September 12, 2023

Beth Peer, Environmental Coordinator
Ochoco National Forest
3160 NE 3rd Street
Prineville, OR 97754

Re: Comments on the North Fork North Fork Crooked River Forest Resilience Project, Draft Environmental Assessment (EA), https://www.fs.usda.gov/project/?project=61651

Dear Ms. Peer and Staff at the Ochoco National Forest,

Please accept the following comments from the Great Old Broads for Wilderness (Broads), Central Oregon Bitterbrush Broadband Chapter (COBB) regarding the North Fork Crooked River (NFCR) Forest Resilience Project Draft EA on the Ochoco National Forest (ONF). The Great Old Broads for Wilderness has over 10,000 members across the nation. We are a national grassroots organization, led by women, that engages and inspires activism to preserve and protect wilderness and wild lands. Part of our mission is to conduct stewardship projects on public lands and advocate for those lands. We believe that conservation and restoration of Oregon's wildlands, fish and wildlife and their habitats, and water resources are a lasting heritage that requires responsible stewardship.

Our local Bitterbrush Broads and Bros chapter has over 400 friends and members in central and eastern Oregon. The Bitterbrush Broads and Bros do educational hikes, stewardship projects, and camping trips in a variety of our central and eastern Oregon national forests since our chapter was formed almost 10 years ago. Our chapter has assisted the Deschutes, Ochoco and Malheur national forests on many partnership projects including noxious weed pulling, closed and decommissioned road surveys, monitoring beaver populations, planting native milkweed for restoration of monarch butterflies, surveying livestock exclosures on the Crooked River National Grassland and Ochoco Forest and engaging in discussions to mitigate user-created impacts in Central Oregon wilderness areas. Many of our members and supporters live in central and eastern Oregon and recreate in the proposed project area. They hunt, fish, backpack, camp, photograph, view wildlife, hike, drive, and engage in other recreational activities.

General Comments

We appreciate the amount of work that the ONF staff has done to prepare the NFCR Draft EA. The NFCR Project proposes a wide variety of purposes including reducing wildfire risk, increasing forest health and vigor for timber and non-timber values, and improving fish and wildlife habitat. The project encompasses 37,577-acres in the NFCR area of the Paulina Ranger District of which approximately 11,000 acres are proposed for "treatments". The project proposes a mix of commercial harvest, thinning, prescribed burning, road reconstruction, temporary roads, some road closures and decommissioning, and other activities. Timber harvest, thinning and prescribed burning are proposed on most forested acres in the project area.

The Broads are concerned about the level of forest "restoration", using a blend of commercial harvest, thinning and prescribed burning. We particularly request the ONF not apply mechanical treatments in any portion of Riparian

Habitat Conservation Areas (RHCAs). These are essential habitats for aquatic species such as redband trout and Columbia spotted frog and a variety of wildlife species including large and small mammals, birds, and amphibians and reptiles. We also encourage the Forest Service (FS) to minimize silvicultural treatments that will harm fish and wildlife species and their habitats. The ONF must substantially reduce road densities (including the proposed reopening of almost 35 miles of ML 1 Closed to ML 2 Administratively Open), and not build or restore any temporary roads. We support the goals of improving fish and wildlife habitat and degraded streams, wetlands, and riparian areas via large wood placement, but urge the ONF to delete commercial timber harvest and minimize thinning activities.

Any commercial harvest or thinning in RHCAs will violate INFISH (1995)[1] standards. These standards clearly lay out that no activity can be done that has the potential to degrade fish habitat including impacts to shade, water temperature and stream channels. All of the action alternatives that include treatments in designated RHCA will cause harm to aquatic species and their habitats. We find some of the discussions in the Draft EA that support timber harvest and thinning in RHCAs not scientifically supported and predisposed toward extractive timber harvest rather than restoration. Most of the largely degraded streams and riparian areas are a result of past and recent timber harvest, past and ongoing livestock grazing, and high road densities (including open, closed, decommissioned and temporary roads that are still actively driven).

We strive to be good partners with the Forest Service because protecting and restoring our public lands is critically important for the enjoyment of current users as well as future generations. Good management of our public lands that belongs to all Americans is essential for our twin crises of climate change and loss of biodiversity. We recommend an alternative that is more environmentally sustainable and minimizes timber harvest and livestock grazing and reduces road densities along with no harvest of large trees over 21 inches dbh.

We make several recommendations to retain and restore viable habitat for fish and wildlife species. We also recommend that the final chosen alternative exclude any activity in RHCAs that will affect shade, stream temperature, stream channels, and sedimentation and not allow any construction of temporary roads. We recommend no harvest of mature and large trees over 21 inches including grand fir and Doug fir. We also support all permanent and seasonal road closures that must be physically blocked and no reopening of ML 1 roads to ML 2 or ML 2 administratively open roads. Roads should be closed with complete physical blocking and not with existing useless berms that fail to block users that violate closed roads. The following sections, not in any particular order, state our concerns and recommendations for each issue.

Purpose and Need

The proposed project is intended to restore characteristic forest vegetative conditions, thereby increasing resilience to insects, disease, fire, and drought, reduce the risk of high severity fires, and enhance and restore hardwood communities. Despite ongoing degradation of streams, wetlands and springs and other important fish and wildlife habitats, the only proposal is to do the same activities that have caused the degradation in the first place, timber harvest, more roads opened, and ongoing livestock grazing. The project is largely about harvesting timber to meet "resilience" while other natural resources have limited attention.

[1] USDA, Forest Service. 1995. Pacific Anadromous Fisheries Habitat (PACFISH), U.S. Forest Service and U.S. Bureau of Land Management. 1994. Environmental assessment for the implementation of interim strategies for managing anadromous fish-producing watersheds in eastern Oregon, Washington, Idaho, and portions of California. Washington, DC: U.S. Department of Agriculture, Forest Service. 68 p.

The analysis uses the "historic range of variability" (HRV) model for restoring vegetation on the forest (Hessburg et al. 1994[2], 1999[3]). In evaluating HRV on the Malheur National Forest, Churchill et al. (2017)[4] used the year 1890 and sampled sites to examine how tree composition, density, openings, clumps, and age have changed in the past 100 plus years. Not surprisingly, many dry side forests have changed given past management practices of large diameter timber (high grading) harvest, extensive roading, and intense livestock grazing. The late 1800s, the base years used for comparison to existing conditions, also did not have high road densities on the landscape that are known to occur on the ONF, which have caused continued degradation of streams and wildlife habitats. There was also no impact from climate change. Using HRV as a target to increase "forest resiliency" in the face of climate change and hotter, and drier weather cycles is a false starting point. The ONF needs to balance the needs and obligations for restoring and maintaining fish and wildlife habitats and productivity with this effort to restore forest resiliency. The project is largely to produce timber and not restore native fish and wildlife habitats.

We note that the Draft EA (p. 2) states that "*Best available science included the peer-reviewed climate change vulnerability assessment, Climate Change Vulnerability and Adaptation in South-Central Oregon (Halofsky et al. 2019)[5], which examined how climate change will impact various resources in the Ochoco National Forest and other areas in South-Central Oregon and identified adaptation actions*." The Draft EA largely relies on Halofsky et al. 2019 and the USDA Forest Service "Climate Adaptation Plan" (2022)[6] for guidance which relies generally on the use of chainsaws and active management rather than nature adapting to climate change. There is a large body of national and international scientific literature on climate change and ways to manage forests, that the ONF ignores, that supports more nature-based solutions to climate change including protecting mature and old growth trees, establishing protected forest reserves, and removing or reducing livestock grazing impacts to restore riparian areas (Duncanson et al. 2023[7], IUCN 2021[8], Kauffman et al. 2022[9], Law et al. 2021[10]). The ONF appears to disregard Executive Order 140721[11], which is a policy to "*preserve biodiversity, mitigate the risks of catastrophic wildfires, and*

[2] Hessburg, P.F.; Mitchell, R.G.; Filip, G.M. 1994. Historical and current roles of insects and pathogens in eastern Oregon and Washington forested landscapes. Gen. Tech. Rep. PNW-GTR-327. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 72 p. (Everett, Richard L., assessment team leader; Eastside forest ecosystem health assessment; Hessburg, Paul F., science team leader and tech. ed., Volume III: assessment.)

[3] Hessburg, Paul F.; Smith, Bradley G.; Kreiter, Scott D.; Miller, Craig A.; Salter, R. Brion; McNicoll, Cecilia H.; Hann, Wendel J. 1999. Historical and current forest and range landscapes in the interior Columbia River basin and portions of the Klamath and Great Basins. Part I: Linking vegetation patterns and landscape vulnerability to potential insect and pathogen disturbances. Gen. Tech. Rep. PNW-GTR-458. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 357 p. (Quigley, Thomas, M., ed., Interior Columbia Basin Ecosystem Management Project: scientific assessment).

[4] Churchill, D.J., Carnwath, G.C., Larson, A.J., Jeronimo, S.A., 2017. Historical forest structure, composition, and spatial pattern in dry conifer forests of the western Blue Mountains, Oregon. Gen. Tech. Rep. PNW-GTR-956. USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon. pp 100.

[5] Halofsky, J.E., Peterson, D.L., Ho, J.J. (editors). 2019. Climate change vulnerability and adaptation in south central Oregon. US Department of Agriculture- Forest Service, Pacific Northwest Research Station. PNW GTP-974. Pp 496.

[6] USDA Forest Service. 2022. Climate Adaptation Plan. FF-1196. 4_NRE_FS_ClimateAdaptationPlan_2022.pdf (usda.gov)

[7] Duncanson, L., M. Liang, V. Leitold, J. Armston, S. M. Krishna Moorthy, and many more. 2023. The effectiveness of global protected areas for climate change mitigation. Nature communications 14:2908. https://doi.org/10.1038/s41467-023-38073-9.

[8] IUCN 2021 forests_and_climate_change_issues_brief.pdf.

[9] Citation: Kauffman JB, Coleman G, Otting N, Lytjen D, Nagy D, Beschta RL. 2022. Riparian vegetation composition and diversity shows resilience following cessation of livestock grazing in northeastern Oregon, USA. PLoS ONE 17(1): e0250136. https://doi.org/10.1371/journal.pone.0250136.

[10] Law, B. E., Berner, L. T., Buotte, P. C., Mildrexler, D. J., & Ripple, W. J. 2021. Strategic forest reserves can protect biodiversity in the western United States and mitigate climate change. Communications Earth & Environment. 2:254.

[11] Biden, J. 2022. Executive Order 140721 of April 22, 2022. Strengthening the Nation's Forests, Communities, and Local Economies.

protect public lands for recreational activities… the irreplaceable role forests play in reaching net-zero gas emissions, stating that in the United States, more than 10 percent of annual greenhouse gas emissions are stored in forests".

The ONF is reminded to implement, per Executive Order 140721, measures that reduce the timber harvest and carbon emissions and loss of carbon sequestration caused by this project. Instead, we urge the ONF to minimize timber harvest and support the benefits of carbon sequestration and storage, biodiversity and the full range of ecosystem benefits for the long-term health of our ecosystems.

Recommendation: The Purpose and Need is largely to cut timber, and fails to restore other natural resources for fish, wildlife, and riparian areas, streams, wetlands, and other ecosystem services. The Draft EA (p. 3 and 127) describes improving and maintaining RHCAs is a key part of the purpose and need for the NFCR. When evaluating this project in the context of climate change, use more national and international authors that support nature-based solutions.

Project Area

The project area is a mosaic of habitats including stringer stands of forest largely near streams and scablands with thin, rocky soils. As the Draft EA reports (p. 2), "*The fractured rock, steep slopes, thin and rocky soils provide a productive plant ecosystem in the scabland stringer and are home to some endemic plants. The mosaic scabland stringers provides edge habitats for wildlife species, including forage, cover and habitat connectivity for big game, small mammals, pollinators, songbirds, raptors, woodpeckers and more*."

There are 6 plant association groups (PAGs) that include 4 forested PAGs of Xeric Pine 8,804 acres, Mesic Pine 5,600 acres, Douglas-fir 4,137 acres and Dry Grand Fir 1,572 acres and non-forested areas of Juniper Woodland 3,964 acres, and non-forest scab rock 13,476 acres. Therefore, the forested portion is a little over half (54%) of the project area. A view of the project area from Google Earth reveals how discontinuous nature of the forested areas (Figure 1).

Need to Conduct an Environmental Impact Statement

The NFCR project is very similar project to the Black Mountain project, which was conducted with an Environmental Impact Statement (EIS). An EIS is conducted when a project is expected to have significant environmental impacts and generally has more analyses than an EA. The Black Mountain Project authorized management activities on 15,810 acres of national forestland, including logging, roadwork, prescribed burning, and restoration. The Black Mountain DEIS and FEIS described that "*The Ochoco National Forest has prepared this Draft/Final Environmental Impact Statement (DEIS/FEIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This DEIS discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives*."

The Black Mountain project has a smaller project area than the NFCR project area (15,801 acres vs 37,577 acres) and less timber volume harvested (17.8 mmbf vs Alt 2, 24.5 mmbf, Alt 3, 18.1 mmbf). The projects proposed are strikingly similar in purpose and need, alternatives, and proposed management strategies. We question why the ONF selected to use an EA which generally has less analyses and by virtue of an EA concludes ahead of the process that there are no significant impacts. We assert that these similar projects with similar impacts indicates that an EIS is warranted for the NFCR project.

Furthermore, the EA process normally is used to determine the significance of the environmental effects and evaluate alternatives to achieve the agency's objectives, a shorter and faster process than an EIS, and used when there are minimal environmental impacts. An EIS is used when a project will have significant environmental effects. The Draft EA shows that there will be numerous and significant environmental impacts including extensive

treatments and new roads over 11,000+ acres, impacts to RHCAs, LOS, connectivity wildlife corridors, and a wide variety of native fish and wildlife species including redband trout, mule deer, elk, goshawks, pileated woodpeckers, scarce pollinators such as bumble bees, which indicates that the project requires an EIS.

Recommendation: Conduct an EIS. An EA is insufficient for the scope and scale of the project.

Historic Range of Variability (HRV)

The ONF continues to use HRV as a management goal and has failed to adapt to current science that shows how unacceptable this tool is for managing vegetation. The HRV in the ONF 1994 draft report Viable Ecosystems Management Guide fails to incorporate changing climate conditions for forest vegetation and management into the future. As Millar (2014)[12] reports, "*As a means of developing reference prescriptions and management targets, HRV is generally inappropriate, although if historic periods are used for reconstruction that have coarse resemblance to present or projected future climates, such as the Medieval Climate Anomaly or middle Holocene rather than the presettlement centuries, these might be defensible…historically informed approaches are likely more effective than an HRV approach under future changing climate regimes for managing and restoring ecosystem function and for assisting transitions to new ecosystem states*".

HRV has been mischaracterized as forest stand treatments which, not surprisingly, emphasize commercial treatments and thinning when in reality HRV is more complex. Our experience having observed the results of HRV treatments on the ground, particularly on the ONF, such as in the Gap and Wolf project areas, is that the end results looks like even-aged management, shelterwood, or seed tree cuts where a minimal number of trees are left standing in each acre treated with a few postage-sized "leave areas" for allegedly wildlife habitat.

The ONF uses HRV to allegedly re-establish the historic range of tree species, tree density, and forest structure, but fails to restore other critical forest resources such as biodiversity, wildlife habitat, water quantity and quality, and riparian and stream habitats. It also fails to address the damage caused by livestock grazing. If HRV is the template to "restore" forests to historic conditions, the forest is more than just tree density, species, and structure. It is even more important to restore biodiversity, riparian areas, floodplain connectivity, soils, and shrub and herbaceous vegetation for long term ecosystem sustainability.

Churchill et al. (2017)[13] and other authors used 1890 or a range of time periods in the late 1800s as their reference point for HRV forest stand conditions. In 1890, there were almost no roads and the few that were present had a forest road density that was virtually zero. In addition, Churchill et al. (2017)[14] and others evaluating HRV did not have any HRV plots in riparian areas. Sampling occurred on upland sites.

The Draft EA proclaims that disease, insects, and wildfire need to be "managed" but these in fact are normal conditions of forests and a necessary part of succession, biodiversity, and forest ecosystem processes critical for forest resilience. Under the Forest Service paradigm, any natural evolutionary agent that kills a tree, such as drought, wildfire, insects, or disease, is considered a threat while a chainsaw is considered a tool for restoration. Natural morality agents are the same factors that shape and maintain healthy forest ecosystems. Using the goals of HRV, the Draft EA forces a shift toward a monoculture dominated by open Ponderosa pine stands. Timber harvest, both removal and trampling by machinery, kills the mycorrhizal network that is essential for tree health and surviving current and future drought cycles.

[12] Millar, C. 2014. Journal of Sustainable Forestry, 33: S28–S42. DOI: 10.1080/10549811.2014.887474.
[13] Churchill et al. 2017. Ibid.
[14] Churchill et al. 2017. Ibid.

One example that the Draft EA uses to justify cutting large grand fir in the project area is under the guise of saving large old ponderosa pine and stand resiliency. For example, Alt 2 (Draft EA, p. 13) proposes "*Alternative 2 will not cut Ponderosa Pine, Douglas-fir, and western larch larger than 21-inch DBH and usually not cut grand fir larger than 30-inch DBH but there may be site specific locations where removing young grand fir larger than 30-inch DBH is necessary to achieve the desired stand resilience. There is a proportion of the late and old structure multi-strata stands that are above historic range in variation that will not be able to move into historic range in variation without removing trees over the above diameter ranges*". The Broads oppose cutting <u>any trees over 21 inches</u>.

The scientific literature shows that grand fir are important for carbon storage, biodiversity, and wildfire resistance. Mildrexler et al. (2023)[15] reports that "*Oregon stands out with the most forested area in the western USA, yet the lowest proportion of its forests protected (Law et al., 2021) … a trait-based approach to assess fire resistance found that the grand fir forest type had the second highest fire resistance score, and one of the lowest fire severity values among forest types of the Inland Northwest USA (Moris et al., 2022)…* A*cross the entirety of all six national forests large grand fir represent 2% of the total species population, a proportion slightly lower, but roughly on par with other dominant species (Figure 3, Mildrexler et al., 2020). It is not uncommon for grand fir to reach 250 to 300 years of age (Howard & Aleksoff, 2000). Thus, large grand fir ≥53 cm DBH and <150 years of age can continue growing and play an important role in storing and accumulating carbon from the atmosphere to help abate the climate crisis… grand fir are resilient to prescribed fire because they have attained the thick bark that provides resistance to low- and moderate-severity fire (Howard & Aleksoff, 2000; Pellegrini et al., 2017… These carbon-rich forests have a large cooling effect on maximum temperatures, provide thermal refugia for biodiversity including sensitive species, and are a high priority for protection. Large grand fir form the best hollow trees for wildlife (Rose et al., 2001)."* In essence, grand fir (and Doug fir) are very important for a variety of attributes including resistance to wildfire, a natural based solution for carbon storage to combat climate change, microclimates for cooling effects, and supporting biodiversity.

The National Forest Management Act (NFMA) requires that the ONF must use the best available science, explain the conclusions from its methodology, and explain why the evidence is reliable. NEPA further requires that the ONF maintain the scientific integrity of data, analyses, and conclusions, use accurate scientific information, and address scientific disagreement. HRV has been controversial for the past 3 decades since its inception and its use for planning projects. We believe that this project fails to incorporate the best available science or address the scientific controversy of using HRV. Baker et al. (2023)[16], asserts that the primary model for HRV, which supports a low severity fire model, is drawn from outdated assumptions, excludes critical data, and is not upheld by the majority of current research. The authors propose a more accurate model for HRV in Western US dry forests is a mid-severity model which means that forests were heterogeneous, with both low and high tree densities and a mixture of fire severities.

Recommendation: Stop using HRV as recommended by many scientists. Use the best science that recommends retaining all mature and old growth forests to support measures to combat climate change from climate scientists that have far more experience that the ONF in understanding the complexities and impacts of timber harvest on temperate forests and climate change and future impacts. Retain all mature and old growth trees over 21 inches for all tree species. Keep commercial timber harvest and machinery out of sensitive areas such as RHCAs, springs, seep, and wetlands.

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[15] Mildrexler, D.J., L.T. Berner, B.E. Law, R.A. Birdsey and W.R. Moomaw. 2023. Protect large trees for climate mitigation, biodiversity, and forest resilience. Conservation Science and Practice. 2023;5: e12944. wileyonlinelibrary.com/journal/csp2. https://doi.org/10.1111/csp2.12944.

[16] Citation: Baker, W.L., Hanson, C.T. Williams, M.A.; D.A. DellaSala. 2023. Countering Omitted Evidence of Variable Historical Forests and Fire Regime in Western USA Dry Forests: The Low-Severity-Fire Model Rejected. Fire 2023, 6, 146. https://doi.org/10.3390/fire6040146.

Alternatives

The Draft EA failed to evaluate a reasonable range of alternatives. NEPA requires the agency's environmental analysis documents to "[r]igorously explore and objectively evaluate all reasonable alternatives" (40 C.F.R. § 1502.14(a). The ONF proposes three alternatives for analysis, including the (No Action) Alternative 1, and two action alternatives that propose commercial harvest, non-commercial thinning, and prescribed burning throughout the project area to move timber stands toward HRV. Both action alternatives treat much of the forested area in a portion of the forest that is mixed open scablands and stringer forests in canyons and stream bottoms. Alternative 2 "treats" 11,307 acres with commercial harvest, thinning and prescribed burning and produces 24.5 mmbf while Alternative 3 "treats" the same amount of acres, produces 18.1 mmbf and does not cut trees over 21 inches (except for hazard trees). We support Alternative 1, or our Bitterbrush Broads and Bros alternative stated below, because they have the least impact on water quantity and quality, fish and wildlife species and their habitats, riparian areas, and soils.

Given the recent decision by Judge Hallman regarding Eastside Screens, Alternative 3 appears to be the only viable action alternative in the Draft EA remaining, which is hardly a choice. It is arbitrary for the agency to consider in detail an action alternative that the agency lacks authority to implement, at the expense of other, viable alternatives.

Recognizing the ONF is likely to implement a project, we recommend an alternative that has the least impact to RHCAs, streams, and mature and old growth stands. We recommend lighter treatments of proposed commercial harvest, and thinning, and many more road closures and decommissioning. We recommend a new "Great Old Broads for Wilderness, Bitterbrush Broads and Bros Alternative" with reduced harvest activities, no new temporary roads throughout the project area and limited thinning and no commercial harvest in RHCAs, no cutting any trees over 21 inches, and other recommendations.

The premise used in the analyses of each action alternative is that the NFCR project area has dense overstock stands of mixed conifer that are causing changes in the hydrology of the area, causing lower base flows and higher peak flows. While "legacy" fire suppression, timber harvest, and livestock grazing is acknowledged as a contributing factor for poor stream health and fish populations, the analyses largely claim that the current degradation is ongoing due to changes in forest stand composition and density. This claim is not supported in the literature. In fact, much of the stream degradation is directly attributable to high road densities, past timber harvest and past and present livestock grazing.

In areas of the Ochoco National Forest (ONF) that have low levels of management including less or no roads, less timber harvest, and less livestock grazing, streams are in relatively good condition and support good populations of redband trout (Dambacher and Jones 2007[17], Stuart et al. 2007[18]). Where there are high road densities, extensive timber harvest, and heavy livestock grazing, streams are severely degraded. For example, populations in areas with low road densities and limited grazing, such as upper reaches of Brush Creek in the Lookout Mountain roadless area, portions of the Mill Creek Wilderness, and in the roadless area along Rock Creek, habitat and fish populations are in reasonably good conditions. These streams have dense stands of mixed conifer with riparian shrubs and have relatively good habitat and trout densities. Areas with high road densities and heavy livestock grazing, such as

[17] Dambacher, J.M. and K.K. Jones 2007. Benchmarks and Patterns of Abundance of Redband Trout in Oregon Streams: a Compilation of Studies. In Schroeder, R.K., and J.D. Hall, editors. 2007. Redband trout: resilience and challenge in a changing landscape. Oregon Chapter, American Fisheries Society, Corvallis. Pp. 47-55.

[18] Stuart, A.S., D. Grover, T.K. Nelson, and S.L. Thiesfeld. 2007. Redband trout investigations in the Crooked River Basin. In Redband trout: resilience and challenge in a changing landscape. Oregon Chapter, American Fisheries Society, Corvallis. Pp. 77-90.

Peterson, Porter Creeks and Roba creeks, have degraded streams with depressed redband trout populations. Essentially, streams and riparian areas with less "management" are in far better condition than managed areas.

The ONF repeatedly concludes in its analyses that these overstocked conifer stands along streambanks are degrading fish habitat and this habitat will continue to decline unless the ONF actively treats the overstocked stands. HRV is characterized by open park-like stands of pine with an understory of grasses. The premise is more open pine stands in the uplands will be complemented by removing conifers in the RHCA. The Draft EA concludes that despite short term disturbances of timber harvest and thinning in the RHCAs, the Project's activities will allow native hardwood shrub and trees like aspen, alder, cottonwood, and other species to flourish. That might be true if there was no livestock grazing. But this project does not address livestock grazing and continued impacts of livestock grazing will continue to degrade streams and riparian areas unless cattle are removed or blocked from using the riparian areas, an unlikely scenario on this forest.

We find the claim that treatment of over 1,100 acres of riparian areas in each action alternative (Draft EA Table 1, p. 5) that will "*Manage to maintain or restore water quality, stream channel integrity, channel processes, sediment regimes, instream flows, and the diversity and productivity of plant communities in riparian zones, and riparian and aquatic habitats*" false and unsubstantiated. There is no data or analysis to support this and in fact, the last 34 years since the Ochoco Forest Land and Resource Management Plan (LRMP) was implemented, which promised stream restoration for the entire forest and Crooked River National Grasslands, has largely failed.

The focus on extractive resources including timber harvest, with high road densities and continued livestock grazing rather than resource protection has perpetuated the same poor riparian and stream conditions that still occur today. The only places that have shown any substantial improvement are in livestock exclosures, *when the fences are maintained*, no timber harvest occurs and there are no roads. In fact, the Draft EA (p. 134) stated that the only sub-watershed within the project area that is considered properly functioning is where livestock grazing was removed. The Draft EA states that "*A 2005 assessment of the North Fork Crooked River found the lower section …to be functioning at risk/ properly functioning with an improving trend (USDA Forest Service 2005). Subsequently, this section was closed from grazing in 2005. This improved condition is reflected in the properly functioning rating of the overall Rough Canyon Creek subwatershed*".

Recommendation: We proposed a new environmentally friendly alternative that we call a Great Old Broads for Wilderness, Bitterbrush Broads and Bros Alternative with the following provisions that reduces impacts to other forest natural resources. It should include the following requirements:

**Conduct an EIS and disclose significant impacts.*
**Protect all mature and old growth trees of all species greater than 21 inches dbh.*
**Set aside additional areas for recruitment of new late old seral structure.*
**No steep slope logging.*
**Manage the forest lightly for climate change and biodiversity for forest resilience and restoration (less than 50% of the treatments proposed in the action alternatives).*
**No logging or commercial harvest in RHCAs and for all class 1, 2, 3 and 4 streams.*
**No treatments in the North Fork Crooked River Wild & Scenic designated corridor.*
**Do not implement any actions that further impacts to INFISH RMOs (e.g., no loss of shade).*
**No harvest or new roads in undeveloped lands in the NFCR project area. These should be retained for biodiversity.*
**Physically close and maintain all roads and meet LRMP standards for road densities in winter range, general forest winter range, and general forest.*
** Do not reopen or convert ML1 closed roads to Administrative ML 2 roads, no new roads, and no temporary roads.*
** Any roads used for administrative use must be analyzed as open ML 2 roads.*

**Conduct minimal site-specific thinning in RHCAs only where cattle grazing can be excluded.*
**Conduct prescribed burns RHCAs only where cattle grazing can be excluded. If there is no protection from livestock grazing, do not do any treatments.*
**Conduct and disclose thorough analyses of carbon emissions and loss of carbon sequestration of this project.*
**Collect much more baseline data on streams and riparian areas to fully disclose the environmental baseline for fish, wildlife, and water resources.*
**Conduct required surveys for all baseline resources and no treatments in RHCAs except for limited thinning and prescribed burns.*
**Conduct required field surveys for potential elk reproductive habitats particularly in areas proximal to wetlands, riparian areas, streams, seeps, and springs.*

Our alternative represents a substantially different but unexamined alternative. We believe it is an environmentally sound option that avoids and minimizes adverse environmental effects, supports the FS's other obligations to protect fish, wildlife, and aquatic habitats, and supports the Project's purpose and need to meet RMOs, improve wildlife and habitat, protect mature and old growth trees, support biodiversity, and promote adaptation to climate change. Our proposed alternative also comports well with a revised Purpose and Need that place greater weight on other important natural resource values, such as fish and wildlife habitat, water quantity and quality, and a resilient forest with proper functioning riparian areas and restored streams.

NFCR Wild and Scenic River

The Standard and Guideline for the Wild and Scenic North Fork Crooked River states that "No scheduled timber harvest, in foreground views from the river, shall be allowed. Timber harvest as necessary to maintain or enhance scenic, recreational, or water quality objectives may be permitted" (USDI and USDA 1993)[19].

As stated above, we oppose any treatments in the Wild and Scenic corridor of the North Fork Crooked River. None of the action alternatives will maintain or enhance and likely will harm scenic and recreational ORVs and water quality.

Recommendation: No timber harvest or thinning in the Wild and Scenic River management area along the NFCR. Absolutely no roads allowed in the Wild and Scenic river management area.

Undeveloped Land

The ONF identified several undeveloped areas in the NFCR project area. The Draft EA (p. 196) that "*the identification of 7 polygons ranging in size from 1,187 acres to 4,436 acres that meets the criteria for undeveloped lands in the NFCR project area (Figure 26). These polygons primarily fall in the scab areas of the scab-stringer landscape*." Alternatives 2 and 3 include proposed activities in the undeveloped polygons, with each alternative proposing treatments over 1,600 acres including commercial harvest, thinning, prescribed burning, and temporary roads. These activities should receive not harvest treatment, development, or roads. The treatments will destroy the character of the undeveloped lands and the undeveloped lands must be left alone and administratively added as Inventoried Roadless Area (IRA).

These undisturbed lands are important for providing natural habitats, biodiversity, moderating climate impacts, drinking water, and restoring aquifers. Undeveloped lands and IRAs are critically important and comprise a very low

[19] USDI and USDA. 1993. North Fork Crooked River Management Plan. 130 pp.

percentage of FS lands. Law et al. (2021)[20] reports that these areas have "*crucial biodiversity and carbon benefits*", "*currently provide clean drinking water for millions of people, support salmon populations and wildlife, and reduce isolation between protected areas*". They also recommend that undeveloped lands provide the "*potential to meet preservation targets by protecting uninventoried roadless areas (e.g., ~2 Mha in Oregon), many of which are candidates for protection and contiguous with IRAs or existing protected areas*". In this case, the undeveloped areas proximity provides great potential multiplier benefits by its proximity to the NFCR Wilderness Study Area.

Loucks et al. (2003)[21] also reported that over three quarters of the IRAs "*have the potential to conserve threatened, endangered, or imperiled species. IRAs would increase the conservation reserve network containing these species by 156%".* The authors conclude that IRAs belonging to the FS are one of the most important biotic areas in the nation, and that their status as roadless areas could have lasting and far-reaching effects for biodiversity conservation. Any roadless and untreated area left on the ONF should and must be left intact.

DellaSala et al. (2011)[22] also reported how critically important roadless are for "*affordable drinking water for municipal and rural communities; water for agricultural and industrial uses; flood control; instream aquatic recreation; aquifer recharge; flood protection; reliable water supply; diverse and productive fisheries; healthy aquatic ecosystems; resident and migratory waterfowl habitat; recovery of endangered species; and, increasingly, the vitality and sustainability of local economies" and that these "benefits accrue nationally and at the local and regional levels*".

DellaSala et al. (2011)[23] also states that "*the roaded, intensively managed landscapes of the other national forest lands have been closely correlated with heavily sediment-laden streams and dramatic changes in flow regimes (Espinosa et al. 1997; Trombulak and Frissell 2000; Center for Biological Diversity et al. 2001; Coffin 2007; Frissell and Carnefix 2007). The small roadless areas that have been left "unmanaged", with a dearth of logging and roads, play a critical role in maintaining high-quality water and protecting aquatic ecosystems. The clean water from remnant roadless areas is important to maintain healthy coldwater salmonid fisheries, sustain viable aquatic ecosystems, and help protect threatened species and ecosystems (Abell et al. 2000; Trout Unlimited 2004). Roadless area are an important refugia for many salmon and trout populations, as well as for a diversity of endangered freshwater species (Henjum et al. 1994; Huntington 1998; Trombulak and Frissell 2000; CBD et al. 2001; Strittholt and DellaSala 2001; Oechsli and Frissell 2002; Strittholt et al. 2004; Petersen 2005)."*

DellaSala et al. (2011) state that "restoration of salmon and trout fisheries in places with high road densities will likely fail without the pivotal role provided by roadless areas as fishery strongholds." Further, they state that "For many major drainages (entire watersheds of major rivers, such as the Columbia River Basin), roadless areas and other wilderness areas represent the last few percentages (typically 1% to 5%) of the landscape with a minimally disturbed, or near natural, hydrology."

[20] Law, B. E., Berner, L. T., Buotte, P. C., Mildrexler, D. J., & Ripple, W. J. 2021. Strategic forest reserves can protect biodiversity in the western United States and mitigate climate change. Communications Earth & Environment. 2:254. https://doi.org/10.1038/s43247-021-00326-0, www.nature.com/commsenv.

[21] Loucks, C., N. Brown, A. Loucks, and K. Cesareo. 2003. USDA Forest Service roadless areas: potential biodiversity conservation reserves. Conservation Ecology 7(2): 5. [online] URL: http://www.consecol.org/vol7/iss2/art5/

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

[23] DellaSala et al. 2011. Ibid.

Frissell and Carnefix (2009)[24] report that "*Roadless areas can be small and fragmented but can accrue to a large fraction of critical landscape. In the Upper Missouri Basin in Montana, within the 37% of the landscape with watersheds classified as the highest value for freshwater conservation, almost one-half occurs within unprotected federal roadless areas; just 7% is inside wilderness and parks. In western Montana, bull trout Salvelinus confluentus abundance increases with watershed roadless proportion. Roadless lands tend to occupy middle to lower elevations compared to protected Wilderness, where they more directly interface with high-value fish habitat; a Montana statewide "fine-filter" assessment revealed remarkably high occurrence of native trout populations associated with roadless areas, even within watersheds that are otherwise compromised. Most roadless areas contain steep lands with expanses of erosion-prone soil. We conclude that the value of roadless areas for native trout and biodiversity conservation continues to receive insufficient evaluation and disclosure in roadless policy debates and decisions."*

Undeveloped areas are always under pressure from extractive development. We assert, rather than more management and more treatment, that these undeveloped areas be protected. New roads, timber harvest and thinning will increase all the harmful activities caused by logging and roads such as soil compaction, erosion, displacement of wildlife, fragmentation of habitat, the spread of noxious and invasive weeds, the increased risk of wildfires from human ignitions (90% of wildfires are caused by human activity), loss of carbon storage, and loss of biodiversity. The ONF must leave this area untouched, as such areas are increasingly rare and valuable every year.

From the scientific studies from diverse authors regarding unmanaged lands, we conclude that commercial logging or thinning treatments, and additional roads in the undeveloped area will cause considerable harm to other natural resources including fish and wildlife habitats and water quantity and quality.

Recommendation: Do not implement any harvest, thinning, or roads in the undeveloped lands. Rather than "treating" this area, protect these lands by administratively adding them to the Inventoried Roadless Areas.

No Harvest of Mature and Old Growth Trees and Forests Over 21 Inches DBH

The ONF must not authorize cutting of any trees over 21 inches, consistent with the original 1994 Eastside Screens. Judge Hallman of the District of Oregon ruled on August 31, 2023 (Greater Hells Canyon Council v. Wilkes, Case No. 2:22-cv-00859-HL, ECF 97) that the Forest Service's 2021 Amendment to the Eastside Screens which eliminated the 21-inch rule was unlawful under NFMA, NEPA and the ESA and the Screens Amendment should be vacated. That means that Vacatur of the Screens Amendment results in the reinstatement of the 21-inch rule as the controlling Forest Plan standard with which this project must be consistent.

The 1995 Eastside Screens were implemented to preserve the few remaining large and old trees, and the ecosystem values they provide for soil, water quality, wildlife, and fish habitats. Those protections were removed by the highly controversial decision made by the Undersecretary of the Department of Agriculture in January 2020 and the Forest Service never completed the required formal NEPA and objection process. The ONF made a politically driven choice at the request of politicians to implement the demands of industry to support extractive industries rather than support conservation of natural resources.

[24] 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.

Historically, large old trees dominated as much as 75% of the eastern Oregon forests (DellaSala and Baker 2020)[25]. The Eastside Screens were in place for 25 years and not long enough to restore the historic amount of large and old trees. The previous century of logging from the 1920s to the 1990s removed the largest and oldest trees across many of the forests in eastern Oregon and impacted biodiversity, soils, water quantity and quality, and many fish and wildlife species that used large old trees for part or all of their life history needs.

Large trees are important as either live or dead, standing or fallen onto the forest floor or into the stream and are critical to forest, wildlife habitat, and watershed function. In streams, fallen logs are large woody debris (LWD). LWD is important for structure, function, and biodiversity of forests in upland and aquatic ecosystems. Habitat for a diversity of wildlife species is found in the dead branches, cavities, seeds, cones, snags, and the buildup of the forest floor with littler. Large old trees have thick bark that withstand forest fires and survive, and provide shade, wind breaks, soil moisture and a cooling effect in the multilayered canopy.

Large trees in RHCAs are a "biocultural heritage" that sequester and store carbon and provide ecosystem services such as clean water, nutrient cycling, and below-ground processes (DellaSala and Baker 2020)[26]. With climate change, it is critical to retain as much atmospheric carbon tied up in the forest and soils, which also benefits biodiversity and water quality (Brandt et al. 2014[27], DellaSala and Baker 2000[28]). Large trees in riparian areas provide stream-side shading and instream hiding cover for aquatic species. Large mature trees accrue soil depth, cycle nutrients, mitigate pollution, purify water, release oxygen, and provide habitat for wildlife at levels far superior to logged forests (Brandt et al. 2014)[29].

Clearing old growth and mature forests in primary forests has major impacts on water and energy cycles at local, global, and continental scales DellaSala et al. (2011)[30]. Old growth and mature forests provide the highest water quality and generate water vapor through evapotranspiration, affecting precipitation at continental scales, provide cooling at local and global scales, and infiltration and groundwater recharge. Roadless areas (which have generally not been harvested) provide the best examples of clean water and biodiversity that are most closely linked to undisturbed natural ecosystems. Numerous authors have reported that when undisturbed watersheds in roadless and protected areas such as national parks, wilderness areas, and national monuments are fragmented by roads, logging, and intensive recreation, both water quality and biodiversity decline as hydrological integrity is lost (USFS 1972[31], 1979[32]; Alexander and Gorte 2008[33]; Anderson 2008[34]).

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[25] DellaSala, D.A. and W.L. Baker 2020. Large trees: Oregon's bio-cultural legacy essential to wildlife, clean water, and carbon storage.

[26] DellaSala, D.A. and W.L. Baker 2020. Large trees: Oregon's bio-cultural legacy essential to wildlife, clean water, and carbon storage.

[27] Brandt et al. 2014. Brandt, P., D. J. Abson, D. A. DellaSala, R. Feller, and H. von Wehrden. 2014. Multifunctionality and biodiversity: ecosystem services in temperate rainforests of the Pacific Northwest, USA. Biological Conservation 169:362–371.

[28] DellaSala and Baker 2020. Ibid.

[29] Brandt et al. 2014. Ibid.

[30] DellaSala et al. 2011. Ibid.

[31] USDA, Forest Service. 1972. RARE I: Final Environmental Statement: Roadless area review and evaluation. Washington, DC: USDA Forest Service.

[32] USDA, Forest Service. 1979. RARE II: Final Environmental Statement: Roadless area review and evaluation. Washington, DC: USDA Forest Service.

[33] Alexander, K., and W. Gorte. 2008. National Forest System Roadless Area initiatives. CRS Report to Congress, Order Code RL30647.

[34] Anderson, M. 2008. A decade of National Forest Roadless Area Conservation: Background Paper. Seattle, WA: The Wilderness Society.

Over 95% of our national wood supply comes from non-federal lands of which most is small-diameter logs. While logging on Forest Service (FS) lands has declined since the early 1990s, meeting the "annual sale quantity" (ASQ) target is arbitrary and continues to drive agency management, culture, and practice. The FS alleges timber harvest receipts are needed to support forest restoration and mitigation. This illogical and wasteful use of taxpayer dollars is justified by the need to restore other parts of the forest previously harmed by past timber harvest and high road densities, which is done by implementing more timber harvest along with new and temporary roads for each project. It's a perpetual and repeating cycle of justifying more management to pay for lands degraded by those same management activities.

Also, proposed "mitigation" of timber harvest impacts has a long history of not happening such as road closures. In fact, the DEA (p. 15) reports that "*The current project will reinforce road closures that are breached or add new physical closures where there had not been one previously*." This is a prime example of how road closure mitigations are never completed from previous sales, even when they were *required by the LRMP.* The Draft EA (p. 167) states that in "*recent years, the road maintenance budget for the Ochoco NF has only allowed for routine maintenance on maintenance level 3-5 roads…Due to limited road maintenance funds, and the adverse effects to other resources as a result of reduced maintenance, current conditions do not meet desired conditions*". The Draft EA (p. 168-169) further states that "*Alternatives 2 and 3 would close 6.15 miles of currently open maintenance level 2 road*" but that this work "*would be completed gradually as funds become available*". Essentially, the ONF acknowledges that there is a limited budget for tackling road conditions and the ONF cannot follow through on its mitigation obligations. If the ONF cannot do even basic road maintenance, the road closures and decommission will never happen, and any proclaimed positive benefits on the landscape will never occur.

Large mature and old growth trees must be protected. A variety of species, many in decline because of habitat loss, depend on large trees and old forests including the American marten, Pacific fisher, Black bear, Vaux's swift, Pileated woodpecker, Northern goshawk and other accipiter hawks, Great gray owl, Black-backed woodpecker, Three toed woodpecker, Pileated woodpecker, and Olive-sided flycatcher. These types of species, which rely on denser forests, and mature or old growth mixed conifer forests with multi layered canopies, are harmed by logging. They rely on large old trees for foraging, roosting, and reproduction. Harvest of large mature trees will continue the decline of many species that rely on these special habitats. The Draft EA did not provide any data on the current status and trend of these species or any legitimate evidence that commercial harvest of large trees over 21 inches will benefit wildlife or restore ecosystem processes.

Recommendation: Do NOT cut any trees over 21 inches.

Protect Mature and Old Growth Forests and Trees for Climate Change

The inventory of mature and old growth forests on FS and USDI Bureau of Land Management (BLM) lands was released in April 2023 to fulfill Executive Order 140721. The EO directed the USDA Forest Service and the USDI Bureau of Land Management (BLM) to "*develop policies to institutionalize climate-smart management and conservation strategies that address threats to mature and old-growth forests on Federal lands*." More specifically, the intent of the EO is to address the importance of mature and old growth forests on federal publicly owned lands for their role to support nature-based climate solutions by storing large amounts of carbon, increasing biodiversity, and water quantity and quality.

The major threat to the mature and old growth forests is timber harvest. Although wildfire, insects and disease are also increasing due to climate change, timber harvest is the greatest threat that the FS can address. While the Biden administration calls protecting forests to combat climate change in the US and abroad, meanwhile hundreds of

thousands of FS acres across the national are proposed that will cut mature and old growth forests, diminishing a critical nature-based solution to combat climate change.

Again, the primary threat to mature and old growth trees is logging, not wildfire, insects, fungi, drought, or climate change. There are nearly 11 million acres of mature and old growth trees in federal forests in Oregon and Washington (about 19% of the lower 48 states). Only about 24% of mature and old growth forests on federal land in Oregon and Washington are fully protected from logging (GAP 1 & 2 designation), despite their huge role in carbon storage and climate mitigation (DellaSala et al. 2022)[35].

Rather than harvesting trees as the guise for managing for wildfire resiliency, we support home hardening for wildfire protections (https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Preparing-homes-for-wildfire), and limited thinning in WUI close to communities. The primary threat to homes comes from wind-driven embers. A recent California wildfire study (Chamberlain et al. 2023)[36] showed that home hardening, landscaping around homes, zoning reforms, and buffering could result in 75% fewer homes ignitions. Metal roofs, screened vents, and other modifications vastly improve the chances of a home surviving even a high-severity blaze. Thinning can contribute to fire risk since new studies have shown that it can promote the spread of wildfires by increased dry fuels, winds, increased growth of vegetation and fine fuels, and increased access to humans that cause 90% of ignitions.

Treatments far from communities and entering roadless and undeveloped areas that have never been harvested is counterproductive to combating wildfires. Many vegetation treatment projects proposed by the FS are more than 25 miles from communities, and often include harvesting mature and old growth trees. These trees have thick bark and already have survived wildfires and must be left alone. Many wildfires, given hot, dry, and windy conditions, burn regardless of vegetation treatments as demonstrated by the Labor Day 2020 wildfires in the Cascades.

Large mature and old trees are important for carbon sequestration and a natural (and free) component for fighting climate change. Large trees in eastern Oregon are only 3% of the remaining trees but store 42% of the carbon (Mildrexler et al. 2020)[37]. Every large and old tree in the forest is critical to retain on the landscape, especially with the twin crises of climate change and loss of biodiversity.

Mature and old growth trees are in short supply due to the legacy of past and present timber harvest. When logged, these trees release up to two thirds of their stored carbon to the atmosphere contributing to global warming. Their emitted carbon takes decades to centuries to recover, if ever. Scientists have tracked carbon emissions from forests to wood products to landfills and from wildfires (Law and Moomaw 2021)[38]. Their analysis of Oregon carbon emissions from wood harvested over the past century showed that 65% of the original carbon returned to the atmosphere as CO_2, while landfills retained 16%, and only 19% remained in wood products. The scientists also

[35] DellaSala DA, Mackey B, Norman P, Campbell C, Comer PJ, Kormos CF, Keith H and Rogers B. 2022. Mature and old-growth forests contribute to large-scale conservation targets in the conterminous United States. Front. For. Glob. Change 5:979528. doi: 10.3389/ffgc.2022.979528.

[36] Chamberlain, M., R. Lee, T. Deacon, N. Watkins, K. David, F. Lei, and I. Meftah. 2023. Town of Paradise California Resilience Challenge Task 1 to Task 4: Risk Reduction, Climate Change, and Insurance Premiums. A Milliman and Corelogic Report. https://drive.zooce.com/management/builtinapps/fileoperator.aspx?child=1&a=D3B60E43-50D3-46D5-A799-2C3CECF14238&ro=1&fid=18160612176842570679_9742692961587398287.
Prepared with funding from the California Resilience Challenge Grant

[37] Mildrexler DJ, Berner LT, Law BE, Birdsey RA and Moomaw WR. 2020. Large Trees Dominate Carbon Storage in Forests East of th3 Cascade Crest in the United States Pacific Northwest. Front. For. Glob. Change 3:594274. doi: 10.3389/ffgc.2020.594274.

[38] Law, B.E., and W. Moomaw. 2021. Keeping trees in the ground where they are already growing is an effective low-tech way to slow climate change. https://theconversation.com/keeping-trees-in-the-ground-where-they-are-already-growing-is-an-effective-low-tech-way-to-slow-climate-change-154618.

undermined the false claims by the Forest Service and timber industry that wildfires are major carbon emitters. Their research from the enormous Biscuit Fire, which burned 772 square miles in southwest Oregon in 2002, emitted less than 10% of Oregon's total emissions that year. Further, scientists evaluated carbon emissions in a future projection from 2020 to 2140 and discovered that even after 120 years, an unharvested forest stored 100 Mg of carbon more than a harvested forest plus its products.

Oregon's wildfires are not major sources of carbon emissions. Oregon State University scientists estimated that between 2011–2015, forest fires averaged 4% of Oregon's total carbon emissions each year, while timber harvest contributed roughly 35% (Figure 1)[39]. Forests store most of their carbon even after severe wildfires, so long as these areas are not salvage logged.

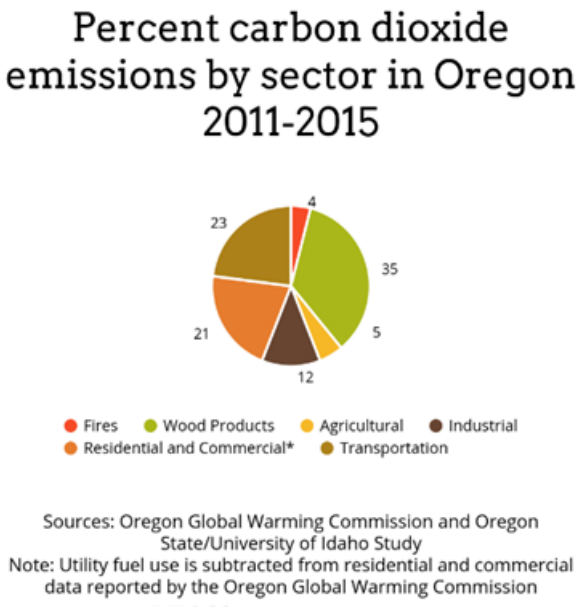

Figure 1. Annual Oregon carbon emissions, 2011-2015 (Data from Law et al. 2018)[40].

Numerous well-respected climate scientists advocate for forest reserves to protect valuable lands and resources that provide carbon storage and sequestration. Scientists at Oregon State University, around the West, and around the world, advocate that countries including the US should create numerous strategic forest reserves to fight climate change and safeguard biodiversity. They explain that climate change and biodiversity are inseparably linked, and forest reserves would counter both emergencies and protect water resources.

Recommendation: Do not cut any mature and large trees over 21 inches consistent with the Eastside Screens (1995). Support the recommendations of climate scientists for forest protection and establishment of forest reserves as low-cost solutions to climate mitigation. Protect all large mature and old growth trees which accumulate massive amounts of carbon in trees, vegetation and soils, homes for diverse wildlife, and serve as sources of water for drinking and other uses.

[39] Law, B. E., T. W. Hudiburg, L. T. Berner, J. Kent, P. C. Buotte, and M. E. Harmon. 2018. Land use strategies to mitigate climate change in carbon dense temperate forests. Proceedings of the National Academy of Sciences USA 115:3663–3668.
[40] Law et al. 2018. Ibid.

Transportation, Road System and Densities

The ONF must evaluate the NFCR project roads to implement a minimum road system consistent with the 2005 Travel Management Rule. The Travel Management Rule (36 CFR part 212[41]) was established to identify a transportation system that is "environmentally and financially sustainable while meeting public needs". The ONF failed to show in the Draft EA how the project's actions for roads are consistent with the 2015 Ochoco Travel Analysis Report and the identification of the "minimum road system". Furthermore, the LRMP (p. 4-224) standard requires the lowest density road system possible. Management areas MA-F20 (Winter range) and MA-F21 (General Forest Winter Range) have a road density standard of a maximum of road and trail use limited 1 mi/mi^2 from December 1 to May 1 and 3 mi/mi^2 for the remainder of the year while General Forest is no more than 3 mi/mi^2.

The Draft EA Table 65 (p. 167) (here Table 1) reports the following roads by miles and status in the project area. From the data shared in the table, the NFCR project area already violates the LRMP standards for roads in the project area. Subtracting the 92.97 miles of closed roads and assuming all closed roads are not driven (which the EA reports that many closed roads are driven), yields a road density for all roads ML 2-5 in the project area of 3.24 mi/mi^2. This road density violates the LRMP standards of 3 mi/mi^2 in general forest and 1 mi/mi^2 in the general forest winter range and winter range. With an unknown but likely high use of closed roads, based on our surveys, the road density is much higher.

Maintenance Level	FS Jurisdiction (mi)	Private Jurisdiction (mi)
1 – Basic Custodial Care (Closed)	92.97	0.31
2 – High Clearance Vehicles	91.34	0.85
3 – Suitable for Passenger Cars	4.58	0.00
4 – Moderate Degree of User Comfort	0.00	0.00
5 – High Degree of User Comfort	0.00	0.00
D – Decommission	53.11	0.00
Total miles in planning area:	**242.01**	**1.16**

Table 1. Draft EA Table 65 of the current distribution of roads by maintenance level and jurisdiction within the planning area.

The NFCR Draft EA (p. 167) reports that "Alternatives 2 and 3 would decommission 9.39 miles of closed maintenance level 1 road and 0.21 miles of open maintenance level 2 road [and] close 6.15 miles of currently open maintenance level 2 road". That means the total amount of roads alleged to be closed in the future is 15.75 miles. Meanwhile, Alternative 2 will increase open roads by 34.49 (ML 1 to ML 2 (admin)) and .33 miles (ML 1 to ML 2) for an increase of 34.82 miles. In addition, temporary roads will be either reopened from past use or new roads will be constructed for a total of 22.89 miles in Alternative 2 and 24.23 miles in Alternative 3. That means the total of new roads for the NFCR project area will be a whopping 57.71 miles and 59.05 miles for Alternatives 2 and 3, respectively. Subtracting the proposed 15.75 miles of road to be closed or decommissioned yields a net increase of roads of almost 42 to 43.3 miles of increased miles of roads driven by motor vehicles. The new road density with project implementation yields a substantially higher road density of 3.95 mi/mi^2 and 3.98 mi/mi^2, well above the road density standards.

[41] USDA Forest Service. 2005. https://www.ecfr.gov/current/title-36/chapter-II/part-212

In addition, the Draft EA (p. 113) in the Invasive Weeds section stated that "There are several miles of closed roads and administrative use roads (210 miles) in the project area". This very high estimate of closed and administrative use roads was NOT documented in the Transportation section and belies the analyses and claims for alleged improvements to resource conditions by closing roads. The Draft EA acknowledged that many closed roads were driven but failed to provide that information in the document, which is a lack of public disclosure on data and analyses for a project that is supposed to meet LRMP road density standards. Essentially, the ONF completes a black box analysis of road densities and then subsequently applies the misleading conclusions of low road densities to wildlife and fisheries analyses, further leading to false conclusions that the project will benefit fish, wildlife, riparian areas, and water.

The ONF fails to meet its road density standards and in some places in the forest, has road densities as high as 12 mi/mi^2, despite Forest Plan standards for management areas general forest and in big game winter range. The forest uses "motor vehicle use maps" (MVUM) to designate open roads but fails to physically block closed roads. Hence, they are driven, causing long term and sometimes irreparable harm to water quantity and quality and fish and wildlife habitats.

In independent surveys by the Oregon Department of Fish and Wildlife (ODFW) and the Great Old Broads for Wilderness, Bitterbrush Broads and Bros chapter and conservation partners, all areas surveyed had many closed and some decommissioned and temporary roads driven by users.

In the Black Mountain Project areas, over 2/3 of the "closed roads" surveyed were regularly driven by the public, and up to ½ of the "decommissioned roads" were driven as well. Of the 115 roads we surveyed in the Black Mountain project area, adjacent to the NFCR project, we documented that 63% of the ML-1 closed roads (45 of 71 ML-1 roads surveyed), 33% of the decommissioned roads (13 of 39), and 5 user-created roads in the Project area that had unauthorized vehicular use. The user-created roads that we observed were part of a much larger network of roads and trails receiving unauthorized use.

ODFW reported similar results of surveys conducted in the proposed 301,000+ acre project area for the Summit Off Highway Vehicle project. They found that 60% of the "closed" roads were regularly driven.

The Bitterbrush Broads and Bros partnered with several other conservation groups and conducted closed road surveys in 2021 in the Mill Creek project area. Despite denser forest and steeper topography than the Black Mountain project area, we found a substantial amount of closed roads that were driven by the public and numerous user-created roads. In the Mill Creek project area, of the 110 closed roads surveyed, 31 (28%) were closed, 66 (60%) were open and illegally driven, and 13 (12%) were not surveyed. We also found numerous decommissioned roads and user created roads that were driven but did not enumerate those.

Physical closure, compliance and enforcement of road closures has been minimal to nonexistent on the ONF. Every time a new planning project is created for timber harvest, thinning, prescribed fire, or some other vegetation treatment, it creates higher and higher densities of roads, where wildfires can be started by the public, and fish and wildlife habitat, and streams and water quality continue to degrade.

The Draft EA (p. 16) states that "*Access of some of these closed roads will still be authorized for Forest Service administration (e.g., maintenance of range improvements), project-level or on-going work (e.g., invasive plant treatments), and emergency access (e.g., fire suppression).* That means in effect, these roads are <u>not closed</u>, they just do not receive as much use as one driven by the public. In many past meetings with the ONF, it has become abundantly clear that many ONF staff, contractors, permittees, adjacent landowners, and more are using "administratively closed" roads. These roads are essentially ML 2 open roads receiving frequent use by a select

subset permitted by the ONF. As an example, some of our Broads are retired agency staff and have records of meetings and letters between the ONF and ODFW meetings that document the numerous personnel, contractors, permittees, adjacent landowners, timber purchasers and more that are given "administrative" leave to drive "closed" roads. Therefore, these roads are NOT closed roads and have the same impacts as any open road. Why bother to gate or close roads that only a portion of users can drive but have the same level of impact?

Our review of the Draft EA Table 4 (p. 16) (here Table 2) shows the following changes in roads in the project area. Changing 34.49 miles and .33 miles of closed ML 1 road to ML 2 or Administrative ML 2 is essentially opening these roads to much more use. Further, construction of new and reopening over 20 miles of temporary roads will dramatically increase the amount of roads driven in the project area. Contrary to false statements in the Draft EA, there will be a net increase of 41.58 and 43.3 miles of newly OPEN roads in the NFCR project area. These false claims negate the claims for increased elk security habitat for more and larger blocks. They undercut the claims for improved riparian habitat. These road increases will increase harm to streams by having a greater hydrologic network that will add more water and sediment to streams in high flow events.

Resource Indicator	Measure	Alternative 2	Alternative 3
Maintenance Level	Miles of Maintenance Level 1 to Decommission	9.39	9.39
	Miles of Maintenance Level 1 to Administrative Maintenance Level 2	34.49	34.49
	Miles of Maintenance Level 1 to Maintenance Level 2	0.33	0.33
	Miles of Maintenance Level 2 to Decommission	0.21	0.21
	Miles of Maintenance Level 2 to Maintenance Level 1	6.15	6.15
	Miles of Maintenance Level 2 to Administrative Maintenance Level 2	28.25	28.25
Road Maintenance And Reconstruction	Miles of Road Maintenance*	122.93	109.81
	Miles of Road Reconstruction*	21.69	19.38
Temporary Roads	Miles of Existing Disturbance	19.72	19.34
	Miles of New Disturbance	3.17	4.89

Table 2. Draft EA Table 4 shows proposed road changes in the North Fork Crooked River planning area.

The Broads have documented via field surveys of closed roads in the Black Mountain and Mill Creek planning areas that almost 2/3 of designated closed roads are driven and many decommissioned roads are driven as well. The agency generates states that the project will assist with meeting forest road density standards when in fact it is increasing road density in the planning area. The ONF falsely claims that it is reducing road density and then fails to state the real impacts to fish and wildlife habitats, hydrology, and streams and riparian areas.

While we strongly support road closures and decommissioning, this project is reopening closed roads to more use by selective users and adds almost 20 miles of temporary roads. The ONF needs to physically close all closed and decommissioned roads, and not implement any new temporary roads. If temporary roads are included in the project, then they must be incorporated into the road density analysis as must all "closed" and decommissioned roads that are open and driven. High road densities are a major pathway to altered hydrology in each basin including higher peak, lower base flows, and a major contributor to sediment in streams as well as impacts to wildlife such as fragmentation of habitats and disturbance.

Because analyses and impacts to other resources rely on the fundamental assumption that the project reduces road density, but in fact does the opposite, it undermines the results and conclusions that the project will benefit these other resources. This includes effects on wildlife, fisheries, stream, hydrology, riparian areas, elk security habitat, core habitat analysis, HEI, and EHA. **These analyses must include all roads driven by ONF employees, permittees, adjacent landowners, timber purchasers and harvest vehicles, and contractors and temporary roads that are new or reopened**, not just open roads in density calculations. Any analyses that uses the "open road" density calculations in the Draft EA are bogus and mislead the public.

From our review of the Draft EA, the ONF has ignored and downplayed the well-documented negative effects and ecological risks associated with logging and roads within streamside corridors and RHCAs. Rieman et al. (2001)[42] noted that: "…*vulnerable aquatic species could be impacted in the short term in ways from which they could not easily recover, even if long-term benefits eventually became evident in later years*." "Resource protection measures" listed in Appendix B-1 are largely band-aids that will fail to protect other resources.

Roads are well documented in the literature to cause permanent impacts to numerous terrestrial and aquatic ecosystems, and are a major threat to biological diversity, fragmentation, loss of connectivity for animal distribution and movement patterns, and have contributed to the spread of invasive and exotic weeds. The existing road system has caused changes to the natural hydrology, adverse impacts to soils, water quality and stream flow, reduced riparian habitat, altered floodplains, and added sediment that has degraded streams and destroyed fish habitat.

Elevated sediment occurs as a result of timber harvest and the increase of "temporary" roads long after treatment stops. Elliot et al. (2011)[43] reported that sediment is the greatest pollutant of forest streams with a forest road network as the main annual source of sediment in forest watersheds. A major factor that increases erosion is traffic. Roads with heavy traffic generate 4 to 5 times the sediment of roads compared to roads with light traffic (Elliot et al. 2010)[44]. Carnefix and Frissell (2009)[45] found there is not truly "safe" threshold road density for aquatic species and negative impacts begin with the first road segment in a watershed, and highly significant impacts began at road densities as low as 1 mi/mi^2.

Many authors have reported on the increased sediment load from roads connected to streams, causing increased aggradation of stream beds, filling of pools, enlarged channel widths and widening width-to-depth ratios (Jackson and Beschta 1984[46], Lisle 1982[47]). As road density increases, there is a clear decline in pool frequency and frequency

[42] Rieman, B., J.T. Peterson, J. Clayton, P. Howell, R. Thurow, W. Thompson, and D. Lee. 2001. Evaluation of potential effects of federal land management alternatives on trends of salmonids and their habitats in the interior Columbia River basin. Forest Ecology and Management 153:43-62.

[43] Elliot, W.J., P.R. Robichaud, and R.B. Foltz. 2011. Erosion processes and prediction n NW US forests. International Symposium on Erosion and Landscape Evolution. September 18-21, 2011. Anchorage, Alaska. 8 pp.

[44] Elliot, W. J., I. S. Miller, and L. Audin (eds.). 2010. Cumulative watershed effects of fuel management in the western United States. Gen. Tech. Rep. RMRS-GTR-231. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 299 p.

[45] Carnefix, G., and C. Frissell. 2009. Aquatic and other environmental impacts of roads: the case for road density as indicator or human disturbance and road-density reduction as restoration target; a concise review. Pacific Rivers Council Science Publication 09-001. 9 pp.

[46] Jackson, W.L. and R. L. Beschta. 1984. Influences of sand delivery on the morphology of sand and gravel channels. Water Resources Bulletin 20(4): 527-533.

[47] Lisle, T.E. 1982. Effects of aggradation and degradation on riffle-pool morphology in natural gravel channels, northwestern California. Water Resources Research. 18:1643-1651.

of large pools, both of which are essential requirements for high-quality fish habitat. Lee et al. (1997)[48] reported that increasing road densities are correlated with declines in the four non-anadromous salmonid species including bull trout, Westslope cutthroat trout, Yellowstone cutthroat trout, and redband trout. As pools are filled in by sediment, they support fewer fish, fish suffer higher mortality, reduce salmonid embryo survival (Bjornn and Reiser 1991[49]; Jensen et al. 2009[50]) and cause decreased fry emergence and juvenile densities, loss of winter carrying capacity, and increased predation (Chapman 1988[51]; Everest et al. 1987[52]; Scrivener and Brownlee 1989[53]; Magee et al. 1996[54]; Weaver and Fraley 1993[55]; Young et al. 1991[56]). High fine sediment load reduces intragravel dissolved oxygen, increases metabolic waste concentrations, decreases intergravel space for aquatic life, and restricts movements of alevins (young fry) (Bjornn and Reiser 1991[57]; Chapman 1988[58]; Everest et al. 1987[59]; Baird et al. 2012[60]).

The Broads recognize that the ONF has implemented a Travel Management Plan (TMP) using Motor Vehicle Use Maps (MVUMs). MVUM maps identify for the forest user the open roads identified in the TMP, but these maps, based on road surveys in the Black Mountain and Mill Creek project areas, fail to show the real roads present on the landscape that are driven. Maps do not prevent users from traveling on closed, decommissioned, temporary and user-created roads and trails. We consistently observed that over 60% of the "closed" roads in both the Mill Creek and Black Mountain project areas are driven by the public. There is little to no compliance or enforcement.

The Draft EA also does not clarify an adequate plan for physically closing roads including funding, monitoring, and effectiveness. The ONF has a long history of failing to follow through implementing road closures to meet Forest Plan standards for road densities. While the HEI analysis used planned road closures (roads that were supposed be closed

[48] Lee, D.C., J.R. Sedell, B.E. Rieman, R.F. Thurow, J.E. Williams, D. Burns, J.L. Clayton, L. Decker, R. Gresswell, R. House, P. Howell, K.M. Lee, K. Macdonald, J. McIntyre, S. McKinney, T. Noel, J.E. O'Connor, C.K. Overton, D. Perkinson, K. Tu. and P. Van Eimeren. 1997. Broadscale Assessment of Aquatic Species and Habitats. In: An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins, T. M. Quigley, and S. J. Arbelbide (Editors). USDA Forest Service Gen. Tech. Rep. PNW-GTR-405, Vol. III, Portland, Oregon, pp. 1057-1713.

[49] Bjornn, T.C. and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. In Meehan, W. (Ed). Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19.

[50] Jensen, D.W., E. A. Steel, A.H. Fullerton, and G.R. Pess. 2009. Impact of fine sediment on egg-to-fry survival of Pacific salmon: A meta-analysis of published studies. Reviews in Fisheries Science, 17(3):348–359.

[51] Chapman, D.W. 1988. Critical review of variables used to define effects of fines in redds of large salmonids. Transactions of the American Fisheries Society 117(1): 1-21.

[52] Everest, F.H., R.L. Beschta, J.S. Scrivener, K.V. Koski, J.R. Sedell and C.J. Cedarholm. 1987. Fine sediment and salmonid production: a paradox. Pp. 98-142, In: J. Colt and R.J. White, eds. Streamside management: forestry and fishery interactions. Contrib. No. 57. Seattle, WA. Institute of For. Res., Univ. WA.

[53] Scrivener, J.C., and M.J. Brownlee. 1989. Effects of forest harvesting on spawning and incubation survival of chum and Coho salmon in Carnation Creek, British Columbia. Canadian Journal of Fisheries and Aquatic Sciences. 46:681-696.

[54] Magee, J.P., T.E. McMahon, and R.F. Thurow. 1996. Variation in spawning habitat of cutthroat trout in a sediment-rich stream basin. Transactions of the American Fisheries Society 125 :768-779.

[55] Weaver, T.M. and J.J. Fraley. 1993. A method to measure emergence success of Westslope cutthroat trout fry from varying substrate compositions in a natural stream channel. North American Journal of Fisheries 13:817-822.

[56] Young, M.K., W.A. Hubert and T.A. Wesche. 1991. Selection of measures of substrate composition to estimate survival to emergence of salmonids and to detect changes in stream substrates. North American Journal of Fisheries Management. 11:339-346.

[57] Bjornn and Reiser. 1991.

[58] Chapman. 1988. Ibid.

[59] Everest et al. 1987. Ibid.

[60] Baird, E.J., W. Floyd, I. Van Meerveld and A.E. Anderson. 2012. Road surface erosion. Part 1: Summary of Effects, Processes, and Assessment Procedures. Streamline Watershed Management Bulletin 15. 9 pp.

from the 1997 NFCR project but never completed) to demonstrate an increase in security habitat, the ONF needs to effectively show that they can close roads and maintain closures over the coming decades.

Also, proposed "mitigation" of timber harvest impacts has a long history of not happening, such as road closures. In fact, the Draft EA (p. 15) reports that "*The current project will reinforce road closures that are breached or add new physical closures where there had not been one previously*." This is a prime example of how road closure mitigations are never completed from previous sales, even when they were required by the LRMP. The Draft EA (p. 167) states that in "*recent years, the road maintenance budget for the Ochoco NF has only allowed for routine maintenance on maintenance level 3-5 roads…Due to limited road maintenance funds, and the adverse effects to other resources as a result of reduced maintenance, current conditions do not meet desired conditions*". The Draft EA (p. 168-169) further states that "*Alternatives 2 and 3 would close 6.15 miles of currently open maintenance level 2 road" but that this work "would be completed gradually as funds become available*". Essentially, the ONF admits that there is a limited budget for tackling road conditions and cannot implement mitigation obligations. If the ONF cannot do basic road maintenance, the planned road closures and decommissions will never happen, and any proclaimed positive benefits on the landscape will never occur. The failure to establish an accurate baseline of motor vehicle use in the project area and the failure to implement promised mitigation has major implications for multiple resource values fish, wildlife, streams, water quantity and quality, sediment loads, fire risk, and the spread of invasive species.

Recommendation: The Final EA must include the mileage of all maintenance levels roads that are "functionally" open on the landscape, as well as all user created roads. This project further impacts fish, wildlife, and water resources by Increasing and NOT decreasing the amount of roads on the landscape. Despite the lack of public disclosure of all data and incorrect analyses, the ONF then incorrectly applies the misleading analyses to a variety of modeling exercises that are done to support the conclusion that the project is justified and will benefit other resources. The core habitat, HEI and elk security analyses fail to correctly disclose the true impacts using this road data and analyses. Please correctly disclose and correctly analyze ALL roads in the project area that are driven including closed, decommissioned, user created and temporary roads for a true estimate of road density. We absolutely support Alternative 1 given these flawed analyses. The ONF must comply with LRMP road standard densities, and All designated closed, decommissioned, user created and temporary roads on the ONF must be signed and physically blocked for entry by any motorized vehicles. All closures must be done commensurate with the timber sale and not wait for up to 10 years following implementation to occur. Road density standards are not simply "mitigation measures" but LRMP requirements.

Hydrology, Streams, Riparian Areas, Wetlands, Seeps, and Springs

False Statements: The Draft EA (p. 135) states that "*Conifers reduce water availability for deep-rooted riparian vegetation (willows, sedges, rushes) that are important to stabilize streambanks, trap sediment, and provide shade for cooler stream temperatures.)."* In fact, several authors have reported the importance of conifers in riparian communities because they provide the structural complexity that supports higher species diversity and richness, important microclimates, and provide LWD for riparian areas and streams that deciduous shrubs cannot (Kauffman 1988[61], Mackenzie and Moran 2004),[62] (Pollock et al. 2012)[63]. Furthermore, the assumption that logging conifers will

[61] Kauffman, J.B. 1983. The status of riparian habitats in Pacific Northwest Forests. Kauffman, J. B. 1988. The status of riparian habitats in Pacific Northwest forests. Pages 45-55 in K. J. Raedeke, ed. Streamside management: riparian wildlife and forestry interactions. College of Forest Resources, Contribution No. 59, University of Washington, Seattle.

[62] Mackenzie, W.H. and J.R. Moran. 2004. Wetlands of British Columbia: a guide to identification. BC Ministry of Forests, Land Management Handbook 52.

[63] Pollock, M. M., T. J. Beechie, and H. Imaki. 2012. Using reference conditions in ecosystem restoration: an example for riparian conifer forests in the Pacific Northwest. Ecosphere 3(11):98. http://dx.doi.org/10.1890/ES12-00175.1

restore hardwoods across the project area RHCAs is faulty. Conifers are frequently found in a floodplain that has been disconnected from the incised stream channel and is caused by past and present land management practices of grazing, roads, and timber harvest. This flawed assumption, that conifers cause stream degradation, which we found in multiple places in the Draft EA, invalidates the environmental impact analysis. Essentially, the Draft EA fails to make a coherent connection between the data, the analyses, and conclusions.

We remind the ONF that the LRMP describes desired conditions in the MA-F15 riparian areas and states: "*Where coniferous evergreens are a natural component of the ecosystem, a variety of size classes will exist to perpetuate the supply of shade and woody debris over time*." The NFCR project repeatedly targets harvest or thinning of conifers in riparian areas despite the LRMP's desired conditions that discourage logging of conifers in RHCAs and requirements for a variety of tree sizes to maintain shade and LWD over time.

A History of Degraded Streams: From the 1940s to the early 1990s on western forests there were no safeguards to balance the risks posed by increasing timber harvest and a lengthening road system (Hicks et al. 1991[64]; Dose and Roper 1994[65]). This led to simplified stream channels with less instream LWD, increased fine sediments in streambeds, and destabilized streambanks (Meehan 1991)[66]. Like many other western forests, much of the Ochoco Forest experienced management actions such as the construction of valley bottom roads, intensive timber harvest and livestock grazing.

The bulk of the National Forest System roads were built in the last 50-60 years with most constructed to access timber harvest, particularly along streams and in riparian areas. With the depletion of large trees over the past century from high grading timber harvest practices, the remaining large trees in riparian areas are all the more important to retain. Large trees provide a far greater benefit than smaller trees and are critical for forming and retaining high quality pools, last longer than smaller trees, and are more effective at providing instream habitat and reducing bank erosion.

Timber harvest and thinning near streams and in riparian areas harms water quality and fish habitat, especially the negative effects associated with the removal of large, commercial-sized trees. While some habitat loss from thinning and burning has a shorter-term impact, the loss of large-diameter trees, snags and down wood takes decades or centuries to recover. Harvest and thinning also reduces recruitment for future snags and downed wood.

Beschta et al. (1995)[67] reported that "*Land management practices in the interior Columbia… have profoundly impacted forest, grassland, and aquatic ecosystems. Watersheds and forests have been degraded (e.g., ecosystems fragmented, habitats simplified or lost, disturbance regimes altered). At every level of biological organization -- within populations, within assemblages, within species, and across the landscape -- the integrity of biological systems has been severely degraded. This is best seen in the marked reduction in the biological diversity in the region."* The authors further stated that "*By narrowly concentrating on forest health (often a euphemism for tree health, recently*

[64] Hicks, B.J., J.D. Hall, P.A. Bisson, and J.R. Sedell. 1991. Responses of salmonids to habitat changes. Pp. 483-518, In: W.R. Meehan, ed. Influences of forest and rangeland management on salmonid fishes and their habitat. American Fisheries Society Sp. Publ. 19. Bethesda, MD.

[65] Dose, J. J., and B. B. Roper, 1994. Long-Term Changes in Low-Flow Channel Widths Within the South Umpqua Watershed, Oregon. Water Resources Bulletin 30:99-1000.

[66] Meehan, ed. 1991. Influences of forest and rangeland management on salmonid fishes and their habitat. American Fisheries Society Sp. Publ. 19. Bethesda, MD.

[67] Beschta, R.L., C.A. Frissell, R. Gresswell, R. Hauer, J.R. Karr, G. W. D.A. Perry, and J.J. Rhodes. 1995. Wildfire and salvage logging: Recommendations for ecologically sound post-fire salvage management and other post-fire treatments on federal lands in the west. 14 pp.

referring to carbon cycling), federal land managers have embarked on an ambitious attempt to address forest management in ways that risk neglecting watershed health and the ecology of aquatic ecosystems."

We agree with the Draft EA (p. 133) statement that "*Watersheds with high integrity are in an unimpaired condition in which ecosystems show little or no influence from human actions (Lackey 2001)."* Human actions can be livestock grazing, roads, timber harvest, thinning and other actions that impact forested ecosystems. Yet this project, contradicts that statement by causing more impact from human actions.

Riparian Management Objectives (RMO) parameters on the ONF. RMOs such as temperature, shade, and pool depth and frequency are largely degraded on all streams in the project area. While the data were not comprehensive for all streams in the project area, many RMO parameters for shade, stream temperature, LWD, stream bank stability, cutbanks, width depth ratios, and pool frequency for streams were not assessed, outdated and not surveyed in the last 3-5 years or failed to meet INFISH standards. Particularly with a warming and drying climate, restoration of riparian areas and degraded streams by past management practices has become more urgent. We note that over the past 30+ years, streams that were once perennial have become intermittent in extended drought years and some local redband trout populations have been extirpated (e.g., some streams on the south side of the Maury Mountains). Without restoration of streams by limiting or cessation of harmful management practices, local extirpations of native redband trout will continue with a warming climate, leading to extirpation and extinction.

Stream and riparian habitats are extremely fragile communities that support ESA-listed species and Regional Forester Sensitive species. INFISH (1995) set riparian goals that include: maintain or restore water quality, stream channel integrity and channel processes, and instream flows to support healthy riparian and aquatic habitats. Interim riparian management objectives include shade, pool frequency and LWD objectives. INFISH also stated that "Actions that reduce habitat quality, whether existing conditions are better or worse than objective values, would be inconsistent with the purpose of this interim direction."

RHCAs: The Draft EA (p. 3, 127) states that improving and maintaining RHCAs is a key part of the purpose and need for the North Fork Crooked River project. Then the Draft EA defines RHCAs "as portions of watersheds where riparian-dependent resources receive primary emphasis and management activities are subject to specific standards and guidelines". Riparian Management Objectives (RMOs), which are to be considered at a landscape scale, contribute to optimum habitat for fish and serve as indicators of watershed health.

To "fix" the extensive failure of RHCAs in meeting RMOs, the Draft EA (p. 139) action alternatives propose to harvest conifers in RHCAs to promote hardwood recovery, create additional pool habitat, and reduce sediment transport. However, this approach will fail as it does not address the many causes of stream degradation identified in the EA. These include lack of floodplain connectivity, past and ongoing livestock grazing, timber harvest, and road densities.

INFISH and Impacts of Forest Management Activities. One of the primary goals of amending planning documents (e.g., INFISH, Eastside Screens) in the 1990s was to implement new management practices that would support viable native salmonids (Ratner et al. 1997[68]; McHugh et al. 2017[69]). The primary method to improve riparian and stream conditions was to limit activities such as timber harvest, road construction, livestock grazing, and other activities near

[68] Ratner, S., R. Lande, and B. B. Roper. 1997. Population viability analysis of spring chinook salmon in the South Umpqua River, Oregon. Conserv. Biol. 11: 879-889.

[69] McHugh et al. 2017. Linking models across scales to assess the viability and restoration potential of a threatened population of steelhead (Oncorhynchus mykiss) in the Middle Fork John Day River, Oregon, USA. Ecological Modelling. 355:24-38.

streams that had caused the degradation (Boisjolie et al. 2017[70]; Roper et al. 2018[71]). The new policies were implemented to minimize sediment runoff from roads, conduct watershed analyses, identify priority watersheds where aquatic species would have greater protection, conduct habitat surveys, and compare survey results against Riparian Management Objectives (RMOs) and implement stream restoration projects where needed. Concurrent with changes in management policies that were expected to improve streams and riparian areas was a 70% reduction in the quantity of timber harvested from public lands in the Pacific Northwest region (Adams et al. 2006)[72].

INFISH (1995) states the following for timber management in RHCAs:

"TM-1 Prohibit timber harvest, including fuelwood cutting, in Riparian Habitat Conservation Areas, except as described below.

a. Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuelwood cutting in Riparian Habitat Conservation Areas only where present and future woody debris needs are met, where cutting would not retard or prevent attainment of other Riparian Management Objectives, and where adverse effects can be avoided to inland native fish. For priority watersheds, complete watershed analysis prior to salvage cutting in RHCAs.
b. Apply silvicultural practices for Riparian Habitat Conservation Areas to acquire desired vegetation characteristics where needed to attain Riparian Management Objectives. **Apply silvicultural practices in a manner that does not retard attainment of Riparian Management Objectives and that avoids adverse effects on inland native fish."**

Action Alternatives 2 and 3 fail to take reasonable actions to address the consistent failure to meet RMOs in the proposed NFCR. While the riparian and stream data in the Draft EA is extremely limited and inadequate, it is a critical flaw and damning indictment that current livestock grazing, timber harvest and road management fails to meet INFISH standards and guidelines. The ONF must take a comprehensive ecological approach to restoration of riparian areas that address the real causes of stream and riparian degradation. Perpetuation of the same management practices and continued violation of the standards and guidelines of INFISH and the LRMP Ochoco Forest Plan will cause the spiraling decline of RHCA conditions and native fish and wildlife populations.

Scientific Literature: Poff et al. 2011[73] reports that "*Logging affects western riparian ecosystems through tree falling, log skidding, road construction, and direct removal of vegetation (DeBano and Schmidt, 1989a, b). The first three factors compact and disturb soil, which increases erosion, depresses growth, and further stresses residual vegetation. Removal of vegetation can alter thermal regimes, increase soil loss, diminish ecological characteristics such as structural* diversity, *alter species composition, and improve site conditions for invasions by nonnative plants and other biota*" (Poff et al. 2011)[74].

[70] Boisjolie, B.A., M.V. Santelmann, R.L. Flitcroft, and S.L. Duncan. 2017. Legal ecotones: A comparative analysis of riparian policy protection in the Oregon Coast Range, USA. Journal of Environmental Management 197 (2017) 206-220.
[71] Roper, B.B., J.M. Capurso, Y. Peroz, and M.K. Young. 2018. Aquatic biodiversity conservation in the context of multiple use management of National Forest System lands. Fisheries, 43, 396–405.
[72] Adams, D.M., R.W. Hayes, and A.J. Daigneault. 2006. Estimated Timber Harvest by U.S. Region and Ownership, 1950-2002.
[73] Poff, B., K.A. Koestner, D.G. Neary, and V. Henderson, 2011. Threats to Riparian Ecosystems in Western North America: An Analysis of Existing Literature. Journal of the American Water Resources. Association (JAWRA) 1-14. DOI: 10.1111/j.1752-1688.2011.00571.
[74] Poff, B., K.A. Koestner, D.G. Neary, and V. Henderson, 2011. Threats to Riparian Ecosystems in Western North America: An Analysis of Existing Literature. Journal of the American Water Resources. Association (JAWRA) 1-14. DOI: 10.1111/j.1752-1688.2011.00571.

Effects on fish habitat from loss of streamside vegetation [from timber harvest, roads, and livestock grazing] include increased stream temperature, loss of cover, increased erosion, widening and shallowing of the stream channel, and reduction or loss of perennial flow. Degraded habitat is characterized by increased sediment and water temperatures, declines in pool depth, quality, and frequency, reduced LWD, increased cutbanks and bank instability, and high width/depth ratios. Water quantity and quality problems, primarily flow reduction or loss, temperature, sedimentation, and turbidity, limit fish distribution and production (Bottom et al. 1985)[75].

Studies have shown that logging, even selective logging, has increased instream fine sediments (Kreutzweiser et al. 2005[76], Miserendino and Masi 2010[77]) and increased instream water temperatures (Guenther et al. 2012)[78] and these changes in habitats are found decades after harvest. Most streams on National Forest lands in Eastern Oregon, like the ONF, have poor shade, high stream temperatures and violate state water quality standards for temperature. These high temperatures are a serious long-term threat to water quality and continue to be a problem due to both past and current land management practices of timber harvest, high road densities and livestock grazing. High stream temperatures, especially in violation of state and Forest Plan stream temperature standards, create chronic and acute lethal conditions for native fish and limit their productivity and survival in areas where they are already stressed by high loads of fine sediments. Even local increases of water temperatures and sediment at the subwatershed or reach scale can cause local extinctions which cannot be recovered (Frissell 2017)[79].

Logging in riparian areas can increase nutrient loads, stream temperature, and sediment and reduce LWD to streams, compromising fish habitat and water quality. Any active management in stream corridors and riparian areas risks harm to stream ecosystems (Frissell 2017)[80] via the release of nutrients and increases in sediment and stream temperatures.

The following are brief descriptions of impacts of riparian harvest and roads on streams and aquatic species with supporting literature or discussion.

A. Nutrients. Riparian areas filter and retain harvest activities up slope. Any vegetation disturbance from wildfires, but especially logging, frees phosphorus and nitrogen in soils and causes a spike in streams. Excess nitrogen increases growth of aquatic plants and algae, consumes dissolved oxygen, and blocks light to deeper waters. Too much nitrogen and phosphorus in the water causes algae that can harm water quality, aquatic habitats and decreases oxygen needed by fish and other aquatic life. Oxygen depletion from algal blooms leads to toxicity and even death of large numbers of fish. Sweeney and Newbold (2014)[81] reported that "*The most familiar aspect of streamside forest buffers is their role in creating sufficient space to intercept pollutants created by upland activity before they enter the*

[75] Bottom, D.L., P.J. Howell, and J.D. Rodgers. 1985. The effects of stream alterations on salmon and trout habitat in Oregon. Oregon Department of Fish and Wildlife, Portland. 70 pp.
[76] Kreutzweiser, D.P., S.S. Capell, and K.P. Good.2005. Effects of fine sediment inputs from a logging road on stream insect communities: A large-scale experimental approach in a Canadian headwater stream. Aquatic Ecology 39(1):55-66. DOI:10.1007/s10452-004-5066-y.
[77] 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.
[78] Guenther, S., T. Gomi, and R. 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.
[79] Frissell, C. 2017. Panel on logging in streamside corridors. John Day, Oregon. https://bluemountainsbiodiversityproject.org/panel-on-logging-in-streamside-corridors-john-day-oregon-2017/.
[80] Frissell, C. 2017. Ibid.
[81] Sweeney, B.W. and J.D. Newbold. 2014. Streamside forest buffer width needed to protect stream water quality, habitat, and organism: A literature review. Journal of the American Water Resources Association (JAWRA) 50(3): 560-584. DOI: 10.1111/jawr.12203.

stream. It is intuitive that wider buffers with more vegetation have greater potential for intercepting, sequestering, degrading, and processing pollutants." The authors concluded that "*when applied to a site with average water flux, predicts removal efficiency of 48% for a 30-m buffer, increasing to 90% for a 100-m buffer*." Wetlands, like riparian areas, also improve water quality by filtering sediments, nutrients, and contaminants (Environmental Protection Agency 2002)[82]. Wetlands are also essential habitats for a wide variety of plants and animals, including many federally threatened and endangered species.

B. Shade. Shade is important to reduce incoming solar radiation and helps keep water temperatures cool. The INFISH RMO standard for shade is 80% shade. Timber harvest and thinning in riparian zones decreases shade and warms water temperatures harming aquatic organisms such as native redband trout and Columbia spotted frog. Shade functions generally occur within 100-200 feet of the channel (Beschta et al. 1987)[83].

The Draft EA (p. 129) acknowledges that "*Observations from data collected from the early 1990s through present indicate that most of the streams within the project area are not meeting management objectives of 80% shaded surface or greater (Table 82, Appendix E)".* Of the 48 reaches surveyed, most of which were surveyed in 1991 or 2008, only 12 reaches had shade data. All 12 reaches failed the 80% shade standard and ranged from 2% on Indian Trail Creek to 75.3% on 1 reach of Dippingvat Creek. The Draft EA failed to report data from the 2005 Westside Allotments Decision Notice and AMP. It documented shade survey information and results were the following: Dippingvat 59%, Dry Paulina 63%, NFCR 21%, and Roba 56%. Again, all failed to meet the RMO standard of 80% shade. The Westside Allotments also stated that "*Approximately 25 historical and present-day exclosures occur within the project area (Table 25), and most of them protect riparian areas or spring sources. Where these have been maintained, exclosures have improved shade conditions dramatically, often despite continued ungulate browsing...In Properly Functioning and Functioning-at-Risk reaches (Table 35), exclosures are the most effective management activity for improving shade conditions. These sites are generally small, however, and the positive effect on watershed-scale temperatures is quickly negated by limited shade downstream*".

Since timber harvest, thinning and prescribed burning all have the potential to impact shade and retard recovery of the INFISH standard, any treatments inside the RHCA areas violate INFISH. The Draft EA states (p. 139) that "*Thinning conifers in and adjacent to RHCAs would help to mitigate the effects of anticipated higher water temperatures, increased extent of wildfire, and continued degradation of aquatic habitat*". This comment is speculative and due to harvest and thinning causing reduced shade, likely to increase, not decrease water temperatures The Draft EA (p. 140) also speculates that "*Minimizing the impacts of roads and grazing may help offset increases in sediment yield, and increasing water conservation can help maintain summer flows*". However, the project actually increases roads by over 40 miles and there are no plans to stop or reduce grazing or build exclosures.

The Draft EA (p. 143) states for Alternative 2 "*would result in 1,104 acres of vegetation treatments within RHCAs (259 acres of commercial harvest). Short-term adverse effects to riparian shade are possible from reduced conifer density in RHCAs".* Alternative 3 (Draft EA p. 145) "*would result in 1,107 acres of vegetation treatments within RHCAs, all of which would be non-commercial. Short-term adverse effects to riparian shade are possible from reduced conifer density in RHCAs".*

Reduction in any shade in RHCAs by management activities is a violation of the INFISH requirement to avoid retarding recovery. These streams already fail to meet INFISH standards due to past timber harvest (and thinning), ongoing

[82] Environmental Protection Agency. 2002. Functions and values of wetlands. Office of Water EPA 843-F-01-002c Environmental Protection Office of Wetlands, March 2002; Agency Oceans and Watersheds (4502T). 2 pp.
[83] Beschta, R.L., R.E. Bilby, G.W. Brown, L.B. Holtby and T.D. Hofstra. 1987. Stream temperature and aquatic habitat: fisheries and forestry interactions. Pp. 191-232, In: Salo and Cundy, eds.

livestock grazing and high road densities. Doing more of the same activities will not move these streams toward recovery. We find all the statements about short-term impacts leading to more hardwood recovery both speculative and misleading. The many less "managed" forested streams on the ONF such as Brush, Mill and Rock creeks have both dense conifer stands and relatively robust riparian hardwood communities and native redband populations are far more robust than the heavily managed and treated areas in the NFCR planning area.

C. Stream temperature. Cool stream temperatures are essential for a variety of native aquatic organisms such as native resident redband trout and Columbia spotted frog. Timber harvest, by shade removal in streamside zones, increases water temperature, that can become chronic or acutely lethal to native fish species especially cold-water salmonids water. The state water quality standard for these stream reaches for native redband trout is 7-day average maximum temperature <18° C (64.4 F).

The only temperature data reported in the Draft EA is for the North Fork Crooked River, which violated the temperature standard for all the years data was collected. In fact, temperatures were 21-29 C (70-84 F), well above the 18 C standard, causing chronic and acute lethal conditions for redband trout.

The Draft EA (p. 129) reported that "*Within the project area there are four streams with assessed water quality impairments related to summer water temperature. These include North Fork Crooked River (7.8 miles), Fox Canyon Creek (5.2 miles), Roba Creek (3.6 miles), and Dry Paulina Creek (3.2 miles). These streams are on Oregon Department of Environmental Quality's (ODEQ) 2022 Section 303(d) List of "Water Quality Limited Waterbodies*."

The Draft failed to report that Dippingvat Creek is also listed as an impaired stream for temperature on the 303(d) list. Any management activity along streams that have degraded water quality (Oregon Department of Environmental Quality), are likely to be further impaired.

Yonce et al. (2021)[84] observed that "*The effects of timber harvest on the thermal regime of streams have been observed globally*" … "*Reduction in baseflow, which can occur due to soil compaction during harvest, may also reduce the capacity to absorb increased thermal inputs. Preventing these adverse effects was a motivating factor in the development of. riparian buffer management practices for forestry. Riparian buffers influence water temperature through shading that reduces direct insolation to streams, and secondary effects on microclimate (air temperature and wind) within the buffer are also important. Additional benefits of buffers include reducing peak storm runoff, maintaining stable baseflow, and potentially filtering out sediment, nutrients, and other pollutant loads from the surrounding area*."

Stream temperatures also increase from the interruption of hillslope drainage patterns. The increase in peak flows and lower base stream discharges are caused by the interception of surface and subsurface flow and increases of channels on the landscape (Furniss et al. 1991)[85]. Loss of riparian cover from timber harvest is well known while a third mechanism is the conversion of groundwater to surface water (Williams 1999)[86]. As streams degrade, subsurface water changes to surface flow and increases solar insolation (Fissekis and Hersh-Burdick 2007[87]; Wonzell

[84] Yonce, H.N., S. Saumya, J.B. Butcher, T.E. Johnson, S.H. Julius, and S.D. LeDuc. 2021. Forest riparian buffers reduce timber harvesting effects on stream temperature, but additional climate adaptation strategies are likely needed under future conditions. Journal of Water and Climate Change 12 (5): 1404–1419.https://doi.org/10.2166/wcc.2020.031

[85] Furniss, M.J., T.D. Roelofs, and C.S. Yee. 1991. Road construction and maintenance in Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society Special Publication 19:297-323.

[86] Williams, C.D. 1999. Summary of Scientific Findings on Roads and Aquatic Ecosystems. Primary Research and Analysis. Environmental Consultants, Medford, Or. 17 pp.

[87] Fissekis, A. and R. Hersh-Burdick. 2007. The physical characteristics of hyporheic Flow. Center for Watershed Sciences. University of California, Davis.

et al. 2009[88]). The hyporheic zone is the area under or beside a stream channel or floodplain that contributes water to the stream and supports cold water refugia for salmonid fish populations and is degraded by timber harvest.

Roads also degrade stream temperature. Roads along valley bottoms, next to streams cause loss of riparian vegetation and canopy cover which increases stream temperature. Higher stream temperature impacts aquatic life by raising stream temperatures above tolerable range for spawning and rearing, leading to disease, reduced metabolic efficiency, and shifts or losses in fish species assemblages (Beschta et al. 1987[89]; Hicks et al. 1991[90]).

D. Pool Frequency and Quality. INFISH RMO standard for pools is the number of pools per mile depending on the channel wetted width. For streams less than 10 feet wide, the requirement is 96 pools per mile, for streams from 10-20 feet wide, 56 pools per mile, and streams 25 feet wide, 47 pools per mile. Of the scant 48 reaches surveyed over the past 3+ decades, 35 failed to meet the INFISH standard, 11 met the standard, and 2 had no survey data.

Pool quantity and quality are critical habitat features that affect survival. Fish rely on pools, taking advantage of the cover provided for feeding and resting and benefitting from the cooler water temperatures in deeper waters. Where stream channels are degraded, riffles elongate and, in many cases, extend through former pool locations resulting in loss of pool volume and large stable debris for cover (Bisson and Seidel 1982)[91]. Both the quantity and quality of pools are important for fish survival and the lack of high-quality pool causes increased predation, reduced hiding cover, and low survival during high temperatures in summer and low temperatures in winter.

The Draft EA (p. 132) reports that "*The majority of streams within the project area fall well short of meeting management objectives of more than 96 pools per mile with no apparent trend in changing conditions (Table 82 Appendix E). Existing data show that only one reach in each of three streams within the project area meets or exceeds INFISH standards of more than 96 pools per mile: Dipping Vat Creek, Fox Canyon Creek and Roba Creek. North Fork Crooked River, with an average wetted width of 40 feet, meets INFISH standards. Survey data indicates an overall decreasing trend of pool quantity in the project area. Only one stream, Dipping Vat Creek shows an improving trend in pools per mile. Pool characteristics across the project area are generally shallow, exhibiting little habitat complexity. Average pool depth according to existing data is 0.78 feet*."

Despite the severe lack of data collection in the NFCR project area, the data shows that over 73% (35 of 48 stream reaches sampled in the project area over the last 30+ years) of the streams fail to meet the minimum INFISH standard. Since most of the data was collected more than 15 years ago, these conditions could have changed and may not reflect baseline conditions. Of the pools sampled in the same surveys less than 20% (9 of 48 reaches), were 1 foot in depth or greater while the remaining 81% of the reaches had pools less than 1 foot in depth. These are terrible conditions for endemic fish such as redband trout to survive.

The 2013 Fox Canyon Cluster AMP reported pool frequency declining in Fox Canyon Creek from 55 to 52 to 46 pools per mile in 2001, 2006, and 2011. The AMP further reported impacts from riparian harvest, illegal wood cutting and

[88] Wonzell, S., R. Haggerty, and M.N. Gooseff. 2009. Hyporheic Zones and Mountain Streams. Key Findings. USDA Forest Service. Aquatic Ecology and Management. Corvallis, OR. 5 pp.
[89] Beschta, R.L., R.E. Bilby, G.W. Brown, L.B. Holtby and T.D. Hofstra. 1987. Stream temperature and aquatic habitat: fisheries and forestry interactions. Pp. 191-232, In: Salo and Cundy, eds.
[90] Hicks et al. 1991. Ibid.
[91] Bisson, P.A. and J.R. Sedell. 1982. Salmonid populations in streams in clearcut vs. old-growth forests of western Washington. In: Timber Managem13nVFish Management Productivity, David W. Narver, Session Leader, B.C. Fish and Wildlife Branch, 780 Blanchard, Victoria, BC. V8R 2Y2.

the 4230-580 road. While the pool data was not in the document, the 2005 Westside Allotments AMP reported that most streams failed to meet pool frequency standards.

During base flows, many tributaries in the project area become limited in fish habitat and water availability in the summer and early fall. Redband trout retreat to limited pool habitat found in the streams. Fish can become isolated in the few deep pools that are fed by subsurface flows. These fish remain there until flows increase, die when food and oxygen are depleted, or are easily accessible to avian and mammalian predators.

E. Large Woody Debris. LWD is an important measure of habitat complexity for sediment retention, pool formation and bank stability on the ONF (Cordova 1995[92]; Stuart et al. 2007[93]). It is also an important feature in the physical and biological structure of a forested stream (McDade et al. 1990)[94]. The INFISH standard for LWD is >20 pieces per mile, >12-inch diameter, and >35-foot length.

Appendix E in the Draft EA reports that of the scant 48 reaches surveyed over 3 decades, only 31% (15) reaches met the minimum 20 pieces per mile while 17% (8) were below the standard while 52% (25) were not surveyed at all. The 2005 Westside Allotments did not provide data but reported that most streams failed to meet RMOs for LWD.

The Draft EA (p. 131-132) reports that "*Available data shows that 68% (17/25) of sampled stream reaches in the project area are meeting the INFISH standard of 20 pieces per mile (Table 82 Appendix E, Figure 18). Research has indicated that current management objectives for pieces of large wood per mile (e.g., >20 pieces per mile) may be too low and in managed watersheds the target should be set higher for the interim until wood loading can occur within the natural range of variability (Fox and Bolton 2007, Wohl et al. 2017a, Wohl et al. 2017b). Based on supporting literature (Montgomery et al. 1995, Beechie and Sibley 1997, Seixas et al. 2020) and professional observations for the project area, the minimum desired large wood frequency per mile in most streams is 80 pieces minimum to enable reaching other INFISH RMOs such as pool frequency*." The Broads concur that the INFISH standard for 20 pieces at 12-inch dbh (and greater than 35 feet long although is not reported in the Draft EA), is too low, 80 pieces is a good target but likely too low as well given past timber harvest in riparian areas that has depleted streams recruitment of LWD.

Higher native salmonid densities are found in streams with more LWD. LWD adds stream complexity and stability and provides habitat for a variety of species and age classes in aquatic and riparian communities (Lisle 2002)[95]. Most RHCAs on managed portions of ONF lands are deficient in LWD from past and present timber harvest. Roper et al. (2019)[96], compared managed versus unmanaged stream reaches on national forests in eastern Oregon and Washington, and Idaho and Montana, and found that wood frequency and volume, and pool frequencies all increased as the forested percent of the riparian zone increased.

Recommendation: Conduct a full field survey of streams for temperature and other RMO parameters. The extreme lack of data fails to meet NEPA compliance for assessing a baseline environmental condition from which to evaluate alternatives. Comply with federal law and provide detailed descriptions and analyses of RHCAs. Because portions of

[92] Cordova, J. 1995. Streamside forests, channel constraint, large woody debris characteristics, and pool morphology in low order streams, Blue Mountains, Oregon. M.S. Thesis. Oregon State University. Corvallis, OR.
[93] Stuart, A.S., D. Grover, T.K. Nelson, and S.L. Thiesfeld. 2007. Redband trout investigations in the Crooked River Basin. In Redband trout: resilience and challenge in a changing landscape. Oregon Chapter, American Fisheries Society, Corvallis. pp. 77-90.
[94] McDade, M.H., Swanson, F.J., McKee, W.A., Franklin, J.F., and Van Sickle, J. 1990. Source distances for coarse woody debris entering small streams in western Oregon and Washington. Can. J. For. Res. 20: 326–330.
[95] Lisle, T.E. 1982. Ibid.
[96] Roper, B.B., W.C. Saunders and J.V. Ojala. 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.

the NFCR watershed are impaired and stream reaches are degraded and fail to meet RMO standards, exclude commercial harvest and limit thinning and prescribed burning to site specific areas of RHCAs. Permanently close all roads possible in RHCAs and reduce road densities to meet LRMP standards. Any thinning treatments in RHCAs should be done by hand, and no temporary roads, mechanical treatments, heavy equipment, or removal of wood allowed. Thinning activities must be only done in very site-specific limited areas with a comprehensive plan and areas must be blocked or excluded from livestock grazing.

Impacts of the NFCR Project to Redband Trout and other Aquatic Species

Redband trout is listed as a federal and state sensitive species, a "management indicator species" (MIS), at risk in the Crooked River Basin and will be negatively impacted by the NFCR project. Redband trout populations on the ONF are highly fragmented and are generally declining in abundance on ONF streams.

FSM 2672.41 is the Forest Service policy implementing the NFMA and establishes objectives and direction to ensure that actions on National Forest System lands do not contribute to trends toward Federal listing or loss of viability of any native or desired non-native species. Redband trout are on the Region 6 Regional Forester sensitive species list. They are also a "management indicator species" (MIS) for the ONF. MIS species were selected because their well-being is used as an indicator of other species dependent upon similar habitat conditions. Indicator species are used to assess the impacts of management actions on a wide range of other wildlife with similar habitat requirements. Their designation gives them essentially a "bellwether" status for other aquatic life in the basin.

The principal reasons for redband trout as a state and federal sensitive species is due to habitat loss, fragmentation of current habitat, isolation of existing populations, and hybridization with coastal rainbow trout and cutthroat trout. In 2014, a Rangewide Conservation Agreement was signed by 6 states, 4 federal agencies (including the US Forest Service), one non-governmental organization and 5 tribal governments. The intent of the Conservation Agreement is to protect and conserve native redband trout, reduce potential threats to the species, and potentially preclude future needs for listing under the ESA as threatened or endangered.

While the species as a whole is sensitive, Crooked River redband trout are particularly sensitive to further habitat degradation due to loss of functional habitat throughout much of the Crooked River Basin (Stuart et al. 2007). Because redband trout are extremely depressed or absent in streams on much of the private lands in the Crooked River Basin due to irrigation withdrawal and fragmentation of fish populations by dams and impoundments, remaining populations on the forest are the last stronghold for the species survival in the basin despite generally poor to fair habitat conditions. Stuart et al. (2007) found that most Crooked River redband trout populations are highly fragmented, many of which are isolated from each other. Streams with low population abundance, marginal habitat and low exchange of genetic material have a high risk of extinction (Rieman and McIntyre 1993).

Deep Creek, a tributary upstream of the NFCR project area, has perennial flows and cooler temperatures and is one of the few strongholds left having a reasonably contiguous population of redband trout. Deep Creek likely provides important spawning and rearing habitat for fish in the North Fork Crooked River since much of the North Fork becomes far too warm to sustain redband trout and is unsuitable for spawning and rearing when temperatures exceed 18 C.

Surveys conducted jointly by ODFW and ONF personnel in the 1990s indicated that while redband trout were present in watersheds or areas of watersheds that represented 45% of the Crooked River basin, relatively strong populations were located in only 7% of the basin, primarily in small headwater streams on ONF lands and in short reaches of the mainstem Crooked River below Bowman Dam and above Lake Billy Chinook (Stuart et al. 2007). However,

habitat conditions on ONF lands indicated that many streams were in poor condition with high summer water temperatures, suboptimal shading, and lack of large wood, due to past and present land management activities.

Stuart et al. (2007) reported that many streams on the ONF had high temperatures. Their results indicate that redband trout are highly susceptible to increasing water temperatures. Figure 2 (from Stuart et al. 2007, Figure 7) demonstrates the swift decline in redband trout abundance as stream temperatures increase, one of the parameters for redband survival and persistence.

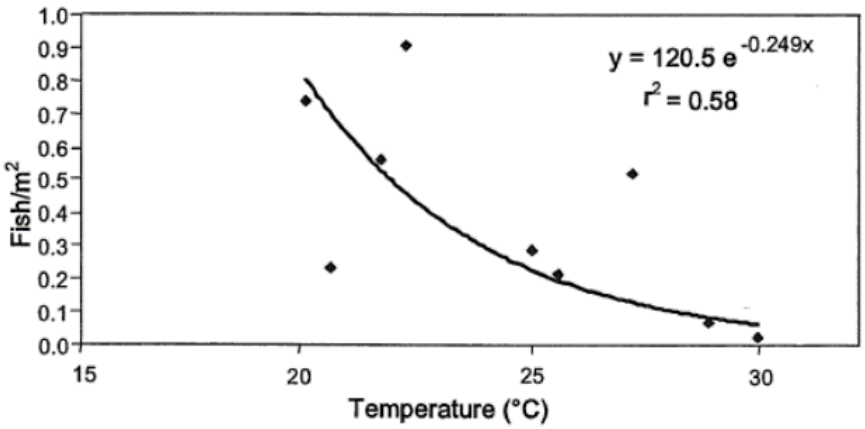

FIGURE 7.—Relationship between density (fish/m^2) of redband trout (all age classes) and maximum water temperatures (°C) in small streams of the Crooked River basin, 1994–1995.

Figure 2. Relative abundance of redband trout declines many fold as stream temperatures increase (from Stuart et al. 2007).

Changes in stream temperatures are caused by the construction and maintenance of roads. Roads directly affect natural sediment and hydrologic regimes by altering streamflows, interrupting hillslope drainage patterns, and altering the magnitude of peak flows and lowers base stream discharge (Furniss et al. 1991). Loss of riparian cover from roads and timber harvest and thinning alter stream temperatures by reducing shade.

Redband trout abundance surveys were conducted on Brush, Porter and Roba creeks and correlated with habitat conditions (Dambacher and Jones 2007). Brush Creek with lower water temperatures, low intensity of cattle grazing, and low intensity of timber harvest had the highest fish densities while Porter and Roba creeks successively had lower fish densities that correlated with higher water temperatures, high levels of livestock grazing, and moderate to high levels of timber harvest and road density. Although the available habitat for redband trout in the three streams differed by no more than a factor of 1.6, there was a 20-fold difference in the density of fish, and age 1+ fish in Brush Creek were significantly higher. Essentially, progressively more management activities led to degraded fish habitat and redband trout population declines.

Further redband trout surveys done by ODFW in more recent years on the ONF shows that many redband trout populations are continuing to decline. The Summit OHV project reported redband trout abundance trends on Deep Creek and its tributaries. The Supplemental FEIS (p. 194) states that "*Some of the perennial streams that have been identified by Forest fish biologists and the Oregon Department of Fish and Wildlife to be critical refuges for redband trout in the Deep Creek Watershed are Deep Creek, Little Summit Creek, Happy Camp Creek and Double Corral Creek. However, many of these systems have been impacted by past management and are not as effective as they once were*

in sustaining redband trout. ODFW estimates that these systems are occupied at approximately 10% of historic levels. In addition to redband trout, Columbia spotted frogs are present throughout the area."

Surveys documented declining trends of redband trout abundance for numerous streams on the ONF. For example, all 3 reaches surveyed by ODFW from 1997 to 2012 showed 2 to 5-fold declines in abundance in Deep Creek. In addition, many Crooked River redband trout populations are highly fragmented by dams and low flows. Even streams that are separated by only a few miles on the landscape such as Roba, Dry Paulina, and Hewed Log are disconnected from the North Fork Crooked River and Fox Canyon creeks. These disconnected populations cannot move freely and places small populations at risk of extinction from continued poor habitat conditions, high stream temperatures, low flows, and continued management activities that imperil these fish.

Recommendation: Select Alternative 1. Failing that, adopt our recommended Bitterbrush Broads and Bros alternative that reduces the project in scope and scale to less than 50% of the proposed action, do not cut trees in RHCAs especially commercial harvest and if any, very limited thinning in site specific locations, fence out or remove livestock. Conduct a full evaluation of streams for temperature and RMO parameters to obtain adequate baseline data and implement monitoring as promised in many planning documents. Comply with federal law and provide detailed descriptions, data, and analyses of RHCAs and RMOS.

Insufficient Environmental Baseline and Lack of Data Collection

All projects that the Broads have reviewed and commented on in the past for ONF planning documents have had a Hydrology and Aquatics Report separate from the Draft EA that provides additional information. There was no Hydrology and Aquatics Report provided for the NFRC project.

Appendix C-1 provides an extensive list of proposed treatment units with acres but there is no map to explain where the units are located. Without a map and context or explanation of where the units are located, how is the public supposed to know where these activities will occur? Are these units located in RHCA and if so what category stream and how close are the prescriptions applied? Are large trees that will be harvested located inside or outside LOS? This list is useless without providing a map and context of where the prescription units are located in the project area.

There is a general lack of RMO data to provide a baseline and much of it is outdated and more than 10 years old. Appendix E in the Draft EA summarizes past stream survey data the FS has collected within the project area. Only 4 stream reaches out of the 48 reaches that were surveyed in the past 30 years were collected in the past 3-5 years. And of those, most of the RMOs fail to meet standards or no data was collected. This fails to satisfy both NEPA's hard look at the environmental baseline, but also is damning in demonstrating how "current management" is failing to meet RMOs. In the 1990s and 2000s, 32 of 48 stream reaches were surveyed and 16 reaches from 2009-2020. Within the last 5 years only 4 of the 48 stream reaches, or 8% of total stream reach surveys, had information on "baseline conditions" for riparian areas and streams in the project area.

The NFCR Draft EA (p. 129) states that "*Temperature data was summarized from the only long-term deployed data logger in the project area located in the lower North Fork Crooked River, downstream of the confluence with Deep Creek (the main cold-water input tributary). It is deployed high up in the project area. Due to a lack of data from other reaches and streams within the project area, these data were extrapolated to represent the whole project area. Figure 16 summarizes available data from 2005 to present. Water temperature has not met INFISH standards in any of the years of available data*." The Draft EA (p. 137) further acknowledges that "I*t is recognized that not all data are reflective of current management (last 3-5 years). For some of the stream systems there are data from the early 1990s and 2000s which has been compared to recently collected data (2009-2020). Using this, assessments of current*

conditions and trends in habitat are assumed to be reflective of management action effectiveness. Evaluation of streams with only recent data was compared to RMOs to determine habitat conditions as long-term trends could not be determined. Extrapolations will be made from currently collected data across the entire project since data was not collected on every stream".

The Draft EA has a severe lack of baseline data on critical water and habitat parameters and the document draws sweeping conclusions based on a paucity of data, mostly outdated. Only one set of stream temperature data was reported for the entire project and that was for the North Fork Crooked River. The Draft EA (p. 130, Fig. 16) has a graphical summary of stream temperature of the designated Wild and Scenic River at one location. This single point of temperature data collection shows a river severely degraded that fails to meet state water quality standards (Figure 3).

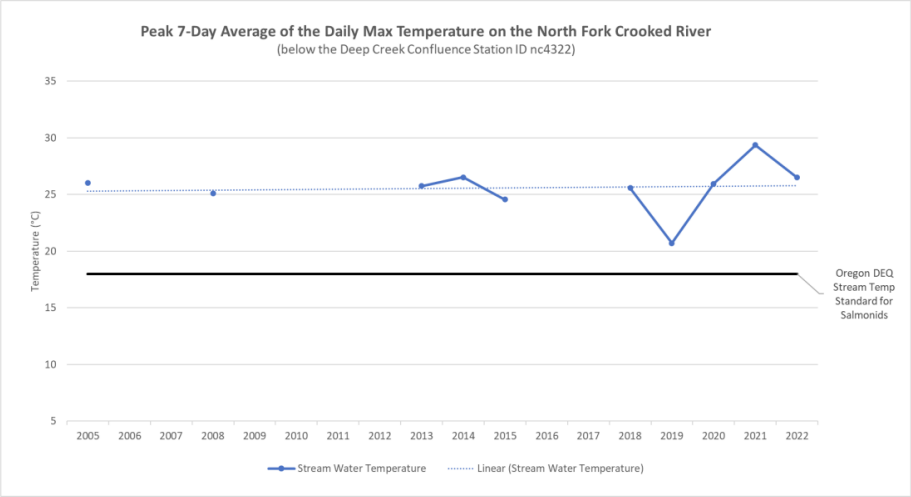

Figure 16. Available stream temperature data from the only long-term deployed data logger in the project area located in the lower North Fork Crooked River, just downstream of the confluence with Deep Creek.

Figure 3. This is the only data collected on stream temperature for the entire project area. It graphically shows the extreme failure to meet state temperature standards.

Ironically, the Broads found some data reported in dated allotment management plans (AMPs) that share some information on stream temperatures in the NFCR project area that was not reported in the NFCR Draft EA. The 2013 Final EIS for the Fox Canyon Clusters AMP reported a water temperature for Fox Canyon Creek of 27.3 C (81.1 F) in 1999. The 2005 Westside Allotments AMP and EA reported stream temperatures for Dry Paulina, Dippingvat and Roba creeks and the North Fork Crooked River sporadically from 1994 to 2004. While tributary temperatures were in the low to mid 70s, the NFCR was similar to the Draft EA temperature reported, ranging from 25.8 C (78.4) to 28.5 C (83.3 F), again well exceeding the state temperature standards.

In addition to the general lack of historical and current data, and trends, we could not find in the Draft EA or Wildlife Report any descriptions, locations, or detailed analysis of the RHCAs and Class I-IV streams and how the proposed treatments will move streams toward attainment of the RMOs in each of the 4 classes of RHCAs. The platitudes and misleading statements about logging conifers to rejuvenate hardwoods and the alleged reduced road densities (which will increase as a result of the project) fail to meet standard scientific analyses. The public cannot fully review and assess the ONF's proposed management activities and impacts to RHCAs, steams and aquatic species without full disclosure of important project information that should be available in the Draft EA and specialist reports.

To comply with NEPA's "hard look", the ONF must collect, maintain, and disclose information about the resources it manages so that an adequate baseline exists to evaluate the environmental impacts of a proposed action. Without

an adequate baseline condition in the Project area before the action begins there is no way to comply with NEPA requirements and determine what effect the project will have on the environment.

Furthermore, the ONF has made false promises in other projects to conduct monitoring data to track the effectiveness of management activities. For example, the 2005 FEIS for the Westside Allotments AMP and EA states the following "*Monitoring Requirements Specific to Alternative 2*" (the selected Alternative) will be conducted by the ONF:

Fisheries/Hydrology
1. The Forest Service would monitor stream temperature conditions within each allotment (6th field HUC/subwatershed), in addition to specific streams currently on the Oregon Department of Environmental Quality 303 (d) list of impaired waterbodies (effectiveness monitoring). Trends attributable to livestock grazing would be expected after a period of 3 – 15 years for properly functioning and functioning-at-risk streams, and >15 years for non-functioning sites to allow for adequate recovery. This period is believed to be sufficient to ascertain the effects of livestock grazing in the face of climatic variability.
2. The Forest Service would establish permanent effectiveness monitoring sites (e.g., channel cross–sections, longitudinal profiles, pebble counts) on selected streams throughout the project area to determine the condition and trend of channel morphology, by channel type, as affected by livestock grazing (effectiveness monitoring). Trends attributable to livestock grazing would be expected after a period of 3 – 15 years for properly functioning and functioning-at-risk streams, and >15 years for non-functioning sites to allow for adequate recovery. This period is believed to be sufficient to ascertain the effects of livestock grazing in the face of climatic variability.
3. The Forest Service would conduct monitoring at reference sites, by channel type, to determine the rate at which stream channels are moving toward attainment of Riparian Management Objectives (RMOs).
4. Forest Service Regional stream surveys (Level II, Bottom Line Surveys) would be conducted in selected streams throughout the project area. This information would help to describe the quantity and quality of fisheries habitat.
5. The Forest Service would monitor streambank alteration annually to determine the level of physical alteration along the streambank in the current grazing season using the "BLM method" (implementation monitoring).

WHERE IS THE PROMISED MONITORING DATA SINCE IT WAS PROMISED IN 2005 BY THE WESTSIDE ALLOTMENTS AMP? Since the EA and AMP were released in 2005, there has been almost 2 decades of NOT collecting monitoring data that would have been applicable for both managing livestock and providing a baseline of stream and riparian habitat parameters. How is the public supposed to trust an agency that makes commitments and fails to follow through? The ONF has been working on the NFCR project for at least 4 years and failed to gather any new pertinent information that would explain baseline conditions and trends to compare project impacts between alternatives.

Recommendations: Start over, conduct stream and habitat surveys that provide current baseline information for streams in the project area. There is virtually no current stream and riparian inventory survey data for this project. Conduct an EIS and provide maps, data, analyses to identify the CURRENT baseline environmental conditions and TRENDS, and the impacts of the proposed project to meet NEPA requirements for a hard look.

Modifying RHCAs

Similar to the recent Black Mountain and Mill Creek projects, it appears that the FS is again modifying INFISH widths by distinguishing between an "outer" and "inner" vegetation zone. The 1989 LRMP states that approximately 50% of the total stream miles in the Forest were in a degraded condition, with problems of turbidity and temperature chiefly from grazing, timber harvest and road building. The Forest Plan set standards for temperature and shade. When the 1995 INFISH amended the LRMP, it set standards for RMOs and established RHCAs and buffer width along streams and around springs, seeps, wetlands, lakes, and ponds to protect the integrity of aquatic resources. Essentially,

INFISH RHCA widths apply unless and until a watershed analysis is completed to provide an ecological basis for increasing or decreasing widths to achieve riparian management goals and objectives and those widths may only be modified in the absence of watershed analysis only where stream reach, or site-specific data support the change.

The Draft EA (p. 13) states that "*Thinning in riparian habitat conservation areas will include site-specific prescriptions where commercial thinning is proposed in Category 1 and 2 RHCAs (i.e., fish-bearing streams and perennial non-fish bearing streams). Prescriptions will be developed based on slope, aspect, stream condition, soil condition, existing vegetation, large woody material, and other factors at each Category 1 or 2 site*". This appears to alter the mandatory buffer widths of INFISH. The Draft EA has not gone through the required INFISH procedures to alter these buffers. The Draft EA fails to clarify the width of INFISH RHCA buffers that will be applied to the various stream categories (1-4) in the Project area and fails to meet NEPAs requirement for disclosure of environmental impacts. The Final EA must reinstate the mandatory INFISH RHCA on Category 1–4 waterbodies.

"Resource Protection Measures" for aquatic resources described in Appendix B-1 are minimal and will fail to protect riparian areas and streams from harvest, mechanical damage, and thinning activities, and violate INFISH. For example, one measure for Water Quality and Aquatics: Protect water quality and fish habitat is "*Apply RHCA specific guidelines for units with hillslopes between 0-20%. Where hillslopes >20% within 0-50 feet of a channel occur, mechanized ground equipment restrictions would extend to a break in slope or 50 feet from the channel*". This nominal resource protection measure of a 50-foot buffer fails to protect aquatic resources and clearly violates INFISH. As we noted on p. 25 of our comments, 100-foot buffers are the most minimal while 300-foot buffers provide the best protection for riparian habitats and aquatic species.

Furthermore, 3 locations in the Draft EA (p. 4, 140, 194) state that there are resource protection measures to protect springs, but Appendix B-1 (resource protection measures) has no statement regarding protecting springs. Where are resource protection measures for streams, wetlands, and seeps?

We also note that the Draft EA fails to meet LRMP and INFISH TM-1 for fuels treatments in riparian areas since the Draft EA appears to modify RHCA widths for logging without adequate explanation for the change. INFISH sets RHCA widths to provide stream shading, restore banks and channel widths, and protect waterbodies from sediment and other environmental damage. Buffers provide protection from these harms. Yet, the Draft EA reports that vegetation management activities are proposed in all four categories of RHCAs but does not state what buffer width are applied.

We also believe that the alleged risk of wildfire in RHCAs does not warrant substantial harvest and thinning. The Draft EA (p. 41) reports that there is a lack of modeled differences between Alternatives 2 and 3 in fire behavior. Furthermore, the LRMP Standards and Guidelines for fuels treatments is that fuel treatment (especially via mechanical means) should be very limited and that greater levels of wildfire risk are acceptable in these areas.

Recommendations: Conduct an EIS, conduct adequate baseline monitoring and public disclosure for all RMOs, and implement a reduced project with no harvest and roads in RHCAs, no additional new or temporary roads, and physically close roads to meet forest LRMP standards for road densities.

Limit the Spread of Invasive and Noxious Weeds

One of the greatest threats to public lands and native fish and wildlife species and their habitats is the spread of exotic and noxious weeds. Invasive and noxious weeds often colonize disturbed sites where native vegetation has

been disturbed, reduced, or removed. Executive Order 13112[97] directs federal agencies to reduce the spread of invasive plants, which is one of the four major threats to ecosystem health.

The Draft EA (p.109) reports that "*There are approximately 2,152 gross acres of documented weed infestations in the project area (Table 45). These infestations primarily infest the roadsides and scablands in the project area. Riparian plant communities in the project area have been infested by primarily houndstongue with several other invasive species. Treatment and control options for species in riparian areas are limited due to the difficulty of terrain and access, proximity to water, and the large extent of infestations*".

All action alternatives in the project area, including timber harvest, thinning, prescribed burning, road reconstruction, temporary roads, livestock grazing, and other activities, have a high potential for introducing and spreading exotic weeds, including species that are already present or bringing in new weed species. This can occur on upland sites and meadow, riparian, and wetland sites. While the Draft EA proposes some resource protection measures, all action alternatives in the project have a high risk of introducing and/or spreading exotic and invasive species to important habitats in violation of the Executive Order above.

The Draft Report (p. 111) reports that "*There would be no activities and, therefore, no direct or indirect effects that would change the existing condition. Non-native invasive species would continue to persist at their current rates and could increase through natural means of spread (animals, wind, water) or by humans (vehicles, OHVs, road maintenance*)"…"*Because the no action alternative does not propose entry into recently disturbed areas and no additional ground disturbance related to this project, the risk of introduction, spread, establishment, and persistence for invasive species in the project area would be the lowest of all alternatives*".

The introduction and spread of nonnative noxious weeds increases substantially in both action alternatives, especially due to the proposed treatment of most forested acres and some non-forested areas.

Recommendation: *The best choice is Alternative 1 and not do the project to comply with Executive Order 13112. However, the ONF will likely move forward with the project despite the damage it will do to other resources. Therefore, reduce the scope and scale of this project and implement our Bitterbrush Broads and Bros alternative with a more reasonable project size and pursue aggressive approaches to limit the introduction and spread of invasive noxious weed species.*

Livestock Grazing Impacts

The Draft EA has numerous statements of the negative impacts of livestock grazing on riparian areas, bank stability, instream habitat, loss of shade, increased temperature, and overall stream condition. For example, the Draft EA (p. 159) states that "*Cattle may have caused shifts in plant species composition and abundance through selection of more palatable forage species. This reduction of plant or shrub abundance may reduce riparian vegetative condition along stream banks along with livestock hoof shear on steam banks may affect bank stability provided by a robust riparian hardwood community. This effect in turn may result in an increase in sediment input that has been shown to result in a reduction in pool depth over time."* The Draft EA (p. 128) notes *that "Historically, Redband trout may have occupied more aquatic habitat within the NFCR project area than presently. Road densities, livestock grazing, timber harvest, and mining have contributed to a reduction in suitable habitat and increased fish passage barriers".*

Despite acknowledging livestock grazing as one of the major causes of degraded riparian areas, the ONF fails to change livestock grazing to attain INFISH standards and guidelines, which is a key purpose and need of the project. In

[97] Clinton, W. 1999. Executive Order 13122, February 3, 1999. Agencies to reduce the spread of invasive plants.

fact, the Draft EA reported (p. 134) that in a 2005 assessment of the North Fork Crooked River, the only section that was functioning at risk/ properly functioning with an improving trend was a section closed from grazing in 2005.

Recommendation: To restore the degraded state of riparian areas and streams across the project area, the ONF must confront and address livestock grazing as a critical negative impact on the NFCR area.

Cumulative Effects

The scope of the cumulative effects analysis of the NFCR is generally limited just to the project area. The Draft EA (p. 18) notes that "*The geographic scope for direct, indirect and cumulative effects is the project area*." Given the large number of recent landscape level projects across the ONF, the cumulative effects analysis needs to evaluate a much larger scale both in the forest and beyond. These projects affect migration routes, connectivity corridors, riparian and stream disturbances, wildlife disturbance, and human activities.

The Draft EA also makes contradictory statements. For example, the Draft EA oddly fragments cumulative effects analyses into each resource area which disregards how connected actions are interrelated and one resource affect others. The Draft EA (p. 2) states that opening forests with timber harvest will expand grasslands but then in a contradictory statement says the "Because there are no other proposed actions in the project area that could have an effect on, there would be no cumulative effect from this alternative." However, these activities are designed to affect ecosystem processes and landscapes using timber harvest. Cumulative effects of past and present timber harvest, livestock grazing, and roads have created the cumulative impact of degraded streams and riparian areas, disconnected and fragmented fish and wildlife populations, and reduced productivity of native species. These management activities do not operate in a vacuum but interact and cumulatively cause greater harm than each one would independently.

The premise used in the analyses of each alternative is that the NFCR project has dense overstocked stands of mixed conifer that are causing changes in the hydrology of the area, causing incised channels with lower base flows and higher peak flows. While "legacy" fire suppression, timber harvest, and livestock grazing is acknowledged as a contributing factor for poor stream health and fish populations, the analyses largely claim that the current degradation is ongoing due to changes in forest stand composition and density. In fact, much of the stream degradation is directly attributable to high road densities, past timber harvest, and past and present livestock grazing and is clearly a cumulative and harmful effect.

Timber harvest throughout the ONF has occurred for over 100 years with significant increases in harvest starting in the 1940s to 1960s (McCallister 2011). The Draft EA (p. 96) acknowledges that "*Past management in the analysis area, including timber harvest, livestock use, beaver removal in riparian systems, the 1964 flood, stream channeling, fire suppression, wildfires, and road construction all have resulted in areas of degraded riparian conditions and altered hydrologic regimes, shifted competition between species, and changed canopy closure*".

As stated earlier, Dambacher and Jones (2007) reported that less managed areas of the ONF has streams in good condition and support higher populations of redband trout while areas with more management had severely degraded streams with low trout abundance. These are consequences of cumulative effects that have tragically harmed native fish populations.

The proposed NFCR project is similar to many of the recently implemented, ongoing and future "vegetation management" projects such as Black Mountain, Gap, Spears, Jackson, Howard Elliot Johnson, Deep, and Wolf (Figure 4). In the past 10 years, the Gap, Spears, Jackson, Howard Elliot Johnson, and Wolf projects have "treated" over 115,000 acres, the Black Mountain project will "treat" over 15,110 acres, while 23,225 acres are proposed for

"treatment" in the Mill Creek project. These projects total over 153,00 acres. Wildfires such as the Bailey Butte, Hash Rock, Ochoco Complex, and Bailey Butte have impacted another 30,000 acres. These are very large landscape changes that affect numerous wildlife species and their habitats, especially big game including elk and mule deer that use different habitats.

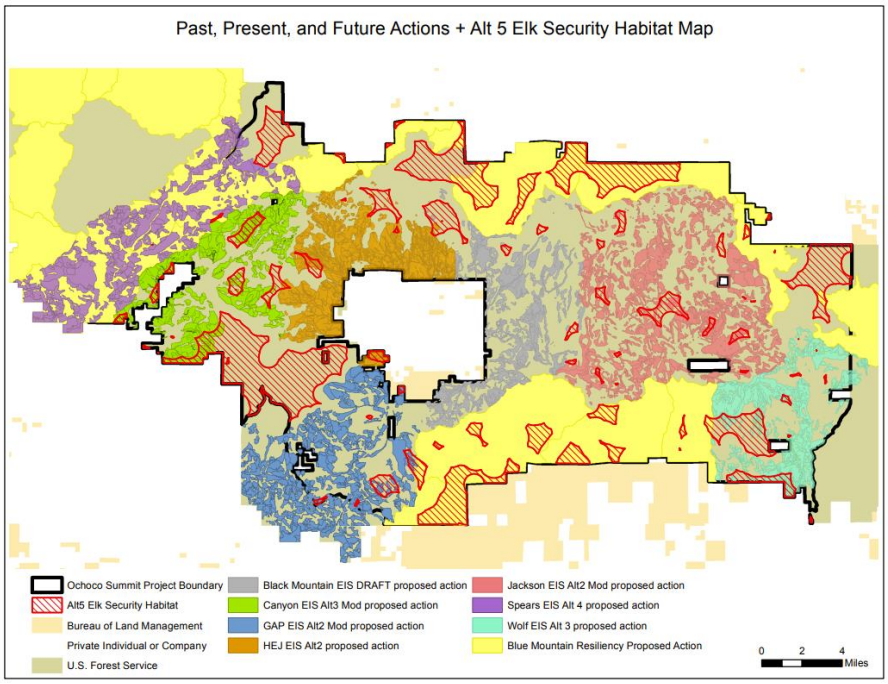

Figure 4. Landscape level projects completed or in progress near the NFCR project area. The area denoted in yellow in the upper left corner is the Mill Creek Project (Draft EA released August 2023) while the area in the lower center in yellow is the NFCR project area.

Further exacerbating the problem, rather than implementing road closures and moving toward the LRMP standards of lower road densities, there is a gradual acceptance that the current situation is normal and acceptable. The ONF fails to meet standards and guidelines required in various plans including the 1989 LRMP and INFISH. With proposed timber harvest and associated roads, the ONF management activities continue to harm aquatic and wildlife habitats.

Cumulative effects from past and present projects have compromised streams causing high summer temperatures that fail state water quality standards, low base summer flows in streams, and incised channels disconnected with floodplains. Other harms are low pool frequency, cutbanks that exceed the 20% standard, and shade that fails to meet the 80% standard for forested areas.

In order to adequately demonstrate and understand a cumulative effects analysis, the Broads request a detailed map of all of the vegetation management projects in the past 20 years of the entire ONF to show how much "vegetation treatment" management activity has occurred in these watersheds. We request that the map include areas delineating timber harvest, thinning and prescribed burning units for all vegetation management projects including Gap, Spears, Jackson, Howard Elliot Johnson, Deep, Black Mountain, Wolf, Black Mountain and Mill Creek, areas proposed for future management (e.g., North Fork Crooked River) and areas burned by wildfire to understand how this project fits with past, present, and planned actions.

The Ninth Circuit consistently has stated that to adequately consider cumulative effects, some quantified or detailed information is required. Without such information, neither the courts nor the public, in reviewing the Forest Service's decisions, can be assured that the Forest Service provided the hard look that NEPA requires.

In this case, proclaiming that streams are impaired due to conifers growing in the floodplain is like putting the cart before the horse. Streams are degraded and downcut and have lost contact with floodplain zones due to past and ongoing cumulative management impacts. Some conifers have grown in floodplains that are left high and dry from lack of connectivity with streams due to incised channels from these harmful practices. However, in other less managed areas in the forest such as roadless and wilderness areas, conifers grow compatibly with riparian shrubs and trees, streams are connected with the floodplain, and conifers are part of the diverse community of species.

Without reducing road densities and improved management of cattle (e.g., significant fencing of riparian areas), reducing or cessation of livestock numbers and duration of grazing, restoration, "restoration" activities such as wood placement and floodplain reconnection will provide relatively short duration improvements. Without making changes in management practices that cause the degradation, these will be Band-Aids that look effective for a limited period of time but will ultimately fail because causal factors have not been addressed.

Recommendation: Cumulative effects analyses must be done for the appropriate and relevant area for each resource. In many cases, the Draft EA simply uses the project area which is arbitrary and inadequate for multiple modeling analyses including HRV, livestock grazing, HEI, EHA, and road densities. Limit and effectively manage the causative factors (e.g., timber harvest, livestock grazing, road densities) that have caused degradations.

Impacts to Elk

There will be significant loss to big game cover with implementation of any of the action alternatives in an area that already is limited by forested stands that provide sufficient cover. Almost half of the project area is open scablands. This project will significantly degrade elk habitat and move elk to exterior boundaries of the forest, and off forest onto private lands during the spring and summer when elk are normally on the forest, calving and rearing young. In the past, big game typically summered on the forest and moved downslope to winter range that is primarily on private land that circles the forest at lower elevations. Most private landowners tolerate current winter elk use, but increased management activities in the forest have caused an increase in use of private lands during the spring and summer, when big game wildlife species were historically in the forest. This in turn has caused ODFW to significantly reduce ODFW's management objectives for big game species and hunting opportunity and associated economic benefits. The Draft EA (p. 69) states that managing healthy, stable elk populations is a cooperative effort between the ONF and ODFW, with the ONF responsible for the management of habitat, and with explicit direction in the LRMP to "*manage elk and deer habitat to meet the population objectives of the ODFW to the extent practicable."*

The Draft EA fails to identify and analyze elk habitat, particularly for reproduction including rutting, wallowing, and calving areas. Elk numbers in the Ochoco Wildlife Management Unit including the project area are already below Oregon Department of Fish and Wildlife's (ODFW) management objectives. All the action alternatives will further impact elk with loss of significant hiding and thermal cover.

The ONF fails to execute the National Forest Management Act (NFMA) and the 1989 Land and Resource Management Plan Standards and Guidelines by not surveying for calving and wallows sites prior to implementation of the Mill Creek Project. The applicable ONF LRMP Standard and Guideline for Rocky Mountain Elk and Mule Deer (LRMP 4-246) states: "*Protect the character of elk calving sites. Minimize disturbance from human activity during calving season (approximately May 15 to June 30). Also protect wallows during rutting season (September 1 to October 15)."*

While the Draft EA states part of the purpose and need for the project is to improve habitat security for big game species. However, the ONF failed to collect important data required to establish an accurate baseline on current conditions for special elk habitat.

Then the Draft EA (p. 74) states that "*Activities proposed in Alternatives 2 and 3 would protect and enhance the character of riparian areas where calving and fawning are likely to occur. Commercial thinning, noncommercial thinning, and prescribed fire would improve forage and browse conditions by reducing tree density and canopy cover which would provide more growing space, sunlight, water and nutrients for aspen, other hardwoods (e.g., willows, alder), riparian vegetation, forbs, shrubs, and grasses*". We fail to understand how an area that is almost half forest and half open scablands that generally lacks cover will benefit from increased disturbances, higher road densities (see discussion on Transportation, Road System and Densities above), and less cover. The assumption that elk habitat will improve is largely based on reducing road densities which the ONF has a long history of failing to do so.

As stated in the Transportation, Road System and Densities section, the analyses is deeply flawed, and the project actually increases road densities that already violate LRMP standards. The analyses for HEI and elk security habitat makes huge assumption regarding roads, fails to account for closed roads that are driven, the net increase of roads is over 40 miles for each action alternative, and the analyses relies on all closed roads to be physically closed while acknowledging the ONF can barely maintain ML roads 3-5 with a limited road maintenance budget. Once again, there is a failed leap of logic from data to analyses to conclusions.

The LRMP Standard and Guideline is clear about protecting elk reproductive sites during spring and fall seasons. The court decision from Judge Hernandez for the past Ochoco Summit OHV Project confirms that more data regarding the location of elk calving sites and wallows must be collected and considered. We recommend the ONF be more proactive and protect these reproductive sites. The Project area is limited in suitable calving and wallow areas due to the extensive road system in the area. Generally, all riparian areas, aspen stands, spring, and seeps are logical calving and wallow sites and can be easily inventoried and avoided, and do not change annually. The Draft EA fails to comply with the LRMP and must take a "hard look" at LRMP standards as required by NEPA.

Research strongly suggests that cow elk have site fidelity for previous used calving locations. As such, calf birthing is likely to occur across the project area. Survival rates for cows and calves disturbed during the neonatal period are significantly reduced and may take up to two years of no disturbance to rebound (Phillips and William 2000[98], Shively et al. 2005[99]). As elk are an ONF MIS species and the ONF has committed to help ODFW meet its current MO's, it stands to reason that the elk's reproductive cycles in the project area are important.

Further, the ONF states that the HEI model is estimated to improve habitat which we find extremely questionable. HEI is based on a combination of cover and road densities and the ONF has been generally unsuccessful at not only physically closing roads but keeping them closed. In addition, HEI relies on a flawed analysis of road densities. The project will treat over 11,000+ acres with harvest, thinning and burning on most forested acres of the project area along with almost 40 additional miles of ML2 and temporary roads. HEI can only decline with reduced cover and a higher road density.

The Draft EA inadequately analyzes how current cattle allotments impact special elk habitats, including specific locations for calving and rutting in the Project area. The project area is entirely covered by several grazing allotments.

[98] Phillips, G.E. and A.W. William. 2000. Reproductive success of elk following disturbance by humans during calving season. The Journal of Wildlife Management. 64(2): 521-530.

[99] Shively, K.J.; A.W. Alldredge, and G.E. Phillips. 2005. Elk reproductive response to removal of calving season disturbance by humans. The Journal of Wildlife Management. 69(3): 1073-1080.

The Draft EA acknowledges that "*The use of high-quality calving and fawning habitat may also be impacted by the presence of livestock within the project area as social avoidance of livestock by big game is well-documented.*". To comply with LRMP standards, ONF must conduct a specific analysis on when and where cattle allotments interact with specific elk calving and rutting sites, as this has a direct impact on elks' ability to effectively use this habitat, and the specifics on how elk are impacted by the Project alternatives.

Recommendation: The ONF must survey potential areas for elk calving sites and wallow areas which can be significantly narrowed by habitat types such as riparian areas, wetlands, aspens, springs, and seeps. Surveys of all potential calving and wallow sites must be completed a year ahead of the Final environmental analysis and decision. Surveys must occur during the calving and rutting periods. All project units found to contain calving and wallow sites must be removed from the project and not subject to implementation. Roads must be seasonally closed that are within 0.5 miles of elk calving and wallow sites.

Wildfire

Like previous projects such as Wolf, Black Mountain, Mill Creek and now the NFCR project, the ONF uses the threat of wildfire to promote the latest paradigm on why "restoration" and "management" are needed to bring resilience to public lands. However, new science has emerged on the importance of a variety of wildfires from low severity at frequent intervals to mid severity and occasional high severity fires. The FS failed to incorporate new science that promotes not just low severity but occasionally moderate and high severity wildfires as part of the landscape. It is past time for the ONF to t ignore and disparage the best available science that recognizes that a variety of wildfire severity is part of the ecosystem mix. Though modern fire suppression efforts may have reduced the spread of some wildfires, it has not reduced the occurrence of the 1% of large and extreme wildfires that are responsible for 90% of the total damage caused by wildfires. The increased stand density is alleged to drive wildfires. However, abundant fuels will not drive large blazes until there are the right climate-weather conditions which include severe drought, low humidity, high temperatures, and, most importantly, high winds.

Not all wildfires as the Draft EA implies are bad and in fact have important ecosystem functions for restoration and wildlife habitats (Hutto et al. 2016[100], DellaSala 2020[101], Harmon et al. 2022[102]). For example, Hutto et al. (2016)[103] reported that "*First, many plant and animal species use, and have sometimes evolved to depend on, severely burned forest conditions for their persistence. Second, evidence from fire history studies also suggests that a complex mosaic of severely burned conifer patches was common historically in the West. Third, to maintain ecological integrity in forests born of mixed-severity fire, land managers will have to accept some severe fire and maintain the integrity of its aftermath. Lastly, public education messages surrounding fire could be modified so that people better understand, and support management designed to maintain ecologically appropriate sizes and distributions of severe fire and the complex early seral forest conditions it creates*."

DellaSala (2020)[104] reports that "*In our region, and much of the West, wildfires burn in a mixed pattern of severity effects on plant communities. The largest wildfires are not uniform conflagrations – rather they burn in a mosaic*

[100] Hutto, R. L., R. E. Keane, R. L. Sherriff, C. T. Rota, L. A. Eby, and V. A. Saab. 2016. Toward a more ecologically informed view of severe forest fires. Ecosphere 7(2): e01255. 10.1002/ecs2.1255.
[101] DellaSala, D. 2020. Senate Interim Committee on Wildfire Prevention and Recovery. January 14, 2020, hearing and public testimony. Geos Institute. 40 pp.
[102] Harmon, M.E.; Hanson, C.T.; DellaSala, D.A. Combustion of aboveground wood from live trees in megafires, CA, USA. Forests 2022, 13, 391. https://doi.org/10.3390/f13030391.
[103] Hutto. 2016. Ibid.
[104] DellaSala. 2020. Ibid.

pattern of mixed severity effects (unburned, low, moderate, high severity burn patches). At the landscape scale, this pattern has been referred to as "pyrodiversity" and it is responsible for Oregon's extraordinary levels of biodiversity present in wildfire burn mosaics. Most notably, the high severity burn patches where most trees are killed (known as "complex early seral forests," snag forests, or charcoal forests are as bio-diverse as patches of old-growth forests."

DellaSala (2020)[105] also states that "*Active management is often proclaimed as a panacea for reducing wildfire-human conflicts, yet it is seldom even defined. Active management can mean just about anything – clearcut logging, salvage logging, high-grade logging, fuels reduction, prescribed fire, thinning, road building, etc. And while degraded forests like plantations can benefit from ecologically appropriate thinning and other restorative actions (snag creation, down logs, road obliteration, weed removals), in most cases thinning – even if done properly – will not encounter a fire during the short period (10-15 years) of when fuels are lowest.*

The Oregon landscape is so vast and efforts to spend billions of dollars on thinning are not likely to be effective nor will they make us safer. This is because we do not know exactly where wildfires will occur, and thinned forests will just grow back quickly in many cases. In fact, the largest empirical dataset ever assembled by researchers recently documented the low co-occurrence of wildfires and thinned sites. Some 99% of thousands of acres of fuels treatments on federal lands did not encounter a wildfire when fuels were lowest. Further, these same researchers found that despite the emphasis on the so-called WUI, codified in the Healthy Forest Restoration Act of 2003, most fuel treatments were being conducted outside this zone and in the backcountry where they will do nothing to protect homes." (DellaSala 2020)[106].

As pointed out above, wildfires produce far less carbon emissions than timber industrial forests (Figure 1). The more managed lands have a generally greater risk of fire severity. Bradley et al. (2016)[107] documented that climate change and extreme weather events combines with more heavily managed industrial forests to produce more mega wildfire events (Figure 5).

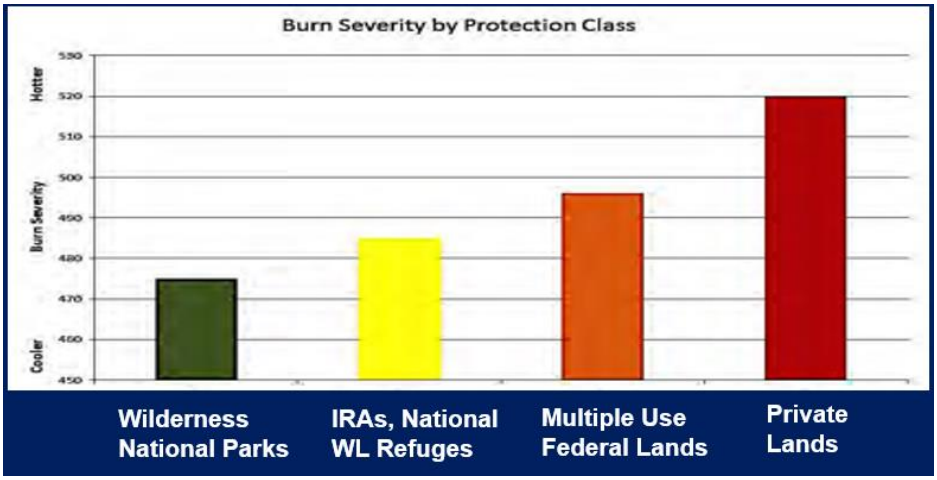

Figure 5. A comparison of burn severity across land protection class. The higher the level of protection from management, the less the burn severity (Data from Bradley et l. 2016)[108].

[105] DellaSala. 2020. Ibid.
[106] DellaSala. 2020. Ibid.
[107] 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.
[108] Bradley et al. 2016. Ibid.

Data over a three-decade period, from 1984-2016, showed that 1,500 wildfires greater than 1,000 acres that covered over 23 million acres in western and great plains states had a much higher burn severity in managed versus unmanaged forests. The authors, after averaging out effects of elevation and climate, show that "*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*". They also state "*a need for managers and policymakers to rethink current forest and fire management direction, particularly proposals that seek to weaken forest protections or suspend environmental laws ostensibly to facilitate a more extensive and industrial forest–fire management regime*."

The authors recommend that "*allowing wildfires to burn under safe conditions is an effective restoration tool for achieving landscape heterogeneity and biodiversity conservation objectives in regions where high levels of biodiversity are associated with mixed-intensity fires. Managers concerned about fires can close and decommission roads that contribute to human-caused fire ignitions and treat* fire-prone tree *plantations where fires have been shown to burn uncharacteristically severe (Odion et al. 2004). Prioritizing fuel treatments to flammable vegetation adjacent to homes along with specific measures that reduce fire risks to home structures are precautionary steps for allowing more fires to proceed safely in the backcountry (Moritz 2014, DellaSala et al. 2015, Moritz and Knowles 2016).*"

Berner et al. 2017[109] (Figure 6) reports that the tree mortality is highest in Oregon among the 11 western states with timber harvest causing 83% of tree mortality, with bark beetles and wildfire causing substantially less mortality at 9% and 8%, respectively.

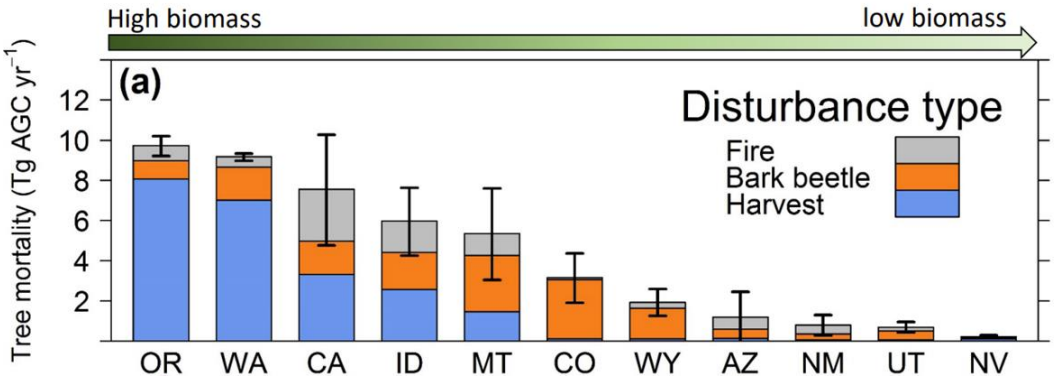

Figure 6. Mean annual tree mortality from fires, bark beetles, and timber harvest on forestland from 2003–2012 for each state in the western US. Tree mortality was quantified as the amount of aboveground carbon (AGC) stored in tree biomass killed by disturbance (Berner et al. 2017)[110].

Despite the increasing amount of large, high severity fires, they have been part of history during previous warm and dry weather cycles. Keeley and Syphard (2021)[111] studied large fires in a historical context by examining records of large fire events in California back to as early as 1860. They note that drought is commonly associated with large fire events. Despite the large fires in recent years, they found that "*there have been other periods with even greater numbers of large fires, e.g., 1929 had the second greatest number of large fires. In fact, the 1920's decade stands out as one with many large fires*" …" *Earlier records show fires of similar size in the nineteenth and early twentieth century. Lengthy droughts, as measured by the Palmer Drought Severity Index (PDSI), were associated with the peaks*

[109] Berner, L.T., B.E. Law, A.J.H. Meddens, and J.A. Hicke. 2017. Tree mortality from fires, bark beetles, and timber harvest during a hot and dry decade in the western United States (2003–2012). Environ. Res. Lett. 12 (2017) 065005. DOI 10.1088/1748-9326/aa6f94.

[110] Berner et al. 2017. Ibid.

[111] Keeley, J.E. and A.D. Syphard. 2021. Large California wildfires: 2020 fires in historical context. Fire Ecology 17:22. https://doi.org/10.1186/s42408-021-00110-7.

in large fires in both the 1920s and the early twenty first century". Another example is in 1910, Ed Pulaski became a hero when he saved numerous miners from the "Big Burn", a fire that consumed over three million acres in three different states in 36 hours. In other words, long before the FS declared that overstocked forest stands must be reduced, during hot, dry, windy conditions, large areas of forests already burned with high severity, particularly during drought cycles.

In 1929, at the beginning of the Dust Bowl era, an astounding 50 million acres burned across the West (Figure 7). Today, officials declare that a season total of 10 million acres is a "record year". The following figure shows that large fires burned much greater land area in the 1920s during the Dust Bowl days.

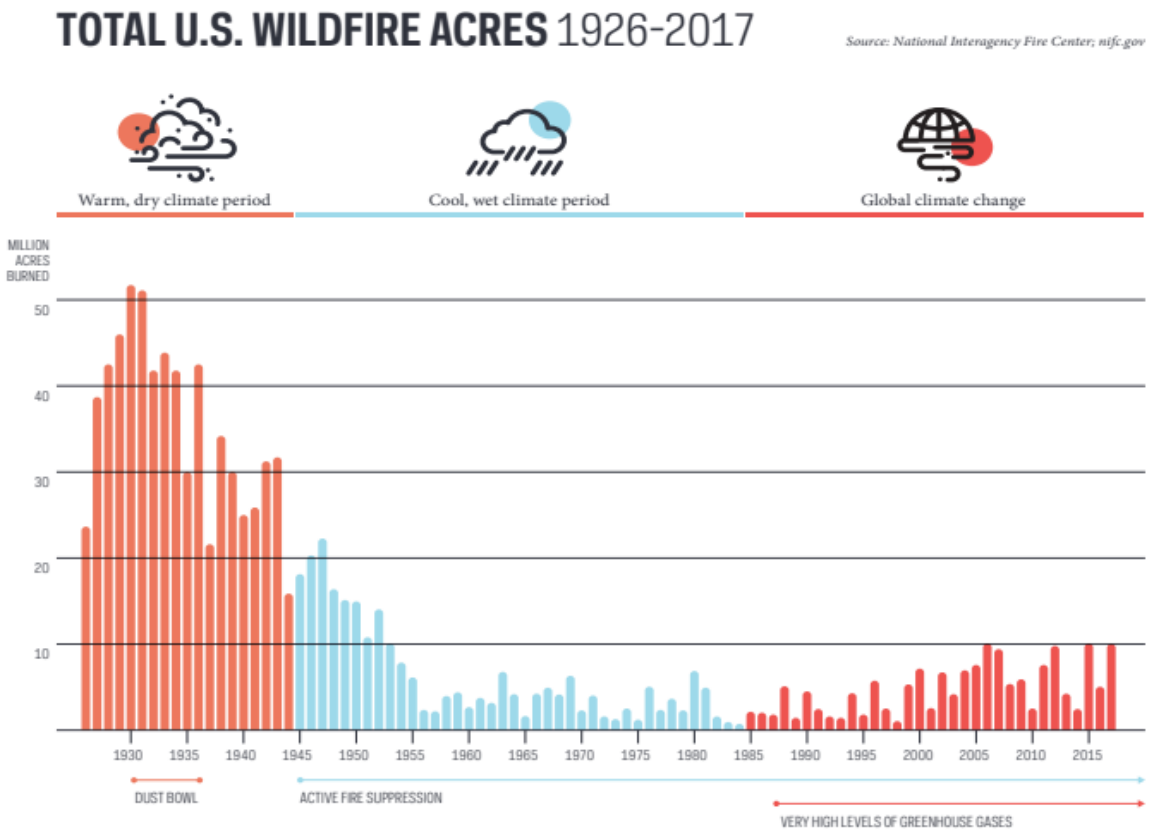

Figure 7. The West experienced drought from the 1900s to the 1930s, which led to wildfires burning tens of millions of acres. A cool, wet period from the 1940s to 1980s led to far less wildfires in the landscape. Since the late 1980s, climate change has caused hotter, drier conditions, causing an increase in wildfires. Source National Interagency Fire Center.

The wildfire statistics show that there were fewer large blazes between the 1940s and 1980s. This was one of the wettest periods in centuries. It was so snowy and cold that glaciers in the Pacific Northwest grew more than ever since the Little Ice Age. Beginning in the late 1980s, with increased carbon emissions, the climate became hotter and drier with more drought conditions. With increased hotter, drier conditions, large wildfires have occurred more frequently across the west.

Furthermore, thinning forests as "treatments" for forest resiliency and limiting wildfires are a shot in the dark. It's impossible to predict where wildfires will burn in the vast landscape of western forests. Schoennagel et al. (2017)[112] and Barnett et al. (2016)[113] show that less than 1% of thinned areas actually encounter wildfire each year, which means that the vast majority of thinning treatments are ineffective at influencing wildfires (Figure 8.

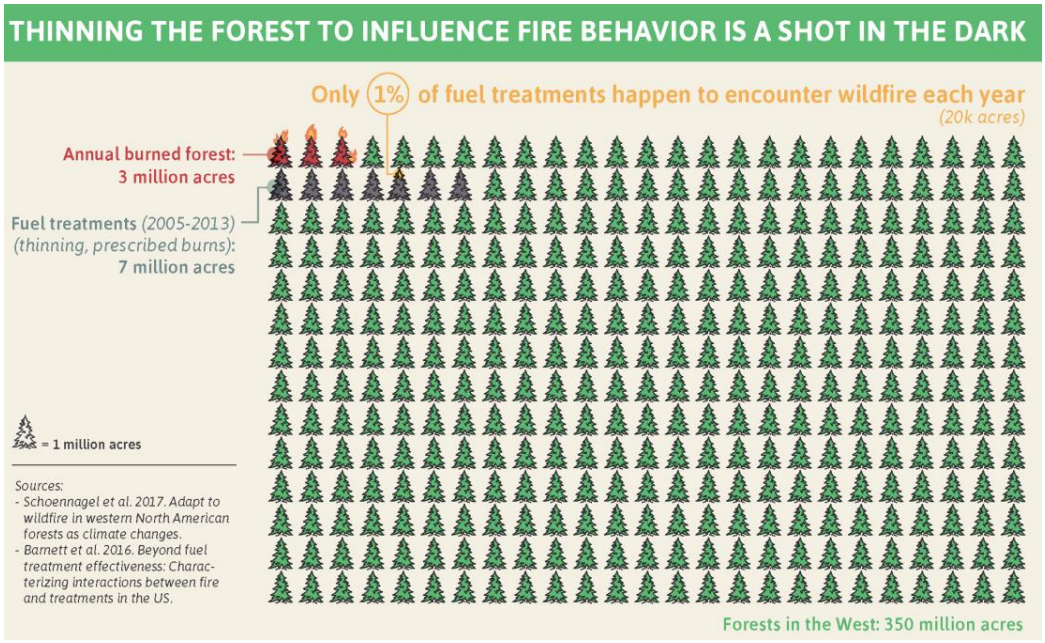

Figure 8. There is only a 1% chance of a wildfire likely to occur in an area treated by thinning under the guise of reducing stand density and wildfire risk.

From these analyses, we conclude that the FS is using the threat of wildfire to conduct larger areas of timber harvest under the guise of "wildfire resiliency" and "restoration". While some dry site ponderosa pine forests, proximate to communities and structures, we believe thinning and harvest is warranted, but the proposed thinning and harvest of large project areas away from towns is unwarranted and will likely have severe impacts on cool, moist forested areas, old growth and large multilayered stands that provide essential services for carbon storage, biodiversity, soil and nutrient cycling and water quality. These harvest strategies add to our climate change woes by substantially increasing more carbon emissions.

The FS also uses the paradigm of harvesting low elevation ponderosa pine to achieve "park-like stands" and "increase wildfire resilience". It is scientifically wrong to apply the same strategy to other tree species in the forest, including larch, lodgepole pine, subalpine fir, Douglas fir, and others, which have longer fire-free intervals and were seldom open and park-like. Some species like lodgepole pine have a shorter life span and rely on wildfire to replace stands and their serotinous cones rely on wildfire to open the cones and reproduce new trees such as the Hash Rock Fire in 2000 on the project area.

[112] Schoennagel, Tania, Jennifer K. Balch, Hannah Brenkert-Smith, Philip E. Dennison, Brian J. Harvey, Meg A. Krawchuk, Nathan Mietkiewicz, et al. 2017. "Adapt to More Wildfire in Western North American Forests as Climate Changes." Proceedings of the National Academy of Sciences 114 (18): 4582–90. https://doi.org/10.1073/pnas.1617464114.
[113] Barnett, Kevin, Carol Miller, and Tyron J. Venn. 2016. "Using Risk Analysis to Reveal Opportunities for the Management of Unplanned Ignitions in Wilderness." Journal of Forestry 114 (6): 610–18. https://doi.org/10.5849/jof.15-111.

Recommendation: Reduce intensive forest management including timber harvest and thinning to justify "wildfire resiliency". Investigate and support climate science and research coming from a variety of universities and other learned institutions that support greater forest protections. Focus tree thinning and prescribed fire near communities.

Climate Change

The climate change and analysis in the NFCR project Draft EA is all about effects of climate change on forest resources and has no solutions to combat carbon emissions caused by this project.

There is zero analysis of the Project's impacts and the amount of carbon emissions produced by all proposed management activities. This includes carbon emissions caused by a) running heavy equipment to expand the road network by over 40 miles, b) a variety of treatments using heavy machinery and equipment to harvest and thin trees, c) transport harvested trees to mills, and d) milling the wood to a product for distribution. There is zero discussion on how much carbon emissions will be produced from 11,307 acres of prescribed burns proposed in both Alternatives 2 and 3. There is zero discussion on how much carbon storage and sequestration will be lost from harvested and thinned trees.

The entire conclusions are misleading about all the expected resource "improvements" that will occur to streams, riparian areas, LOS, wildfire frequency, and improved wildlife and elk habitat as a result of treatments despite the huge expansion of the road network, failure to reduce and exclude cattle from riparian areas, loss of hiding and thermal cover for big game species, impacts to connectivity corridors and failure to reconnect streams with floodplains.

The ONF gave a very one-sided analysis in the Draft EA (p. 193-195) of why this project should be done to restore riparian areas, streams, and forest conditions (which in all likelihood may cause greater negative impacts to these resources) while failing to consider the increased carbon emissions and loss of carbon sequestration and long-term ecosystem health. The concern generated about wildfires is overrated given that there is only a 1% chance of a wildfire likely to occur in areas treated by thinning. The project, like many of the nearby and adjacent vegetation projects such as Gap, Wolf, Black Mountain, and Howard Elliot Johnson to name a few, are largely harvesting trees to support short-sighted local economic goals rather than considering the long-term impacts of loss of carbon storage, increased carbon emissions and lost ecosystem services.

The Draft EA (p. 140) states that adaptations for fisheries and aquatic habitats are the following: "*Adaptation options: Primary adaptation strategies for fisheries and aquatic habitat focus on storing more water on the landscape, increasing resilience to disturbance, maintaining and restoring riparian and wetland vegetation complexity, and maintaining and restoring natural thermal conditions in streams. Specifically, managers can protect springs, increase shallow groundwater storage, increase soil water storage by maintaining or restoring riparian vegetation, and encourage beaver populations. Minimizing the impacts of roads and grazing may help offset increases in sediment yield, and increasing water conservation can help maintain summer flows. Implementing fuel treatments across the landscape may help reduce fire severity, in turn reducing erosion that degrades aquatic systems. Adaptation tactics will be most efficient if they are coordinated with existing stream management and restoration efforts conducted by the Forest Service, other agencies, and private landowners*".

Ironically, the Draft EA references a statement from Halofsky et al. (2019) that states "*Land use conversion, grazing, and nonnative species will compound the effects of climate change on shrubland and grassland*." It is nonsensical to claim benefits of treatments that will reduce tree density along scabland stringers, help to open the existing scablands and reinvigorate grasses, forbs and sagebrush in a project area that is already 50% non-forested. This is the type of short-term economic reasoning, rather than multi-generational planning for sustainability and forest health.

The Draft EA fails to report the carbon emissions caused by the project and loss of carbon sequestration while overstating the need to do forest management (at the expense of streams, water quality, fish and wildlife habitats and soils) in order to protect forests from increasing wildfires from a warming and drying climate. As stated in the previous section on wildfires, future severe wildfires will be climate and wind driven events and no amount of forest management will stop mega wildfire events such as occurred in the Cascade Mountains in September 2020.

There is a huge body of science on climate change and the relationship of forests in the Pacific Northwest and their importance for carbon storage and species biodiversity. Timber harvest in Oregon is the number one emitter of carbon contributing to climate change and is also the greatest cause of tree mortality. This project as designed is flawed and increases risks from climate change and further degrades species biodiversity.

We note that the ONF failed to do the typical cookie cutter approach to analyzing carbon losses in the NFCR project. We also note that a recent court case in Montana was ruled in favor of the plaintiffs when the FS failed to consider the impacts of logging large mature trees in the context of climate change. In this ruling, U.S. District Court Judge Molloy found that the FS failed to consider the climate harms of logging thousands of acres of forest that currently store carbon. The court rejected the FS's argument that the project would have an "infinitesimal" impact on climate change because young trees would eventually replace the carbon being stored in trees the project would cut down. In his ruling, Molloy said "*logging causes immediate carbon losses, while re-sequestration happens slowly over time, time that the planet may not have*." The court stated the following:

> *"In light of the above, the USFS's consideration of the Project's climate impacts fails NEPA in two ways. First, by relying almost entirely on the cookie cutter and boilerplate Project Climate Report to analyze the carbon impact of the project, the USFS did not utilize high quality and accurate information which NEPA requires. See 40 C.F.R § 1500.1. Second, even though the USFS posited that the short-term loss of carbon from logging would be outweighed by the net increase in carbon sequestration resulting from a healthier forest, this assertion is not backed up by a scientific explanation. Rather, the USFS generally concludes that carbon as a result of the Project's activities make up "only a tiny percentage of forest carbon stocks of the Kootenai National Forest, and an infinitesimal amount of total forest carbon stocks of the United States." FS-020743. Under this logic, the USFS could always skirt "hard look" analysis when doing a carbon impacts review by breaking up a project into small pieces and comparing them to huge carbon stocks such as those contained within the over two million acres of land in the Kootenai National Forest.*
>
> *The EA discusses how the USFS plans to ameliorate root disease from a selection of trees in the Project area, which will lead to growth of trees that can store more carbon than diseased trees. See FS-002243 (noting that a purpose and need of the Project is to "[p]romote" root disease-resistant tree species like "western larch, ponderosa pine, and western white pine"). However, like its analysis of the net carbon loss resulting from logging, the EA does not sufficiently provide scientific evidence indicating why this benefit would offset the carbon loss leading to an overall "minor" impact on the environment.*
>
> *Ultimately, "[greenhouse gas] reduction must happen quickly" and removing carbon from forests in the form of logging, even if the trees are going to grow back, will take decades to centuries to re-sequester. FS-038329. Put more simply, logging causes immediate carbon losses, while re-sequestration happens slowly over time, time that the planet may not have.*
>
> *While the USFS did address climate change in the EA through the Forest and Project Carbon Plans, merely discussing carbon impacts and concluding that they will be minor does not equate to a "hard look." NEPA*

requires more than a statement of platitudes, it requires appraisal to the public of the actual impacts of an individual project. With all in agreement that climate change as a result of carbon emissions is an increasingly serious national and global problem, see FS- 020739, the USFS has the responsibility to give the public an accurate picture of what impacts a project may have, no matter how "infinitesimal" they believe they may be. They did not do so here. Accordingly, the agency failed to take a "hard look" at the Project's carbon emissions, violating NEPA."

In the NFCR Draft EA, the ONF failed to do any analysis of carbon loss and emissions from this project. By failing to conduct a meaningful and necessary evaluation of loss of carbon and increase of carbon emissions to the atmosphere, the FS fails to take a hard look at how its actions contribute to increased carbon emissions, and loss of carbon sequestration throughout all aspects of the project.

Today's world has 50% more carbon dioxide in the atmosphere compared to preindustrial levels. As shown above in Figure 1, logging is Oregon's largest source of annual carbon emissions at 35%, while wildfires generally account for 4% of Oregon's total carbon emissions each year. Law and Moomaw (2021)[114] report that the Pacific Northwest contains some of the highest carbon dense forests in the world that can store carbon in trees for 800 years or more, and that reducing logging on public lands by half would have huge climate benefits. The authors also found that forests retain the majority of their carbon after wildfires as snags if they are not harvested by "salvage logging."

Law et al. (2021)[115] advocates for the establishment of strategic forest reserves in the 11 western states for assisting with the twin crises of biodiversity and climate change. The researchers at Oregon State University stated that the U.S. needs to establish new "Strategic Forest Reserves" to protect wildlife and reduce carbon emissions that contribute to climate change. Their maps show that Western forests would store the most carbon and help the most fish and wildlife species if they were given the same level of protection from logging, grazing, and mining as designated wilderness areas receive. These maps include significant areas of the ONF which should protect more areas from timber harvest to meet President Biden's 30X30 goal. Every National Forest, particularly in the Pacific Northwest, should support climate change goals which should include more protected lands and less timber harvest.

While the intent of the project is to move toward "resiliency," research shows that these same forests are critical for combating climate change by retaining and protecting more mature and old growth forests because larger trees store and sequester far more carbon. The project as proposed currently in the Draft EA increases carbon emissions and climate change, reduces biodiversity, and makes the forest less resilient.

Climate change is expected to alter many of the native habitats of fish and wildlife species on forest lands, even for iconic species such as elk and mule deer. Streams and riparian areas will be critically impacted by warmer and drier winters, and by more extreme weather events. Climate change predictions suggest that temperature increases alone will render 2 - 7% of headwater trout habitat in the Pacific Northwest unsuitable by 2030; 5 - 20% by 2060; and 8 - 33% by 2090 (Bisson 2008[116]; Independent Scientific Advisory Board 2007[117]). Climate change, particularly in light of

[114] Law, B.E., and W. Moomaw. 2021. Keeping trees in the ground where they are already growing is an effective low-tech way to slow climate change. https://theconversation.com/keeping-trees-in-the-ground-where-they-are-already-growing-is-an-effective-low-tech-way-to-slow-climate-change-154618.

[115] Law, B. E., Berner, L. T., Buotte, P. C., Mildrexler, D. J., & Ripple, W. J. 2021. Strategic forest reserves can protect biodiversity in the western United States and mitigate climate change. Communications Earth & Environment. 2:254. https://doi.org/10.1038/s43247-021-00326-0, www.nature.com/commsenv.

[116] Bisson, P. 2008. Salmon and Trout in the Pacific Northwest and Climate Change. (June 16, 2008). U.S. Department of Agriculture, Forest Service, Climate Change Resource Center.

[117] Independent Scientific Advisory Board (ISAB). 2007. Climate change impacts on Columbia River Basin fish and wildlife. Northwest Power and Conservation Council. ISAB 2007-2.

already poor stream conditions on the ONF of high sediment, poor bank stability, low pool frequency, and high summer temperatures may cause native aquatic species to go extinct. More recent publications such as the IPCC Climate Change Report (2023)[118] gave even more dire news with climate change happening more rapidly than predicted with greater negative consequences to ecosystem sustainability, biodiversity and human existence.

In order to combat climate change, the ONF must contribute to federal and global efforts to protect 30% of the land by 2030, and 50% by 2050. Without these immediately needed and urgent efforts to slow and reverse anthropogenic climate change, the consequences to our ecosystems, inhabitants including humans, and sustainability and livability of our planet is in jeopardy. The Broads can support site-specific, well planned, limited, and sustainable harvests in appropriate places on national forest lands. However, that requires immediate and reasonable actions that facilitate increased conservation and protection of public lands.

Law (2021)[119] in testimony before Congress stated that "*Forests with medium and high carbon per acre also have medium and high biodiversity, promoting ecosystem resilience to climate change. We are in the midst of an emergency to address both climate change and biodiversity loss (Ripple et al. 2019)[120]. We must consider both forest carbon and biodiversity when determining management strategies in forests. Studies estimate that at least one-third of American wildlife, more than 12,000 species, are at increased risk of extinction, with extinction risk being highest in the largest and smallest vertebrates (Ripple et al. 2017)[121]. Under future climate projections, medium to high carbon density western U.S. forests with relatively low to moderate vulnerability of mortality from fire or drought also have high amounts of critical habitat and high species diversity (Buotte et al. 2020)[122]. If protected, these forests have a strong potential to support biodiversity into the future and to promote ecosystem resilience to a changing climate. These areas are primarily in the Pacific Northwest and northern Rocky Mountains in Idaho and Montana. A recent global study also strongly confirmed the spatial coincidence of areas important for carbon storage and biodiversity protection (Dinerstein et al. 2020)[123]."*

Recommendation: *Follow the science, that is, the correct and best science and use this to minimize the project's impact on the landscape. The Broads support the science and research stated by numerous scientists that climate change is the main driver for wildfires while current forest management practices (aka timber harvest especially any large mature trees and in RHCAs) of forests is depleting not only carbon storage and sequestration but is a huge emitter and a threat to fish and wildlife species biodiversity which is in crisis right now. We believe the best option for this project is to first, eliminate the project (Alternative 1), or second reduce the scope and scale of the project, stay out of RHCAS, old growth, and other areas that should remain unmanaged, and do not reopen or create new roads and close numerous roads permanently.*

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[118] IPCC, 2023: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 35-115, doi: 10.59327/IPCC/AR6-9789291691647.

[119] Law. B.E. 2021. Wildfire in a warming world: Opportunities to improve community collaboration, climate resilience, and workforce capacity. Statement of Dr. Beverly Law, Professor Emeritus Oregon State University before the U.S. House of Representatives subcommittee on national parks, forests, and public lands. 6 pp.

[120] Ripple, W.J. C. Wolf, T.M. Newsome, P. Barnard, and W.R. Moomaw, and 11,258 Scientist signatories from 153 countries. 2019. World Scientists' Warning of a Climate Emergency. BioScience • January 2020 / Vol. 70 No. 1.

[121] Ripple WJ, C. Wolf, T.M. Newsome, M. Galetti, M. Alamgir, E. Crist, M.I. Mahmoud, and W.F. Laurance. 2017. World scientists' warning to humanity: A second notice. BioScience 67: 1026–1028.

[122] Buotte, P. C., B. E. Law, W. J. Ripple, and L.T. Berner. 2020. Carbon sequestration and biodiversity co-benefits of preserving forests in the western United States. Ecological Applications 30(2): e02039. 10.1002/eap.2039.

[123] Dinerstein, E., A. R. Joshi, C. Vynne, A. T. L. Lee, F. Pharand-Deschênes, M. França, S. Fernando, T. Birch, K. Burkart, G. P. Asner, and D. Olson. 2020. A "Global Safety Net" to reverse biodiversity loss and stabilize Earth's climate. Sci. Adv. 2020; 6: eabb2824.

Conclusion

We believe the ONF has special places that need special consideration for vegetation management projects. The NFCR project area is best protected with Alternative 1. We understand the Forest Service must meet a Congressional mandate for multiple use, meet timber sale targets, and is implementing projects to "restore HRV" and "wildfire resiliency". As another option, we recommend that you pursue our proposed Great Old Broads for Wilderness, Bitterbrush Broads and Bros Alternative. Our alternative substantially reduces the size and scope of the project, does not reopen roads, or develop any temporary roads, substantially closes, and decommissions roads more than what is stated in the Draft EA, protects undeveloped lands for climate change and biodiversity, and restricts timber harvest, thinning and prescribed burning to areas in upland dry site areas largely near WUI, and largely stays out of RHCAs, and mature and old growth.

Thank you for the opportunity to comment.

Sincerely,

*/Mary Fleischmann/*electronic signature

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