personal communications from George Wuerthner, in our communication regarding limitations of fire scar analyses used in research with similar methodology, include:

> *"Take a hypothetical situation: Let's say you have a 1000 acre study area. You note a fire someplace in that 1000 acres every single year over a hundred year period. However, for argument's sake, each of those fires burns less than a single acre. So you have a total of 100 fires and a fire interval of 1 year. I.e. the fire scar history suggests there is a fire every year. But because each fire is less than an acre, you have only burned 100 acres in a hundred years or only 10% of the 1000 acre study site. Even at a fire every year, it would require 1000 years to get to the fire rotation.*
>
> *This is why it's important to note how large the fire is. You can do this in a number of ways including using air photos, fire atlas, or Government Land Office survey notes as Baker has done.*
>
> *Using fire scars, the best way to do this is to only include fires that burn a significant amount of the study area. In other words, again using the 1000 acres. You would ignore all the fires that are only recorded at one or even a few sights and assume they are small fires of no consequence. After all we are trying to get to the notion of how important fire was in any area and the kind of fire that burned. The only fires you would include would be the years when the majority of the study sites burned, preferably across much of the 1000 acres. You could also note the occurrence of even-aged stands across large areas that might indicate regrowth after a stand replacement blaze. That would give you the real fire rotation."*

Similarly, personal communications from William Baker, in our communication regarding limitations of fire scar analyses used in research with similar methodology (and so are also relevant here), include:

> *"There are no estimates of historical fire rotations, the essential rate parameter of historical fires. Composite fire interval estimates are done within each site, not across sites, which is OK. But, there is little correction to remove small fires, so their MFRI is close to a mean CFI-all fires in the Baker (2017) terminology. Using Baker (2017 Table 2), to estimate fire rotation, for mean CFI--all fires, we would multiply MFRI by 2.44. For the range of MFRIs in their Table 1, which is 10.6-21.2 years, the estimated range of historical fire rotations would then be 25.9 to 51.7 years.*
>
> *Based on these fire rotations, these were not frequent-fire forests with fire rotations < 25 years that would have kept fuel loads generally reduced, since fuels can recover within about 10-20 years usually. Instead, historically there would have*

been ample time for fuels to fully recover between fires, including plenty of fully regrown shrubs, many small trees, lots of small wood, some larger wood etc. and some stands with higher tree density. It is important to estimate fire rotations because it is well accepted now in the scientific fire community that the MFRI used in Johnston et al. does not estimate historical rates of burning and should not be used to guide restoration programs (Baker 2017). See the quotes in this paper from well fire historians that make this very clear.

Also, in the intro Johnston et al. suggest fire regimes would have been mixed severity, but then they did no reconstruction of fire severity, which of course is essential where fires where historically mixed in severity. The paper doesn't say so explicitly, but seems to assume that all fires were low-severity, and the final paragraphs even imply that higher-severity fires did not occur. Of course, what would be expected is that in moister forests, more of the fires that occurred would be higher-severity, including substantial patches of high-severity fire, whereas in ponderosa of course more of the fires would have been low-severity, with fewer that were higher-severity, as has been shown nearly everywhere that fire severities have been reconstructed in these kinds of forests. Showing, as they do, that MFRI did not differ between dry and moist forests has little meaning, since it is not the occurrence of fires, but instead fire size and fire severity that would be expected to differ. They have no data on the essential fire-severity parameter of historical fire regimes in ponderosa pine and mixed-conifer forests in their study areas, and certainly cannot conclude that historical fire regimes would have been similar in these two types of forest.

Also, their historical basal area estimates are based on just extant (live) historical trees, not dead trees present on the forest floor. Although fires may have been suppressed, there are many other sources of continuing tree mortality that could have killed and even removed many of the smaller trees present in the late-1800s (e.g., bark beetles, drought, competition, root rots etc.). They did not compare their basal area estimates to early historical reports, such as Munger 1917 to see whether extant live historical trees even approximately estimate basal area, tree density, and tree diameter distributions in the late-1800s to early 1900s. It is well known that smaller trees present in the late-1800s would likely have burned, died from competition or other mortality agents, and decomposed since then, particularly in moister forests. Since logging is often aimed at smaller trees, and they have no validation at all that smaller trees are correctly reconstructed by using just extant live trees that happen to still be present, this study does not provide a sufficiently sound basis for any restoration logging program."

The Forest Service claims that Douglas and Grand firs and other less fire-resistant trees are present in larger numbers and higher densities across the landscape than they were historically, as a consequence of fire suppression. However, the Forest Service abuses this rationale by applying it overly broadly and aggressively, and uses it as an excuse to extensively log old growth and mature forests– including in ecologically inappropriate areas such as forests with ample evidence of historic mixed-conifer and high-density forests, on north and east facing slopes; deep gulches and narrow valleys; forests on soils that hold more nutrients and moisture (such as ash soils); and other areas that show historic evidence of supporting mixed-conifer forests in general and Grand fir in particular.

A study from Bradley et al. (2016) challenges USFS assumptions about the fire risk associated with more protected areas—those area that have been less-managed or less-logged, but may still have experienced some degree of fire exclusion (such as Wilderness areas. riparian corridors have also, of course, seen much more protection than upland areas). **Exhibit 158.** The authors state:

> *"There is a widespread view among land managers and others that the protected status of many forestlands in the western United States corresponds with higher fire severity levels due to historical restrictions on logging that contribute to greater amounts of biomass and fuel loading in less intensively managed areas, particularly after decades of fire suppression. This view has led to recent proposals—both administrative and legislative—to reduce or eliminate forest protections and increase some forms of logging based on the belief that restrictions on active management have increased fire severity. 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 had lower severity values even though they are generally identified as having the highest overall levels of biomass and fuel loading. Our results suggest a need to reconsider current overly simplistic assumptions about the relationship between forest protection and fire severity in fire management and policy"**
>
> **"Protected forests burn at lower severities: We found no evidence to support the prevailing forest/fire management hypothesis that higher levels of forest protections are associated with more severe fires based on the RF and linear mixed-effects modeling approaches. On the contrary, using over three decades of fire severity data from relatively frequent-fire pine and mixed-conifer forests throughout the western United States, we found support for the opposite conclusion—burn severity tended to be higher in areas with lower levels of protection status (more intense management), after accounting for topographic and climatic conditions in all three model runs. Thus, we rejected the prevailing forest management view that areas with higher protection levels burn most severely during wildfires."**

In addition, recent research suggests that Grand fir forests are more fire resistant than generally assumed by the agency. Moris et al. 2022 found:

> *"The grand fir forest type had severity values at the same level of forest types dominated by fire-resister species despite grand fir was classified as a fire-avoider species. ... In many ponderosa pine forests maintained historically by a high frequency, low-severity fire regime, the transition towards denser forests dominated by Douglas-fir and grand fir would explain why ponderosa pine and*

Douglas-fir still compose a significant proportion of basal area in the grand fir forest type, and many maintain large, old, fire-resistant ponderosa pine trees (Johnston et al. 2021; Merschel et al. 2021). Therefore, the particular structure and composition of these "recent" grand fir forests (e.g., Merschel et al. 2014), with an important presence of large-diameter trees of fire-resistant species, may provide latent fire resistance (Larson et al. 2013)."

The Draft Plan's direction to increase logging, while simultaneously eliminating or rollbacking most of the enforceable standards that provide sidebars of protection from logging and other land management is largely taking place under the guise of fear of fire. However, increased logging will not keep communities safer and is likely to create increased fire risk in addition to widespread ecological damage. Riparian and aquatic habitats are particularly vulnerable to damage from logging and roading. Cooler, moister forests and forests that provide climate and fire refugia will likely be targeted and lost—compromising or destroying their ability to moderate or help ameliorate the effects of climate change.

Under the Draft Plan, heavy and industrial-style logging will increase on National Forests in the Blue Mountains. In addition to research by Bradley et al. 2016 and Zald and Dunn 2018 [**Exhibit 159**], new research has come out showing that industrial logging makes wildfires worse, and increases fire risk. The University of Utah online newsroom discusses this recent research in the article *Industry-managed forests more likely to fuel megafires* (**Exhibit 160**)*:*

The odds of high-severity wildfire were nearly one-and-a-half times higher on industrial private land than on publicly owned forests*, a new study found. Forests managed by timber companies were more likely to exhibit the conditions that megafires love—dense stands of regularly spaced trees with continuous vegetation connecting the understory to the canopy.*

The research, led by the University of Utah, University of California, Berkeley, and the United States Forest Service, is the first to identify how extreme weather conditions and forest management practices jointly impact fire severity.

In a 2022 study*, Levine and collaborators found that fire severity was typically higher on privately managed forests. They also discovered the risks extended to areas near, but not owned by, private industry, threatening the wilderness, small landowners and urban areas in their shadow. This new study is the first to identify the underlying forest structures that make high-severity fires more likely in some areas than in others.*

The draft Forest Plan also ignores the important ecological benefits to many species of high-severity fire and snag forests, and seems likely to continue the practice of managing for low-severity frequent fire across the landscape—including in places that did not experience frequent fire and were likely to burn at high severities. We also have concerns about the Forest Service's ongoing use of prescribed fire in ecologically inappropriate areas. It is also important to note that prescribed fire is not the same as wildfire. Prescribed burns can and do cause ecologically important damage to crucial wildlife habitat, particularly if done in ecologically inappropriate areas such as fire and climate refugia. We are also concerned about the loss of snags and downed logs, and note that prescribed burns do not necessarily mimic the same dynamics as wildfire. In addition, timing of prescribed burns, such as those done in spring, potentially interrupts delicate life cycle rhythms of wildlife, such as egg laying and hatching and can harm insects, butterflies, nesting birds, and other species. and that prescribed fire can cause lasting, long-term negative reductions in snags, logs, and dead wood habitats (Arkle and Pilliod, 2010 [**Exhibit 161**]; Pilliod et al. 2006 [**Exhibit 162**]).

Historical documents

The Forest Plan revision analysis should take into consideration historical documents and forest conditions. The following are the primary summary points gleaned from review of historical documents dated from the early to mid 1900s. The forest conditions described in these historical documents, such as generally dense forests and abundant representation of fir trees in the pictures, are conditions that run contrary to the Forest Service's assumptions used to justify logging of large firs, in riparian forests, and in mixed-conifer and mature and old forests.

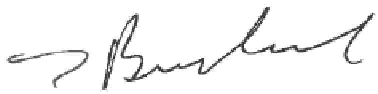
Please see the Historical Documents: A Summary of Forest Density and Species Composition submitted in BMBP's exhibits folder for in-depth quotations, excerpts, and citations upon which these summary points are based.

- Clumps of higher density forests are natural and documented in early historical accounts—even within Ponderosa pine forests.
- Grand fir and other non-Ponderosa pine species were historically well-represented on the landscape. Historical accounts of mixed conifer stands include descriptions of fir being the most abundant and dominant species in those forest types; Douglas fir and smaller percentages of Western larch were also described. Early seral species were not the dominant or most abundant components of these stands in the majority of historical accounts. Mixed conifer forests comprised large percentages of the forested landscapes in Eastern Oregon. In some watersheds, close to half of the forests were mixed conifer stands. Percentages vary according to historical documents and geographic area.
- Ponderosa pine forests also contained a substantial percentage of other tree species, including Grand fir. Pure Ponderosa pine stands were rare.
- Grand fir was targeted for removal as per regional direction to foresters working on National Forests. Current estimates of Grand fir density and volume may be erroneously based on anecdotal observations that occurred after substantial proportions of fir were already removed across the landscape.
- Extensive overgrazing during the turn of the century may have created artificially open forest stands in some areas.

Conclusion

BMBP as an organization has spent over 30 years advocating for the forested ecosystems of the Blue Mountains. We implore the Forest Service to fully consider these comments, assess and incorporate the comments, suggested alternatives, and references cited included herein, and fully analyze and adopt forest plans for the Umatilla, Malheur, and

Wallowa-Whitman National Forests that allow these landscapes and the humans and wildlife that rely upon them to persist into the future.



Tom Buchele
Earthrise Law Center
Counsel for BMBP

Karen Coulter
Director
BMBP

Paula Hood
Co-Director
BMBP

Austin Starnes
Staff Attorney
BMBP

Additional Signatories:

s/Chad Hanson
Director and Principal Ecologist
John Muir Project

s/Paul Ruprecht
Nevada Director
Western Watersheds Project

Exhibits Cited

Exhibit 001: October 3, 2025 Email exchange between Christopher Dennis, Deputy Public Affairs officer for the Umatilla National Forest, and Austin Starnes, Staff Attorney for BMBP.

Exhibit 002: Bolsinger, C.L. and Berger, J.M., 1975. The timber resources of the Blue Mountain area, Oregon. Res. Bull. PNW-RB-057. Portland, OR: US Department of Agriculture, Forest Service, Pacific Northwest Research Station. 71 p, 57.

Exhibit 003: Cowlin, R.W. and Briegleb, P.A., 1942. Forest resources of the ponderosa pine region of Washington and Oregon (No. 490). US Department of Agriculture, Forest Service.

Exhibit 004: Henjum, M.G., 1994. Interim protection for late-successional forests, fisheries, and watersheds: National forests east of the Cascade Crest, Oregon, and Washington (Vol. 94, No. 2). Wildlife Society.

Exhibit 005: Merschel, A.G., Spies, T.A. and Heyerdahl, E.K., 2014. Mixed-conifer forests of central Oregon: effects of logging and fire exclusion vary with environment. Ecological Applications, 24(7), pp.1670-1688.

Exhibit 006: Hessburg, P. F., Charnley, S., Wendel, K. L., White, E. M., Singleton, P. H., Peterson, D. W., Halofsky, J. E., Gray, A. N., Spies, T. A., Flitcroft, R. L., & White, R. (2020). *The 1994 Eastside Screens large-tree harvest limit: Review of science relevant to forest planning 25 years later* (Pacific Northwest Research Station, General Technical Report PNW-GTR-990). U.S. Department of Agriculture, Forest Service.

Exhibit 007: Powell, D. C. (2013). *Eastside Screens chronology* (White Paper F14-SO-WP-SILV-53). U.S. Department of Agriculture, Forest Service, Umatilla National Forest.

Exhibit 008: Thomas, J. W. (Tech. Ed.). (1979). *Wildlife habitats in managed forests: The Blue Mountains of Oregon and Washington* (Agriculture Handbook No. 553). U.S. Department of Agriculture, Forest Service.

Exhibit 009: Wisdom, M.J., 2000. *Source habitats for terrestrial vertebrates of focus in the interior Columbia Basin: broadscale trends and management implications* (Vol. 485). US Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Exhibit 010: Bull, E. L., Parks, C. G., & Torgersen, T. R. (1997). *Trees and logs important to wildlife in the interior Columbia River basin* (Gen. Tech. Rep. PNW-GTR-391). U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Exhibit 011: Moris, J.V., Reilly, M.J., Yang, Z., Cohen, W.B., Motta, R. and Ascoli, D., 2022. *Using a trait-based approach to assess fire resistance in forest landscapes of the Inland Northwest, USA.* Landscape Ecology.

Exhibit 012: Hakkenberg, C.R., Clark, M.L., Bailey, T., Burns, P. and Goetz, S.J., 2024. *Ladder fuels rather than canopy volumes consistently predict wildfire severity even in extreme topographic-weather conditions*. Communications Earth & Environment.

Exhibit 013: Zhou, D., Zhao, S.Q., Liu, S. and Oeding, J., 2013. *A meta-analysis on the impacts of partial cutting on forest structure and carbon storage*. Biogeosciences,

Exhibit 014: Watts, A., Wondzell, S., Jarecke, K. and Bladon, K., 2024. *Hot air or dry dirt: Investigating the greater drought risk to forests in the Pacific Northwest*. Science Findings 268. Portland, OR: US Department of Agriculture, Forest Service, Pacific Northwest Research Station

Exhibit 015: Johnston, J. D., Stephens, P. N., Schmidt, M. R., Jeronimo, S. M. A., Brackett, A. E., Wuenschel, A. E., Ulrich, D. E. M., Paine, R. H., Duloisy, L. F., Greenler, S. M., Larson, A. J., & Churchill, D. J. (2025). *Significant mortality of old trees across a dry forest landscape, Oregon, USA. Forest Ecology and Management*.

Exhibit 016: Hagmann, R. K., Hessburg, P. F., Prichard, S. J., Povak, N. A., Brown, P. M., Fulé, P. Z., Keane, R. E., Knapp, E. E., Lydersen, J. M., Metlen, K. L., Reilly, M. J., Sánchez Meador, A. J., Stephens, S. L., Stevens, J. T., Taylor, A. H., Yocom, L. L., Battaglia, M. A., Churchill, D. J., Daniels, L. D., Falk, D. A., Henson, P., Johnston, J. D., Krawchuk, M. A., Levine, C. R., Meigs, G. W., Merschel, A. G., North, M. P., Safford, H. D., Swetnam, T. W., & Waltz, A. E. M. (2021). *Evidence for widespread changes in the structure, composition, and fire regimes of western North American forests*. Ecological Applications.

Exhibit 017: Mildrexler, D. J., Berner, L. T., Law, B. E., & Moomaw, W. R. (2020). *Large trees dominate carbon storage in forests east of the Cascade Crest in the United States Pacific Northwest*. Frontiers in Forests and Global Change.

Exhibit 018: Greater Hells Canyon Council v. Wilkes, No. 2:22-cv-00859-HL (D. Or. Mar. 29, 2024). Order adopting findings and recommendation and requiring an environmental impact statement.

Exhibit 019: Johnston, J. D., Greenler, S. M., Miller, B. A., Reilly, M. J., Lindsay, A. A., & Dunn, C. J. (2021). *Diameter limits impede restoration of historical conditions in dry mixed-conifer forests of eastern Oregon, USA*. Ecosphere

Exhibit 020: Keane, Robert E., Paul F. Hessburg, Peter B. Landres, Fred J. Swanson. *The use of historical range and variability (HRV) in landscape management.* Forest Ecology and Management.

Exhibit 021: Keppel, G., Van Niel, K., Wardell-Johnson, G. W., Yates, C. J., Byrne, M., Mucina, L., Schut, A. G. T., Hopper, S., & Franklin, S. E. (2012). *Refugia: Identifying and understanding safe havens for biodiversity under climate change*. Global Ecology and Biogeography.

Exhibit 022: Law, B. E., Hudiburg, T. W., Berner, L. T., Kent, J. J., Buotte, P. C., & Harmon, M. E. (2018). *Land use strategies to mitigate climate change in carbon dense temperate forests*. Proceedings of the National Academy of Sciences.

Exhibit 023: Halofsky, J. E., & Peterson, D. L. (Eds.). (2017). *Climate change vulnerability and adaptation in the Blue Mountains*. (Gen. Tech. Rep. PNW-GTR-939). U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Exhibit 024: Heller, N. E., & Zavaleta, E. S. (2009). *Biodiversity management in the face of climate change: A review of 22 years of recommendations*. Biological Conservation.

Exhibit 025: Swanston, C. W., Janowiak, M. K., Brandt, L. A., Butler, P. R., Handler, S. D., Shannon, P. D., Derby Lewis, A., Handler, C., Tomasek, B., Ontl, T. A., & others. (2016). *Forest adaptation resources: Climate change tools and approaches for land managers* (2nd ed.; Gen. Tech. Rep. NRS-GTR-87-2). U.S. Department of Agriculture, Forest Service, Northern Research Station.

Exhibit 026: Independent Scientific Advisory Board. (2007). *Climate change impacts on Columbia River Basin fish and wildlife* (ISAB Climate Change Report ISAB 2007-2). Northwest Power and Conservation Council.

Exhibit 027: Beschta, R. L., Frissell, C. A., Gresswell, R. E., Hauer, F. R., Karr, J. R., Minshall, G. W., Perry, D. A., & Rhodes, J. J. (1995, March). *Wildfire and salvage logging: Recommendations for ecologically sound post-fire salvage management and other post-fire treatments on federal lands in the West*.

Exhibit 028: Karr, J. R., Rhodes, J. J., Minshall, G. W., Hauer, F. R., Beschta, R. L., Frissell, C. A., & Perry, D. A. (2004). *The effects of postfire salvage logging on aquatic ecosystems in the American West*. BioScience

Exhibit 029: Law, B. E., Berner, L. T., Mildrexler, D. J., Bloemers, R. O., & Ripple, W. J. (2022). *Strategic reserves in Oregon's forests for biodiversity, water, and carbon to mitigate and adapt to climate change*. Frontiers in Forests and Global Change.

Exhibit 030: Dominick A. DellaSala, B. C. Baker, Chad T. Hanson, Luke Ruediger & William L. Baker, *Have Western USA Fire Suppression and Megafire Active Management Approaches Become a Contemporary Sisyphus*?, **268** Biological Conservation (2022)

Exhibit 031: Mildrexler, D. J., Law, B. E., Berner, L. T., & Moomaw, W. R. (2023). *Protect large trees for climate mitigation, biodiversity, and forest resilience goals*. Conservation Science and Practice.

Exhibit 032: Rosenberg, K. V., Dokter, A. M., Blancher, P. J., Sauer, J. R., Smith, A. C., Smith, P. A., Stanton, J. C., Panjabi, A., Helft, L., Parr, M., & Marra, P. P. (2019). *Decline of the North American avifauna*. Science.

Exhibit 033: Forest Service Handbook 1909.12, ch. 20 (July 30, 2025)

Exhibit 034: Marshall, M.R.; DeCecco, J.A.; Williams, A.B.; Gale, G.A.; Cooper, R.J. (2003). Use of regenerating clearcuts by late-successional bird species and their young during the post-fledgling period. Forest Ecology and Management 183 (2003) 127–135.

Exhibit 035: Csuti, B.; Kimerling, J.; O'Neill, T.; Shaughnessy, M.; Gaines, E.; Huso, M. (1997). Atlas of Oregon Wildlife: Distribution, Habitat, and Natural History. Oregon State University Press, Corvallis, Oregon.

Exhibit 036: Langham G.; Schuetz J.; Distler T; Soykan C.; Wilsey C. (2015) Conservation Status of North American Birds in the Face of Future Climate Change. PLoS ONE 10(9): e0135350. https://doi.org/10.1371/journal.pone.0135350

Exhibit 037: Hutto, R. 2008. The ecological importance of severe wildfires: some like it hot. Ecological Applications, 18(8), 2008, pp. 1827–1834

Exhibit 038: Quigley, T.; Haynes, R.; Graham, R. 1996. Integrated Scientific Assessment for ecosystem management in the interior Colubia Basin and portions of the Klamath and Great Basins. PNW-GTR-382. USDA, Forest Service, PNW Research Station.

Exhibit 039: Hutto, R. 2006. Towards meaningful snag-management guidelines for postfire salvage logging in North American conifer forests. Conservation Biology 20(4) pp 984-993. http://www.sierraforestlegacy.org/Resources/Conservation/SierraNevadaWildlife/BlackBacked Woodpecker/BBW O-Hutto06.pdf

Exhibit 040: Open Letter to Members of Congress from 250 Scientists Concerned about Post-fire Logging (2013). Accessed online: https://johnmuirproject.org/wp-content/uploads/2015/04/ScientistSign-onLettertoCongressRePostfireLogging.pdf

Exhibit 041: Donato, D., J. B. Fontaine, J. L. Campbell, W. D. Robinson, J. B. Kauffman and B. E. Law. 2006. Post-Wildfire Logging Hinders Regeneration and Increases Fire Risk. Science, New Series, Vol. 311, No. 5759 (Jan. 20, 2006), p. 352 Published by: American Association for the Advancement of Science Stable URL: http://www.jstor.org/stable/3843349

Exhibit 042: Lindenmayer, D. and Noss, R. 2006. Salvage Logging, Ecosystem Processes, and Biodiversity Conservation. Conservation Biology Volume 20, No. 4, 949–958 ©2006 Society for Conservation Biology DOI: 10.1111/j.1523-1739.2006.00497.x.

Exhibit 043: Titus, Jonathan & Householder, John. (2007). SALVAGE LOGGING AND REPLANTING REDUCE UNDERSTORY COVER AND RICHNESS COMPARED TO UNSALVAGED-UNPLANTED. Western North American Naturalist. 67. 219-231.

Exhibit 044: Keeley, J. 2006. Fire Management Impacts on Invasive Plants in the Western United States. Conservation Biology Volume 20, No. 2, 375–384. 2006 Society for Conservation Biology. DOI: 10.1111/j.1523-1739.2006.00339.x.

Exhibit 045: Donato, D. Fontaine, J.; Robinson, D.; Kauffman, B.; and Law, B.. 2009. Vegetation response to a short interval between high-severity wildfires in a mixed-evergreen forest. Department of Forest Science and Fisheries and Wildlife, Oregon State University, Corvallis, OR 97331, USA; and Institute of Pacific Islands Forestry, USDA Forest Service, Hilo, HI 96720, USA. doi: 10.1111/j.1365-2745.2008.01456.x.

Exhibit 046: PNW Research Station 2017. Woodpecker Woes: The Right Tree Can Be Hard to Find. USDA USFS.

Exhibit 047: Thomas, J. and Spies, T. 2010. Factors associated with crown damage following recurring mixed-severity wildfires and post-fire management in southwestern Oregon. Landscape Ecol. (2010) 25:775–789. DOI 10.1007/s10980-010-9456-3.

Exhibit 048: Carter, J., Vasquez, E. and Jones, A. (2020). Spatial Analysis of Livestock Grazing and Forest Service Management in the High Uintas Wilderness, Utah. Journal of Geographic Information System, 12, 45-69. https://doi.org/10.4236/jgis.2020.122003

Exhibit 049: Goss, L.M. and Roper, B.B. 2018. The Relationship Between Measures of Annual Livestock Disturbance in Western Riparian Areas and Stream Conditions Important to Trout, Salmon, and Char. Western North American Naturalist, 78(1):76-91. http://www.bioone.org/doi/full/10.3398/064.078.0108

Exhibit 050: Bridger-Teton National Forest. Streambank Alteration Measurement and Implementation, Final November 5, 2008. Ronna Simon.

Exhibit 051: Holechek, J. L., R. D. Pieper, C. H. Herbel. 2010. RANGE MANAGEMENT: PRINCIPLES AND PRACTICES. 6th ed. Prentice-Hall. Upper Saddle River, NJ.

Exhibit 052: Clary and Webster (1989) Managing grazing of riparian areas in the Intermountain Region. General Technical Report. INT-263. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station, 11 p.

Exhibit 053: Kinney J. and Clary, W. (1994). A photographic Utilization Guide for Key Riparian Graminoids. USDA, Forest Service. Intermountain Research Station. General Techical Report INT-GTR-308.; Cowley, E.R. (1999). Stubble Height Based on Height-Weight Curves for Nine Key Riparian Graminoids.

Exhibit 054: WAFWA. 2025. Recommendations for domestic sheep and goat management in wild sheep habitat. Western Association of Fish and Wildlife Agencies Wild Sheep Initiative, Boise, Idaho, USA.

Exhibit 055: Yeo, J. 2012. Revitalization of a native Wyoming Big Sagebrush/ Bluebunch Wheatgrass Community in Idaho: a 10-year Summary. BLM Technical Bulletin 2014-1 (recommending 4–5 years of rest following reseeding)

Exhibit 056: Pyke, D.A., Chambers, J.C., Pellant, M., Miller, R.F., Beck, J.L., Doescher, P.S., Roundy, B.A., Schupp, E.W., Knick, S.T., Brunson, M., and McIver, J.D., 2017, Restoration handbook for sagebrush steppe ecosystems with emphasis on greater sage-grouse habitat—Part 3. Site level restoration decisions: U.S. Geological Survey Circular 1426, 62 p., https://doi.org/10.3133/cir1426

Exhibit 057: Veblen, Post Fire Grazing Management in the Great Basin, Great Basin Factsheet Series, No. 7 (2015) (available at http://www.sagegrouseinitiative.com/wp-content/uploads/2015/07/7Post-fireGrazing.pdf) (last visited August 13, 2019)

Exhibit 058: Reisner, M. D., Grace, J. B., Pyke, D. A. and Doescher, P. S. 2013. Conditions favouring *Bromus tectorum* dominance of endangered sagebrush steppe ecosystems. Journal of Applied Ecology, 50(4): 1039-1049. doi: 10.1111/1365-2664.12097

Exhibit 059: Condon, L.A. & Pyke, D.A. (2018). Fire and Grazing Influence Site Resistance to Bromus tectorum Through Their Effects on Shrub, Bunchgrass and Biocrust Communities in the Great Basin (USA). Ecosystems (2018) 21:1416.

Exhibit 060: J.H. Kaltenecker, et al., (1999). *Biological Soil Crusts in Three Sagebrush Communities Recovering From a Century of Livestock Trampling*, SHRUBLAND ECOTONES, RMRS-P-11 222-226 (USDA Forest Service, Rocky Mountain Research Station, Ogden, Utah 1999).

Exhibit 061: Root, H., Miller, J., and Rosentreter, R. 2019. Grazing disturbance promotes exotic annual grasses by degrading soil biocrust communities. Ecological Applications, 0,(0), 2019, e02016.https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/eap.2016

Exhibit 062: Williamson, M.A. et al. (2019). Fire, livestock grazing, topography, and precipitation affect occurrence and prevalence of cheatgrass (Bromus tectorum) in the Central Great Basin, USA. Biol Invasions. https://doi.org/10.1007/s10530-019-02120-8

Exhibit 063: Law, B.; Berner, L.; Buotte, P.; Mildrexler, D.; Ripple, W. 2023. *Strategic Forest Reserves can protect biodiversity in the western United States and Mitigate Climate Change.* COMMUNICATIONS EARTH & ENVIRONMENT | https://doi.org/10.1038/s43247-021-00326-0.

Exhibit 064: Roper, B.; Saunders, C.; Ojala, J. 2019. Did changes in western federal land management policies improve salmonid habitat in streams on public lands within the Interior Columbia River Basin? Environ Monit Assess (2019) 191:574 https://doi.org/10.1007/s10661-019-7716-5.

Exhibit 065: Roper, B.; Saunders, C.; Ojala, J. 2022. The Relationship between Disturbance Events and Substantial Changes in Stream Conditions on Public Lands in the Inland Pacific Northwest. North American Journal of Fisheries Management 43:268–284, 2023 Published 2022. ISSN: 0275-5947 print / 1548-8675 online DOI: 10.1002/nafm.10858.

Exhibit 066: Holthuijzen, A. 2021. "Passive Restoration of a Small Mountain Stream in Eastern Oregon," *Northwest Science* 95(1), 54-72, (12 October 2021). https://doi.org/10.3955/046.095.0104

Exhibit 067: Kauffman (1997)

Exhibit 068: Langston, Nancy. "Environmental history and restoration in the western forests." Journal of the West 38.4 (1999): 45-56.

Exhibit 069: Millar, Constance I., and Wallace B. Woolfenden. "The role of climate change in interpreting historical variability." Ecological Applications 9.4 (1999): 1207-1216.

Exhibit 070: Kauffman, J. Boone. "Death rides the forest: perceptions of fire, land use, and ecological restoration of western forests." Conservation Biology 18.4 (2004): 878-882

Exhibit 071: Noss, Reed F., et al. "Managing fire-prone forests in the western United States." Frontiers in Ecology and the Environment 4.9 (2006a): 481-487.

Exhibit 072: Agee, James K. "The landscape ecology of western forest fire regimes." Northwest Science 72 (1998): 24.

Exhibit 073: Franklin, Jerry F., and K. Norman Johnson. "A restoration framework for federal forests in the Pacific Northwest." Journal of Forestry 110.8 (2012): 429-439.

Exhibit 074: Hessburg, Paul F., et al. "Restoring fire-prone Inland Pacific landscapes: seven core principles." Landscape Ecology 30.10 (2015): 1805-1835

Exhibit 075: DellaSala, Dominick A., et al. "Forest health: moving beyond rhetoric to restore healthy landscapes in the inland Northwest." Wildlife Society Bulletin (1973-2006) 23.3 (1995): 346-356.

Exhibit 076: Agee, James K. "The fallacy of passive management: managing for firesafe forest reserves." Conservation 3.1 (2002): 18-26.

Exhibit 077: Reinhardt, Elizabeth D., et al. "Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States." Forest Ecology and Management 256.12 (2008): 1997-2006.

Exhibit 078: National Oceanic and Atmospheric Administration (NOAA) 1996. Coastal Salmon Conservation: Working Guidance for Comprehensive Salmon Restoration Initiatives on the Pacific Coast.

Exhibit 079: National Oceanic and Atmospheric Administration (NOAA) 2011. 5-Year Review: Summary and Evaluation of Snake River Sockeye, Snake River Spring-Summer Chinook, Snake River Fall-Run Chinook, Snake River Basin Steelhead. National Marine Fisheries Northwest Region.

Exhibit 080: United States Forest Service (USFS) 2015. Malheur National Forest—Roads Analysis—Executive Summary.

Exhibit 081: United States Fish and Wildlife Service (USFWS) 2010. “USFWS Bull Trout Final Rule”. 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for Bull Trout in the Coterminous United States; Final Rule**.**

Exhibit 082: United States Fish and Wildlife Service (USFWS) 2010. Bull Trout Final Habitat Justification: Rational for Why Habitat is Essential, and Documentation of Occupancy. Accessed online at: http://www.fws.gov/pacific/bulltrout/pdf/Justification Docs/BTFinalJustifyfulldoc.pdf.

Exhibit 083: United States Forest Service (USFS) 2018. Final Environmental Impact Statement for the Proposed Revised Land Management Plans for the Malheur, Umatilla, and Wallowa-Whitman National Forests.

Exhibit 084: Carnefix and Frissell 2009. Aquatic and Other Environmental Impacts of Roads: The Case for Road Density as Indicator of Human Disturbance and Road Density Reduction as Restoration Target; a Concise Review. The Pacific Rivers Council.

Exhibit 085: National Oceanic and Atmospheric Administration (NOAA) 2011. 5-Year Review: Summary & Evaluation of Middle Columbia River Steelhead. National Marine Fisheries Northwest Region.

Exhibit 086: Bader, M., 2000. Based Ecosystem Protection in the Northern Rocky Mountains of the United States. Alliance for the Wild Rockies. USDA Forest Service Proceedings RMRS-P-15-VOL-2. 2000. Accessed at:
http://www.fs.fed.us/rm/pubs/rmrs_p015_2/rmrs_p015_2_099_110.pdf.

Exhibit 087: Bradley, C.; Rhodes, J.; Kessler, J.; Frissell, C., 2002. An Analysis of Trout and Salmon Status and Conservation Values of Potential Candidates in Idaho and Eastern Washington. Published by: The Western Native Trout Campaign; the Center for Biological Diversity, The Biodiversity Conservation Alliance, and the Pacific Rivers Council.

Exhibit 088: DellaSala, D.; Karr, J.; Olson, D.; 2011. Roadless areas and clean water. Journal of Soil and Water Conservation, 66(3): 78A-84A. Accessed at:
http://www.jswconline.org/content/66/3/78A.full.pdf

Exhibit 089: Frissell, C. and Carnefix, G.; 2007. The Geography of Freshwater Conservation: Roadless Areas and Critical Watersheds for Native Trout. Wild Trout IX symposium. Accessed at: http://www.blm.gov/or/plans/wopr/pub_comments/paper_documents/Paper_1989-2023/WOPR_PAPER_01989.120001.pdf

Exhibit 090: Rieman, B.; Clayton, J.; 1997. Wildfire and Native Fish: Issues of Forest Health and Conservation of Sensitive Species. Forest Service, Rocky Mountain Research Station.

Exhibit 091: Rieman, B.; Lee, D.; Thurow, R.; 2000. Toward an Integrated Classification of Ecosystems: Defining Opportunities for Managing Fish and Forest Health. Environmental Management Vol. 25, No. 4, pp. 425–444. Accessed at:
http://andrewsforest.oregonstate.edu/pubs/pdf/pub3225.pdf

Exhibit 092: Thurow, R.; Lee, D.; Rieman, B. 2001. Distribution and Status of Seven Native Salmonids in the Interior Columbia River Basin and Portions of the Klamath River and Great Basins. North American Journal of Fisheries Management, 17:4,1094-1110. United States Fish and Wildlife

Exhibit 093: Public Lands Initiative (Trout Unlimited), 2004. Where the Wild Lands are: Oregon; the Importance of Roadless Areas to Oregon's Fish, Wildlife, Hunting and Angling.

Exhibit 094: Western Native Trout Campaign, 2001. Imperiled Western Trout and the Importance of Roadless Areas. Published by the Center for Biological Diversity, Pacific Rivers Council, and Biodiversity Associates.

Exhibit 095: Quigley, T. and Arbelbide, S. 1997; An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins. PNW-GTR-405.

Exhibit 096: Olson 2000. Master's thesis: Fire in riparian zones: a comparison of historical fire occurrence in riparian and upslope forests in the Blue Mountains and southern Cascades of Oregon.

Exhibit 097: Howell, P. 2006. Effects of Wildfire and Subsequent Hydrologic Events on Fish Distribution and Abundance in Tributaries of North Fork John Day River. North American Journal of Fisheries Management 26:983–994, 2006. Copyright by the American Fisheries Society 2006 DOI: 10.1577/M05-114.1

Exhibit 098: Rosenberg, A.; Dunham, J.; Neville, H. 2012 Fish Life Histories, Wildfire, and Resilience—A Case Study of Rainbow Trout in the Boise River, Idaho. USDA Forest Service RMRS-GTR-290. 2012.

Exhibit 099: Warren, D.; Roon, D.; Swartz, A.; Blandon, K. 2022. Loss of riparian forests from wildfire led to increased stream temperatures in summer, yet salmonid fish persisted. Ecosphere. 2022;13:e4233. https://onlinelibrary.wiley.com/r/ecs2 1 of 8 https://doi.org/10.1002/ecs2.4233.

Exhibit 100: Schwartz, A. and Warren, D. 2023. Wildfire in western Oregon increases stream temperatures, benthic biofilms, and juvenile coastal cutthroat trout size and densities with mixed effects on adult trout and coastal giant salamanders. Can. J. Fish. Aquat. Sci. 00: 1–14 (2023) | dx.doi.org/10.1139/cjfas-2022-0053.

Exhibit 101: Nez Perce presentation 2022 Nez Perce Tribe staff presentation on their analysis of Snake River Basin Chinook and Steelhead – Quasi-Extinction Threshold and Call to Action https://www.nwcouncil.org/sites/default/files/2021_05_4.pdf

Exhibit 102: Idaho Statesman, Baker, E. 2021. Key salmon population are crossing alarming threshold--and more are nearing that line. https://www.idahostatesman.com/news/local/environment/article251131359.html

Exhibit 103: Idaho Capital Sun, Commentary by Pat Ford 2025. Accessed online at: https://idahocapitalsun.com/2025/08/20/salmon-and-steelhead-extinction-threshold-science-and-the-ocean-fish-of-northeast-oregon/

Exhibit 104: Crozier, L.G., Burke, B.J., Chasco, B.E. et al. Climate change threatens Chinook salmon throughout their life cycle. Commun Biol 4, 222 (2021). https://doi.org/10.1038/s42003-021-01734-w.

Exhibit 105: Bryce, S.; Lomnicky, S.; Gregg, A.; Kaufmann, P. 2010. Protecting sediment-sensitive aquatic species in mountain streams through the application of biologically based streambed sediment criteria. J.N. Am. Benthol. Soc., 2010, 29(2):657-672.

Exhibit 106: Nietch, C.; Borst, M.; Schubauer-Berigan, J.; 2005. Risk management of sediment stress: a framework for sediment risk management research. Environmental Management 36:175–194.

Exhibit 107: Cederholm C., Reid L., Salo E. (1980). Cumulative effects of logging road sediment on salmonid populations in Clearwater River, Jefferson County, Washington. College of Fisheries, University of Seattle, Washington.

Exhibit 108: Cover, M.; May, C.; Dietrich, W.; and Resh, V. 2018 Quantitative linkages among sediment supply, streambed fine sediment, and benthic macroinvertebrates in northern California streams. J. N. Am. Benthol. Soc., 2008, 27(1):135–149 2008 by The North American Benthological Society DOI: 10.1899/07–032.1 Published online: 15 January 2008

Exhibit 109: United States Environmental Protection Agency (USEPA), 2006, SABS Framework for Developing Suspended and Bedded Sediments (SABS) Water Quality Criteria

Exhibit 110: Croke, J.C., Hairsine, P.B., 2006, Sediment delivery in managed forests: a review: Environmental Review, v. 14, p. 59-87.

Exhibit 111: Moore, D. and Wondzell, S. 2005. Physical hydrology and the effects of forest harvesting in the Pacific Northwest: A review. Journal of the American Waters Association, 41(4) pp. 763-784.

Exhibit 112: Idaho Department of Environmental Quality (IDEQ). (2003). Guide for selection of sediment targets for use in Idaho TMDLs. Retrieved from http://www.deq.state.id.us/WATER/ data_reports/surface_water/monitoring/sediment_targets_guide.pdf/.

Exhibit 113: Steele, A. and Beckman, B. 2014. Stream Temperature Variability: Why It Matters To Salmon. USDA, Pacific Northwest Research Station.

Exhibit 114: United States Fish and Wildlife Service (USFWS) 2010. "USFWS Bull Trout Final Rule". 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for Bull Trout in the Coterminous United States; Final Rule.

Exhibit 115: PNW Research Station Science Findings. 2017. Adaptation to Wildfire: A Fish Story. https://www.fs.usda.gov/pnw/sciencef/scifi198.pdf.

Exhibit 116: Caissie, D., 2006. The thermal regime of rivers: a review. Freshwat. Biol. 51, 1389– 1406.

Exhibit 117: Davies, P.E. & M. Nelson, Relationships between riparian buffer widths and the effects of logging on stream habitat, invertebrate community composition and fish abundance, 45 Australian Journal of Marine and Freshwater Research, at 1289–1305 (1994)

Exhibit 118: DeWalle, D.R., Modeling stream shade: Riparian buffer height and density as important as buffer width, 46 Journal of the American Water Resources Association 2, at 323–333 (2010).

Exhibit 119: Kiffney, P.M. et al., Responses of Periphyton and Insects to Experimental Manipulation of Riparian Buffer Width Along Forest Streams, 40 Journal of Applied Ecology, at 1060-1076 (2003).

Exhibit 120: Groom, J.; Dent, L.; Madsen, L; and Fleuret, J. 2011. Response to western Oregon (USA) stream temperatures to contemporary forest management. Forest Ecology and Management 262:1618-1629.

Exhibit 121: Groom J.; Dent, L.; and Madsen, L. 2011. Stream temperature change detection for state and private forests in the Oregon Coast Range. Water Resources Research 47, W01501.

Exhibit 122: Jones, K.; Poole, G.; Meyer, J.; Bumback, W.; and Kramer, E. 2006. Quantifying Expected Ecological Response to Natural Resource Legislation: A Case Study of Riparian Buffers, Aquatic Habitat, and Trout Populations. Ecology and Society 11:15.

Exhibit 123: Sweeney, B.; and Newbold, J.2014. Streamside Forest Buffer Width Needed to Protect Stream Water Quality, Habitat, and Organisms: A Literature Review. Journal of the American Water Resources Association 50(3): 560-584.

Exhibit 124: Pollock, M.; Beechie, T.; Liermann, M.; and Bigley, R. 2009. Stream temperature relationships to forest harvest in Western Washington. Journal of the American Water Resources Association 45(1):141-156.

Exhibit 125: Wigington, P.; Ebersole, J.; Colvin, M.; Leibowitz, S.; Miller, B.; Hansen, B.; Lavigne, H.; White, D.; Baker, J.; Church, M.; Brooks, J.; Cairns, M.; and Compton, J. 2006. Coho salmon dependence on intermittent streams. Frontiers in Ecology and the Environment 4(10) pp. 514-519.

Exhibit 126: Poole, G.; O'Daniel, S.; Jones, K.; Woessner, W.; Bernhardt, E.; Helton, A.; Stanford, J.; Boer, B.; and Beechie, T. 2008. Hydrologic spiraling: The role of multiple interactive flow paths in stream ecosystems. River Research and Applications 24(7):1018-1031.

Exhibit 127: Poole, G.; and Berman, C. 2001. An ecological perspective on in-stream temperature: Natural heat dynamics and mechanisms of human-caused thermal degradation. Environmental Management 27(6):787– 802.

Exhibit 128: Ebersole, J.; Wigington, P.; Liebowitz, S.; and Comeleo, R. 2015. Predicting the occurrence of cold-water patches at intermittent and ephemeral tributary confluences with warm rivers. Freshwater Science 34(1):111–124.

Exhibit 129: Rhodes, J.J., McCullough, D.A., and Espinosa Jr., F.A., 1994. A Coarse Screening Process for Evaluation of the Effects of Land Management Activities on Salmon Spawning and Rearing Habitat in ESA Consultations. CRITFC Tech. Rept. 94-4, Portland, Or.

Exhibit 130: Erman, D.C., Erman, N.A., Costick, L., and Beckwitt, S. 1996. Appendix 3. Management and land use buffers. Sierra Nevada Ecosystem Project Final Report to Congress, Vol. III, pp. 270- 273. Wildland Resources Center Report No. 39, University of California, Davis.

Exhibit 131: Espinosa, F.A., Rhodes, J.J., and McCullough, D. A. 1997. The failure of existing plans to protect salmon habitat on the Clearwater National Forest in Idaho. J. Env. Management 49: 205-230.

Exhibit 132: Freeman, M.; Pringle, C.; and Jackson, C. 2007. Hydrologic connectivity and the contribution of stream headwaters to ecological integrity and regional scales. Journal of the American Water Resources Association 43(1):5-14.

Exhibit 133: Gomi, Takashi & Moore, R. & Hassan, Marwan. (2005). Suspended Sediment Dynamics in Small Forest Streams of the Pacific Northwest. JAWRA Journal of the American Water Resources Association. 41. 877- 898. 10.1111/j.1752-1688.2005.tb03775.x.

Exhibit 134: Nieber, J.; Arika, C.; Lenhart, C.; Titov, M.; and Brooks, K. 2011. Evaluation of buffer width on hydrologic function, water quality, and ecological integrity of wetlands.

Exhibit 135: Sweeney, B.; and Newbold, J.2014. Streamside Forest Buffer Width Needed to Protect Stream Water Quality, Habitat, and Organisms: A Literature Review. Journal of the American Water Resources Association 50(3): 560-584.

Exhibit 136: Guenther, S., Gomi, T., and Moore, R. (2012). Stream and bed temperature variability in a coastal headwater catchment: influences of surface-subsurface interactions and partial-retention forest harvesting. Hydrological Processes, 28: 1238–1249.

Exhibit 137: Kreutzweiser , D., Capell, S., and Good, K. (2005). Macroinvertebrate community responses to selection logging in riparian and upland areas of headwater catchments in a northern hardwood forest. Journal of the North American Benthological Society, 24(1):208-222.

Exhibit 138: Miserendino, L. and Masi, C. (2010). The effects of land use on environmental features and functional organization of macroinvertebrate communities in Patagonian low order streams. Ecological Indicators, 10(2): 311-319.

Exhibit 139: Zhang, Y.; Richardson, J.; and Pinto, X. 2009. Catchment-scale effects of forestry practices on benthic invertebrate communities in Pacific coastal streams. Journal of Applied Ecology 46,1292-1303.

Exhibit 140: Beechie, T. 2001. Empirical predictors of annual bed load travel distance, and implications for salmonid habitat restoration and protection. Earth Surface Processes and Landforms 26,1025-1034.

Exhibit 141: Beechie, T.; Veldhuisen, C.; Schuett-Hames, D.; DeVries, P.; Conrad, R.; and Beamer, E. 2005. Monitoring treatments to reduce sediment and hydrologic effects from roads. Pages 35-65. Methods for monitoring stream and watershed restoration. (*Book*)

Exhibit 142: Benda, L. and Dunne, T. 1997. Stochastic forcing of sediment routing and storage in channel networks. Water Resources Research 33, 2849-2863.

Exhibit 143: Kelsey, H. 1982. Hillslope evolution and sediment movement in a forested headwater basin, Van Duzen River, north coastal California. Pages 86-96 in Sediment budgets and routing in forested drainage basins. USFS PNW GTR-141, Portland, Oregon.

Exhibit 144: Madej, M. and Ozaki, V. 1996. Channel response to sediment wave propagation and movement, Redwood Creek, California, USA. Earth Surface Processes and Landforms 21:911-927.

Exhibit 145: Flaspohler, D., Fisher, C., Huckins, C., Bub, B., and Van Dusen, P., (2002). Temporal patterns in aquatic and avian communities following selective logging in the Upper Great Lakes Region. Forest Science, 48(2): 339– 349.

Exhibit 146: Lecerf, A. and Richardson, J. (2010). Litter decomposition can detect effects of high and moderate levels of forest disturbance on stream condition. Forest Ecology and Management, 259 (2010) 2433– 2443.

Exhibit 147: Harr, D. and Coffin, B. 1992. Influence of Timber Harvest on Rain-On-Snow Runoff:A Mechanism for Cumulative Watershed Effects. Interdisciplinary Approaches in Hydrology and Hydrogeology, American Institute of Hydrology pp. 455-469

Exhibit 148: Coutant, C. 1999. Perspectives on temperature in the Pacific Northwest's fresh waters. Environmental Sciences Division Publication, US Dept. of Energy, Tennessee.

Exhibit 149: Jones, J. and Grant, G. 1996. Peak flow responses to clear-cutting and roads in small and large basins, western Cascades, Oregon. Water Resources Research 32(4) pp. 959-974.

Exhibit 150: Chen, J.; Franklin, J.; and Spies, T.1992. Vegetation responses to edge environments in old-growth Douglas-fir forests. Ecological Applications 2, 387-396.

Exhibit 151: Chen, J.; Franklin, J.; and Spies, T. 1995. Growing-season microclimatic gradients from clearcut edges into old-growth Douglas-fir forests. Ecological Applications 5, 74-86.

Exhibit 152: Brosofske, K.; Chen, J.; Naiman, R.; and Franklin, J. 1997. Harvesting effects on microclimatic gradients from small streams to uplands in western Washington. Ecological Applications Vol. 7, 1188–1200.

Exhibit 153: Hicks, B., Beschta, R., and Harr, D. (1991). Long-term changes in streamflow following logging in western Oregon and associated fisheries implications. Water Resources Bulletin, (27):2.

Exhibit 154: Janisch, J.; Foster, A.; Ehinger, W.; 2011. Characteristics of small headwater wetlands in second-growth forests of Washington, USA. Forest Ecology and Management 261 (7) 1265-1274, ISSN 0378-1127, 10.1016/j.foreco.2011.01.005.

Exhibit 155: Janisch , J..; Wondzell, S.; Ehinger, W.; 2012. Headwater stream temperature: Interpreting response after logging, with and without riparian buffers, Washington, USA. Forest Ecology and Management 270 (2012) 302–313.

Exhibit 156: Buttle, J.; Creed, I.; Moore, R..; 2009. Advances in Canadian Forest hydrology, 2003-2007. Canadian Water Resources Journal, 34(2), 113.

Exhibit 157: Harley, G.; Heyerdahl, E.; Johnston, J.; Olson, D. 2020. Riparian and adjacent upland forests burned synchronously during dry years in eastern Oregon (1650-1900 CE), USA.

Exhibit 158: 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 United States? Ecosphere 7(10):e01492.10.1002/ecs2.1492.

Exhibit 159: Zald HSJ, Dunn CJ. Severe fire weather and intensive forest management increase fire severity in a multi-ownership landscape. Ecol Appl. 2018 Jun;28(4):1068-1080. doi: 10.1002/eap.1710. Epub 2018 Apr 26. PMID: 29698575.

Exhibit 160: University of Utah Communications, Lisa Potter, 2025. Industry-managed forests more likely to fuel megafires. Accessed online at: https://attheu.utah.edu/facultystaff/industry-managed-forests-more-likely-to-fuel-megafires/?utm_content=bufferf80af&utm_medium=social&utm_source=bufferapp.com&utm_campaign=buffer.

Exhibit 161: Arkle, Robert & Pilliod, David. (2010). Prescribed fires as ecological surrogates for wildfires: A stream and riparian perspective. Forest Ecology and Management. 259. 893-903. 10.1016/j.foreco.2009.11.029.

Exhibit 162: Pilliod, D.; Bull, E.; Hayes, J.; Wales, B. 2006. Wildlife and Invertebrate Response to Fuel Reduction Treatments in Dry Coniferous Forests of the Western United States: A Synthesis. USDA Forest Service/UNL Faculty Publications. Paper 63.