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RE: Grasshopper Timber Sale scoping comments

> "Natural disturbance processes vary in scale and effects and create wide variation in landscape and habitat elements. We have had little to no effect in our attempts to control many of these processes. We have had the most success in attempting to control fire but now realize that often these efforts were misguided and have created as many or more problems than they solved."
>
> *White River Watershed Analysis,5-36.*

Bark's mission is to bring about a transformation of public lands on and around Mt. Hood National Forest into a place where *natural* processes prevail, where wildlife thrives and where local communities have a social, cultural, and economic investment in its restoration and preservation. Bark has over 25,000 supporters[1] who use the public land lands surrounding Mt. Hood, including the areas proposed for logging in this project, for a wide range of uses including: hiking, skiing, nature study, non-timber forest product collection, spiritual renewal, and other recreation and cultural values. We submit these comments on behalf of our supporters.

The Grasshopper project proposes to treat 5,658 acres of forest with a combination of commercial logging and pre-commercial thinning across a diverse forest ecosystem adjacent to the Badger Creek Wilderness. Given the geographic scope of this project and its proximity to important ecological and recreational areas, it is critical that Forest Service (FS) staff take careful steps to foster public engagement by engaging with, and responding to, public comments of concern

[1] Supporters in this case is defined as significant donors and petition-signees which Bark has identified as being active users of Mount Hood National Forest.

and recommendation. Over Bark's 20 years monitoring projects on Mt. Hood National Forest, we have found that when the FS has meaningfully involved knowledgeable and engaged forest users, outcomes improve - both on the ground and between the public and the agency.

From August 2-4, 30 Bark volunteers camped in the Grasshopper planning area and compiled extensive field notes. We are unable to collate these notes before the scoping comment deadline but confirmed with the District Ranger that you will consider our detailed site-specific information when we are able to submit it. Thanks for your flexibility – we can ensure that the gathered information will help ensure the project meets its purpose and need.

PROJECT PURPOSE & NEED

The scoping letter states that the "overall purpose is to conduct activities within the planning area to improve health and vigor". The need is to "reduce risks associated with high intensity fire, to protect and enhance wildlife habitat, and to contribute to a sustainable supply of timber."

To better understand the reasoning behind this purpose and need in this project area, we request answers for the following questions in the forthcoming NEPA analysis. Throughout the document find references and resources to help the FS answer these questions.

1) Please define "health and vigor". In what context is "health and vigor" assessed? Does "health and vigor" pertain to the ecological system as a whole or to individual trees? What methods are used to determine the need or opportunity to "improving health and vigor"?
2) Exactly what is meant by "reduce risks associated with high intensity wildfire"? What specific risks have been identified and by what method?
3) Where and for which species is habitat in need of enhancement?
4) In the draft scoping letter, the FS estimated that this project would produce 15-20 MMBF. Is this still the volume target for the project?
5) What studies does the Forest Service refer to in planning active management to reduce the risk of fire fighters engaging high intensity fire? What specific areas of the project are considered high hazard?

FIRE: HISTORICAL, POLITICAL & ECOLOGICAL CONTEXT

The scoping notice states that a "*majority of proposed areas for treatment have been mapped as Condition Class 2 & 3*". We appreciate that you provided a map that specifies these conditions on the landscape and note that much of the project area is in Condition Class 1, the least departed from its natural fire regime. Please provide an complete description of the overall condition of the project area in regard to fire in the forthcoming NEPA analysis. Given the

diversity of FRCC in the project area, how will the prescriptions be customized to properly suit each area, either within, or beyond, its natural fire regime?

Bark understands the complexity in managing wildland fire. On one hand, fire is recognized as essential to forest ecosystems and the past 100 years of fire suppression has degraded the forest's ecological conditions. At the same time, the 1990 Mt. Hood LRMP directs the Forest Service to fully suppress all ignitions outside of Wilderness, in direct conflict with the best available science to date, which acknowledges much of the forest *needs* to burn, and fire simply cannot be controlled to the degree outlined in the Forest Plan. Complicating things further, public perception and agency culture are strongly aligned with inaccurate narratives about the presence and effects of fire on the landscape. While a significant challenge, Bark believes the FS has the authority and resources to address fire appropriately, as a natural and necessary part of a forests' lifecycle, by developing fire management practices based on site specific information and application of modern scientific knowledge.

Diversity of fire regimes in project area

Fire Environment – FMU East "*Fire regime alteration - All Fire Regimes that occur on the Mt. Hood National Forest are represented in this FMU. The eastern half of the FMU is predominantly made up of fire regimes I and IIIA. These are the short interval regimes. Fire Regime I is characterized by a fire interval of 0-35 years and low severity fires. Regime IIIA has a fire interval of <50 years and fires are a mixed severity. The remainder of the FMU is made up of the longer interval mixed severity and stand replacement fire regimes.*" 2012 Mt Hood Fire Management Plan **3.2.2.4**

Fire Behavior – FMU East "*Overall, the FMU rates out a moderate risk due to the low number of annual fire starts but the increasing probability of escaped fires within the high hazard areas."* **3.2.2.4.1**

Recent fire research has confirmed that fire behavior often varied significantly, even in a specific general fire regime. At landscape scales most fires occur as a mix of low, moderate and high severity. At that scale, fires differ in terms of the relative amounts of severity types, and amount and sizes of mortality patches. The patch sizes of the different severity classes affect many ecological processes, including succession and wildlife habitat.

In his extensive research, Dr. Baker used "pre-1900 General Land Office Surveys, with new methods that allow accurate reconstruction of detailed forest structure, to test eight hypotheses about historical structure and fire across

about 400,000 ha of dry forests in Oregon's eastern Cascades".[2] Through this study, Baker found historic fire regimes and forest structure to be much more variable than previously assumed. He concluded that given historical variability in fire and forest structure, an ecological approach to restoration would restore fuels and manage for variable-severity fires rather than reduce fuels to lower fire risk.

The effectiveness of fuels reduction in reducing wildfire is questionable and it can also be argued that the Forest Service should not attempt to reduce wildfire severity. Until recently, dry ponderosa pine forests were thought to have been "park-like" in structure, maintained by mostly low-severity fires. The second part of this assumption is that these forests have become denser and more prone to high-severity fire due to fire suppression.[3] However, there is increasing scientific consensus from landscape-scale assessments that, prior to any significant effects of fire suppression, large, high-intensity fires were common and physical structure was more variable in these pine forests.[4]

Given that *"Standards & Guidelines should not work to constrain natural processes," 5-37 of WRWA*, in the forthcoming assessment please analyze the natural fire regimes of the project area and how the proposed treatments can work with, rather against, these natural processes. Consider revising the purpose and need to be in better alignment with the White River Watershed Analysis by focusing on management that does not constrain natural processes.

Appropriateness of fire suppression practices in the project area

As this project describes a goal of enabling firefighter safety, we assume that the Forest Service intends to continue fire suppression in the project area. Bark would like a further review of the appropriateness of implementing this policy across the project area in light of the acknowledged need for fire to return to the landscape – especially the Badger Creek Wilderness. Please further define the project goals related to the interaction of fire and ecosystem function, recreation, and other uses. The White River Watershed Analysis suggests that a continued practice of excluding fire would not benefit ecological conditions.

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[2] Baker, William, 2015, Are High-Severity Fires Burning at Much Higher Rates Recently than Historically in Dry-Forest Landscapes of the Western USA? https://doi.org/10.1371/journal.pone.0136147

[3] Baker, W. L. 2012. Implications of spatially extensive historical data from surveys for restoring dry forests of Oregon's eastern Cascades. Ecosphere 3(3):23. http://dx.doi.org/10.1890/ES11-00320.1

[4] Odion DC, Hanson CT, Arsenault A, Baker WL, DellaSala DA, et al. (2014) Examining Historical and Current Mixed-Severity Fire Regimes in Ponderosa Pine and Mixed-Conifer Forests of Western North America. PLoS ONE 9(2): e87852. doi:10.1371/journal.pone.0087852

In the NEPA analysis, please analyze the ecological costs and benefits of fire inclusion versus fire exclusion from this landscape and identify opportunities to use prescribed fire to meet desired future conditions. Please identify the ecological value of mixed severity fire, especially where it is the natural fire regime, and how this project will ensure its return to the landscape.

Prescribed Fire

Prescribed burning should be considered for use in meeting management objectives in areas where ecological studies show that natural fire has played a significant role in ecosystem development. Mt. Hood LRMP, FW-049.

More than 20 years ago, the White River Watershed Analysis (WRWA) noted that the Badger Creek Wilderness is outside of its natural fire regime and would benefit from burning. *WRWA at 5-33*. As the Watershed Analysis recommends that the Forest Service "[d]evelop prescribed natural Fire Plan for Badger Creek Wilderness" suggests that the Grasshopper project analysis is an appropriate place for the FS to consider actions that allow fire in the Badger Creek Wilderness. *WRWA 6-5.*

Roads and Wildfire

One cannot deny the amplifying effect road density has on fire starts. According to the Forest Service, more than 90% of wildland fires are the result of human activity, and ignitions are almost twice as likely in roaded areas as they are in roadless areas.[5]

In his study of the effects of roads on wildfires in national forests in California, Robert F. Johnson concluded that over 52% of human-caused fires occurred within 33 feet of a road edge.[6] According to the 2000 USDA report cited above, human-ignited wildfire is almost 5 times more likely to occur in a roaded area than in a roadless area. DellaSala and Frost[7] also argue that "in the Western United States, most of the more than 378,000 miles of National Forest roads traverse heavily managed forests with the greatest potential for fire."

[5] USDA Forest Service. 1998. 1991-1997 Wildland fire statistics. Fire and Aviation Management, Washington, D.C.
[6] Johnson, R.F. 1963. The roadside fire problem. Fire Control Notes 24: 5-7
[7] DellaSala, D. A., and E. Frost. 2001. An ecologically based strategy for fire and fuel management in national forest roadless areas. Fire Management Today, v. 61, no. 2, p. 12-23. http://www.fs.fed.us/fire/fmt/fmt_pdfs/fmn61-2.pdf. Donato, D.C., J.B. Fontaine, J.L. Campbell, W.D. Robinson, J.B. Kauffman, and B.E. Law. 2006. Post-wildfire logging hinders regeneration and increases fire risk. Science 311: 352

Although it can be argued that roads improve access for fire suppression, this benefit is counterbalance with the much lower probabilities of fire starts in roadless areas, or areas with closed roads. The Forest Service has acknowledged: "A potential factor in the increase in fire size and severity may be related to increased incidence of human-caused ignition. Human access is likely to be increased by roads, a factor that will greatly increase the chances of both accidental and intentional human ignitions."[8]

The Forest Service's map of fire starts in the area, shows that the majority of recent fires were human caused. Recent researchers note that the direct role of people in increasing wildfire activity has been largely overlooked.[9] They evaluated over 1.5 million government records of wildfires that had to be extinguished or managed by state or federal agencies from 1992 to 2012 and examined geographic and seasonal extents of human-ignited wildfires relative to lightning-ignited wildfires and found that humans have vastly expanded the spatial and seasonal "fire niche" in the coterminous United States, accounting for 84% of all wildfires and 44% of total area burned. During the 21-y time period, the human caused fire season was three times longer than the lightning caused fire season and added an average of 40,000 wildfires per year across the United States. Human-started wildfires disproportionally occurred where fuel moisture was higher than lightning-started fires, thereby helping expand the geographic and seasonal niche of wildfire. Human-started wildfires were dominant (>80% of ignitions) in over 5.1 million km2, the vast majority of the United States, whereas lightning-started fires were dominant in only 0.7 million km2, primarily in sparsely populated areas of the mountainous western United States.

In the NEPA documents, please include a cost/benefit analysis of the impact of keeping roads open/building new roads for firefighting as compared with the increase in ignitions from public access.

CLIMATE CHANGE

Sustaining Ecosystem Function

The Forest Service has a responsibility to protect these forest ecosystems for the public trust. The complex structure and multi-layered canopy of mature & old-growth forests provide a buffer against thermal extremes which means that older forests can serve as climate refugia as the climate warms. Organisms can

[8] USDA. 2000. Forest Service Roadless Area Conservation Rule Final Environmental Impact Statement, Ch. 3,.

[9] Balch, J. K., Bradley, B.A., Abatzoglou, J.T., Nagy, R.C., Fusco, E.J.,& Mahood, A.L. 2017. Human-started wildfires expand the fire niche across the United States. PNAS Early Edition.
http://www.pnas.org/cgi/doi/10.1073/pnas.1617394114

respond to climate change by existing in less affected microclimates, by adapting, or by migrating. By assisting the abilities of creatures to do these three things, greater amounts of biodiversity can be maintained and preserved. The FS can do this by avoiding fragmentation of habitat zones and increasing connectivity between habitats, as well as increasing ecosystem redundancy. Increasing redundancy has the beneficial effect of allowing a species to persist even if a local population dies out. Redundancy can be done literally or functionally; i.e. creating lots of similar habitats or lots of different and distinct habitats with similar purposes—both are useful. Protecting currently "unmanaged" areas helps establish habitat for existing organisms and increases ecosystem health and biodiversity, which help mitigate the stress of climate change and increase resilience.[10] Please address the impacts to wildlife from climate change, and opportunities that the Forest Service has to protect or enhance their habitat in the Grasshopper project area.

We encourage the FS practice adaptation planning for Grasshopper, by: (1) increasing or maintaining carbon sequestration by avoiding logging mature and old growth trees, and restoring ecosystem function; and (2) facilitating responses to climate change by sustaining genetic and species diversity through allowing more natural selection in trees, enhancing landscape connectivity for migration/dispersal of plant and animal species, and by aiding dispersal to favorable climates. Id.

Acknowledging agency action that exacerbates negative climate impact

The evolving analysis of climate change within the NEPA process is an important benchmark in the future of public involvement. This has become a major point of concern, not just for the scientific community, but an issue that has squarely fallen within the public interest. At the end of the Obama administration, the Council on Environmental Quality (CEQ) released final guidance for federal agencies on how to consider the impacts of their actions on global climate change in their NEPA analysis. This final guidance provides a framework for agencies to consider both the effects of a proposed action on climate change, as indicated by its estimated greenhouse gas emissions, and the effects of climate change on a proposed action.

However, on March 28, 2017 the Trump Administration issued the "Presidential Executive Order on Promoting Energy Independence and Economic Growth" which attempts to relieve agencies from the requirement to consider the effects of GHG emissions and climate change: https://www.whitehouse.gov/the-press-office/2017/03/28/presidential-executive-order-promoting-energy-independence-and-economi-1. Among other things, this executive order rescinds

[10] Dunwiddie PW, Hall SA, Ingraham MW, Bakker JD, Nelson KS, Fuller R, and Gray E. 2009. Rethinking Conservation Practice in Light of Climate Change. Ecological restoration, 27:3; 320-329.

the CEQ guidance regarding consideration of climate change in federal decision-making, but the E.O. also recognizes that "[t]his order shall be implemented consistent with applicable law" and "all agencies should take appropriate actions to promote clean air and clean water for the American people, while also respecting the proper roles of the Congress and the States concerning these matters in our constitutional republic." While the guidance was finalized in August 2016, it followed a series of court rulings addressing the issue of greenhouse gases and NEPA, which found that whenever greenhouse gases are significant or rise from the project, either directly or indirectly, they much be analyzed in a NEPA document. **Thus, despite the E.O., the Forest Service must continue to carefully consider the effects of GHG emissions and climate change in all of its decisions.**

In past NEPA analyses, the Forest Service claimed the short-term carbon emissions and the difference in long-term carbon storage attributable to the Proposed Action are of such small magnitude that they are unlikely to be detectable at global, continental or regional scales. Additionally, it asserted that changes in carbon stores are unlikely to affect the results of any models now being used to predict climate change. The same thing could be, and is, said about every individual timber sale in National Forests in the Pacific Northwest. The failure of federal agencies to place projects within the context of emissions from logging on a regional or statewide level has led the public to thinking that the forestry sector is no longer a contributor to global greenhouse gas emissions.

However, it is increasingly apparent that carbon emissions from logging are a significant pollutant in Oregon. The Forest Carbon Accounting Report prepared by the Oregon Global Warming Commission, found that Oregon's forests are globally significant in their ability to sequester and store carbon, but that logging and milling trees is a significant sources of carbon release.[11] The Report notes that, "[b]ased on available evidence today, forest harvest does not result in material carbon conservation; rather it results in net carbon emissions measured against leaving forests unharvested."[12] The aforementioned CEQ guidance, which we encourage you to follow, requires the FS to **consider alternatives that would make the action and affected communities more resilient to the effects of a changing climate.** The FS should also choose mitigation measures to reduce action related GHG emissions or increase carbon sequestration in the same fashion as they consider alternatives and mitigation measures for any other environmental effects.

[11] https://www.oregon.gov/ODF/ForestBenefits/Documents/Forest%20Carbon%20Study/OGWC-Forest-Carbon-Project-Report-2018.pdf

[12] *Id.* at 15.

Climate change will not only affect natural systems, it will also intensify the adverse impacts of human activities such as off-road vehicles, roadbuilding and logging. **The FS must analyze the impacts of these activities in the broader context of climate change and acknowledge that the historic impacts of these activities will be exacerbated by climate change.** The FS must then commit to specific management actions to address the increased impacts of these threats now and to take additional actions as necessary.

In regards to climate change's effects on species, the Intergovernmental Panel on Climate Change (IPCC) states that: (1) about 20-30% of known plant and animal species are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C; (2) types of changes seen in plants include range shifts (in both latitude and elevation) and changes in growing season length, and threatened systems include those with physical barriers to migration (e.g. montane ecosystems); (3) non-climate stresses can increase vulnerability to climate change by reducing resilience and adaptive capacity; and (4) unmitigated climate change would, in the long term, be likely to exceed the capacity of natural and managed systems to adapt.[13]

PROPOSED ACTION

Site Specific Information

As noted in the introduction, 30 Bark volunteers recently spent three days in the Grasshopper planning area and compiled extensive field notes. We are unable to collate these notes before the scoping comment deadline and confirmed with the District Ranger that you will consider our detailed site specific information when we are able to submit it. That said, the discussion below provides some information about the project area gleaned from our time in the field and the watershed analysis.

Active Management in Late Successional Reserves

The Grasshopper project area proposes management on 786 acres of Late-Successional Reserves (LSRs). According to the Northwest Forest Plan (NWFP), LSRs are to be managed to protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late-successional and old-growth reacted species, including the northern spotted owl. *NWFP, C-11*. Thinning and other silvicultural treatments inside reserves are subject to review

[13] Statement Of Dr. Beverly Law Professor, Global Change Forest Science Oregon State University And Ameriflux Network Science Chair Before The United States Senate Subcommittee On Public Lands And Forests Of The Senate Committee On Energy And Natural Resources November 18, 2009 Concerning Managing Federal Forests In Response To Climate Change, Including For Natural Resource Adaptation And Carbon Sequestration

by the Regional Ecosystem Office to ensure that the treatments benefit the creation of late-successional forest conditions. *NWFP, C-13.*

Bark volunteers field checked LSR units in the central part of the timber sale, including areas off the 4810-220 road. They found that most, if not all, of these units are never-logged, healthy forest. One group found a Douglas fir in Unit 192 that was too big to measure with a forester's DBH tape (pictured here). Logging these forests is at odds with the Northwest Forest Plan, as well as conflicting with the northern spotted owl Recovery Plan as we believe these LSRs provide currently suitable spotted owl habitat.

As there is a general prohibition on commercial logging in LSRs, it is the burden of the agency to show that the proposed actions are clearly needed and will not prevent the LSR from providing the habitat for which it was created. **In the NEPA analysis, please provide specific stand information for any units proposed for logging within LSRs, and the ecological rationale for the actions proposed within these stands.** Please discuss the role of standing and down dead trees in enhancing biodiversity and the ecological impact of decreasing future snag retention by logging in LSRs. If your rationale is incomplete or inconsistent with the projected outcomes of commercial thinning (in relation to expediting creation of late-successional structure), Bark recommends dropping these units from the project.

Riparian Reserve Management

The scoping letter provides sparse information about vegetation management proposed for the 535 acres of Riparian Reserves. **Please clarify whether the FS proposes Variable Density Thinning in the Riparian Reserves or limit treatment to Riparian Area Enhancement and Snag Creation, as described on page 4 of the scoping letter.** Bark supports snag creation in the Riparian Reserves and strongly advocates the FS include beaver habitat restoration as a part of its Riparian Area Enhancement (detailed below). Bark's concerns are based both on the clear direction of the Northwest Forest Plan and on science synthesized by the Coast Range Association, which recommended that "(t)hinning and fuels reduction by means of mechanized equipment or for

commercial log removal purposes should be generally prohibited in *Riparian Reserves* and *Key Watersheds*."[14]

Any action taken in Riparian Reserves must comply with the Aquatic Conservation Strategy (ACS) of the NWFP. The ACS includes nine specific objectives for restoring watersheds. *NWFP at B-9*. Complying with the ACSOs means that the FS must manage riparian-dependent resources to maintain the existing condition or implement actions to restore the conditions. Commercial logging in Riparian Reserves is generally prohibited in Riparian Reserves and is allowed *only when necessary* to "acquire the desired vegetation characteristics needed to attain ACS objectives." *NWFP at C-33*. While some aquatic degradation, standing alone, does not constitute ACS noncompliance, the FS must avoid degradation that leads to the non-attainment of ACS objectives at both the short-term, localized scale and the long-term, watershed scale.[15] To make a finding that the logging "meets" or "does not prevent attainment" of the ACSOs, the NWFP requires the FS to describe the existing conditions of the watersheds within the project area, assess the natural variability of important physical and biological components, and explain *how* the proposed logging would maintain or restore the conditions of the watershed.[16]

Additionally, the WRWA recommends that, **in general, timber harvesting in Riparian Reserves should not remove any trees larger than 15 inches DBH**. *WRWA at 5-12*. As the Northwest Forest Plan describes the Watershed Analysis as "one of the principal analyses that will be used in making decisions on implementation of the Aquatic Conservation Strategy," we anticipate that you will follow this recommendation. *NWFP at B-20.*

The WRWA also acknowledges that water is over-allocated in an ecological sense, and instream flow was not historically recognized as a beneficial use. *WRWA at 5-56.* Because of this over-allocation, Three Mile Creek becomes completely dewatered in the summer. Please seek out management activities that could increase water retention in the upper watershed in order to have more available water year-round.

Many ACSOs could be better met through a "no action" alternative. For example, many RRs are currently below the Forest Plan standards for woody debris in streams (which correlates to ACSO #3 and #8). Given that much of this area is

[14] Frissell, Christopher A., R. J. Baker, D. DellaSala, R. M. Hughes, J.R. Karr, D. A. McCullough, R. K. Nawa, J. Rhodes, M.C. Scurlock, R. C. Wissmar. 2014. Conservation of Aquatic and Fishery Resources in the Pacific Northwest: Implications of New Science for the Aquatic Conservation Strategy of the Northwest Forest Plan . Coast Range Association, Corvallis, OR. 44 pp. (http://coastrange.org/documents/ACS-Finalreport-44pp-0808.pdf)

[15] Pac. Coast Fed'n of Fishermen's Ass'ns v. NMFS, 265 F.3d 1028, 1037 (9th Cir. 2001).

[16] Klamath Siskiyou Wildlands v. Forest Service, 373 F. Supp. 2d.

entering the stem-exclusion phase, where trees naturally begin to die and structural diversity increases, No-Action would lead to more available LWD. Several sources point to passive management as the best approach to achieve ACSOs in RRs. Pollock and Beechie[17] reviewed the sizes of deadwood and live trees used by different vertebrate species to understand which species are likely to benefit from different thinning treatments. In Pollock and Beechie's study, passive management created dense forests that produced large volumes of large diameter deadwood over extended time periods as overstory tree densities slowly declined. To better meet the ACSOs, and enhance wildlife habitat, Bark recommends no commercial timber harvest in RRs.

Also, please analyze compliance with the ACSOs in the context of a changing climate. As weather events are is becoming more unpredictable, riparian areas can act as a refuge for organisms as a heat buffer and heat sink. Thus, restoring vegetation to provide shade over riparian zones will be crucial to the success of riparian inhabitants, as well as provide the latent effects of water purification and filtration.[18]

Variable Density Thinning

The scoping letter does not discuss whether there is an upper-diameter or age limit on the trees to be logged in this project. Most ecologists agree that removal of large, old trees is not ecologically justified and does not reduce fire risks. Such trees contribute to the resistance and resilience of the forest ecosystems of which they are a part. Large, old trees of fire-resistant species are the ones most likely to survive a wildfire and subsequently serve as biological legacies and seed sources for ecosystem recovery. They also are exceptionally important as wildlife habitat, before and after a wildfire event, and as sources of the large snags and logs that are critical components of terrestrial and aquatic habitats. For all practical purposes, they are impossible to replace.[19]

In the dry forest portions of Grasshopper, Bark suggest you follow the recommendations in the FS's Guide to Fuel Treatments in Dry Forests of the Western United States[20] (Guide), which elaborates on the "thin from below"

[17] Pollock, Michael M. and Timothy J. Beechie, 2014. Does Riparian Forest Restoration Thinning Enhance Biodiversity? The Ecological Importance of Large Wood. Journal of the American Water Resources Association (JAWRA) 50(3): 543-559. DOI: 10.1111/jawr.12206

[18] Seavy NE, Gardali T, Golet GH, Griggs T, Howell CA, Kelsey R, Small SL, Viers JH, Weigand JF. 2009. Ecological Restoration, 27:3; 330-338.

[19] DellaSala, D., Williams, J., Williams, C., Franklin, J., 2006. Beyond Smoke and Mirrors: a Synthesis of Fire Policy and Science. Conservation Biology, Volume 18, Issue 4 976-985.

[20] Johnson, M.C., D.L. Peterson and C.L. Raymond. 2007. Guide to Fuel Treatments in Dry Forests of the Western United States: Assessing Forest Structure and Fire Hazard. USDA For. Serv. Pac. Nor. Res. Sta. Gen. Tech. Rep. PNW-GTR-686. Portland, OR.

concept and specifies that **an upper diameter limit on tree removal is consistent with the purpose and need for the Grasshopper Project**.

In practice, thinning from below often has a DBH limit above which no trees are logged. In the Guide scenarios, all stems are harvested starting with trees smaller than 1" DBH, then proceeding to larger stems, with no trees larger than 18" DBH harvested. This limit is intended to retain larger, more fire-resistant individuals. While this upper DBH limit could be higher or lower depending on local harvest specifications and resource objectives, in every scenario examined by the Guide, an upper diameter limit of 18" DBH was applied to treatments.

To reduce impacts to existing wildlife habitat and ensure a viable future mixed-conifer seed source while promoting human safety within all proposed VDT prescription units, Bark recommends that the FS include an 18-inch DBH limit. Favoring large tree structure provides a higher level of resource protection, ensuring that the canopy is closed enough to protect moist microclimates and retaining the most fire-resistant, mature and old growth trees.

Bark has observed a conflict between the need to meet the Forest's timber targets and the goal of thinning forest to improve forest health. Often, we have seen older, larger overstory trees removed from the Forest to produce volume in areas that should focus on younger stand density. A DBH limit would be helpful to ensure that the prescription truly is focused on improving forest structure.

When Bark has suggested such diameter limits in the past, NEPA planners have dismissed the suggestion with the brief explanation that diameter limits don't give the FS enough flexibility in project design. If a hard DBH limit will not fit every unit, Bark suggests that the Forest Service adopt it as a guiding principle for project design that could be deviated from slightly when shown necessary.

Finally, in the recent Crystal Clear Restoration Project, the Forest Service rejected the concept of DBH limits in its Response to NEPA Comments, but all the contracts implementing the sale included DBH limits ranging from 21-29 inches. If a project like CCR, that was explicitly designed to meet timber volume targets, could include such DBH limits, we expect that a purpose and need such as that in the proposed Grasshopper project, can and should include an ecologically sound DBH limit.

Logging in Mature and Native Forest

The best way for the FS to ensure that there is an overall increase of old growth forest habitat in the future is to let mature forests grow unmanaged. Furthermore, there is new urgency to protect mature forests to store carbon in order mitigate climate change.

In comparing the map of treatment types to the GIS layers of past logging, it appears that the VDT prescription overlaps with native forest that the Forest Service has not previously logged. We understand that the stated purpose of the project is to "enhance forest health and vigor". As requested above, please clarify the intention behind this language. Does the FS seek to invigorate biodiversity and ecological function or invigorate commercial productivity? While you may seek to achieve both, 100 years of commercial management and fire exclusion resulted in a massive loss of biodiversity, degradation of watersheds and overall ecological function, demonstrating that commercial productivity is incompatible with ecological health.

Until recently, few studies have examined the effects of variable density thinning (VDT) at longer time scales. A study of 14-year growth response of residual trees in thinned and un-thinned VDT sub-treatments in five young mixed-conifer stands located on the Olympic Peninsula in western Washington revealed that thinning was not significantly effective at stimulating growth of upper canopy trees. In this size class neither diameter growth nor crown length increased significantly compared to trees in un-thinned patches.[21] This research does not provide support the FS's common claim that thinning will accelerate growth of residual trees. We must conclude that VDT prescriptions in native forest are intended to serve commercial goals, though research does not support this action for this purpose, either. Please redefine the purpose and need to accurately describe that the agency's motivations and goals for the project center on commercial productivity.

In 2016, the USFS and BLM released a bibliography, complete with annotations, compiling studies that have examined the impacts of thinning in mature forest stands[22] which was recently reviewed by Paul Reed, a PhD student at the University of Oregon.[23] Overall, the studies included in the bibliography addressed a variety of characteristics of old-growth forest structure. Reed found that while thinning can positively affect certain aspects of old-growth development, such as minimally increasing diameter size, there is generally a lack of, or inconsistency in, evidence that thinning improves old-growth characteristics. This is especially true regarding impacts of thinning on the abundance and size of snags and downed wood; these old-growth structural features were largely overlooked and the evidence that does exist suggests thinning does not adequately manage for these features. Based off this lack of

[21] Willis, John L.; Roberts, Scott D.; Harrington, Constance A. 2018. Variable density thinning promotes variable structural responses 14 years after treatment in the Pacific Northwest. Forest Ecology and Management. 410: 114-125. https://doi.org/10.1016/j.foreco.2018.01.006.

[22] Powers, M., and S. Wessell. 2016. Management impacts and developmental patterns in mature Douglas-fir forests of the Pacific Northwest: An Annotated Bibliography.

[23] Reed, P. 2016. Reviewing the US Forest Service and Bureau of Land Management's "mature stand thinning" bibliography. Available by request.

compelling evidence, according Reed, it is most appropriate to implement a precautionary approach towards managing and thinning mature forest stands.

Effectiveness of fuel breaks in affecting fire behavior

The WRWA notes that **when fires are pushed by a strong westerly wind even the White River will not provide a significant fuel break** because the main method of fire spread is long-range fire spotting. *WRWA at 5-34.* In proposing fuel breaks, Bark recommends the FS consider topographical conditions in detail, as fuel breaks are largely ineffective unless both weather and site conditions are "right" which cannot be guaranteed. FS should not seek to remove trees and vegetation, build roads, or disturb soils to establish any inappropriately located "fuel break".

Bark groundtruthed units along the 4860 road where a fuel break is proposed. This area contained stands of never-logged forest dominated by mountain hemlock and silver fir. This sub-alpine habitat is at extreme risk of being lost due to climate change and should be retained whenever possible. Given its fire regime, this cold, moist subalpine forest would only burn during extreme fire weather - conditions during which a fuel break would be largely ineffective in altering fire behavior and could put wildland firefighters' lives at risk if held as a line of defense. We observed that nearby previously logged units contained large numbers of small, young trees including lodgepole pine, creating more hazardous fuel in the long term.

In the NEPA analysis, please, consider the tradeoffs of losing mature, native stands to create a "fuel break" unlikely to impact fire behavior. The FS should not euphemize the destruction of native forest as a fuel break in order to make a project seem less controversial. The WRWA acknowledged that large fires are "within the range of natural conditions in the Crest Zone" though also noting that "the consequences of such a fire are not socially acceptable" *WRWA at 5-33.* It is time to change what is socially acceptable to match ecological realities. Instead of focusing on logging as a way to reduce fire risk, the Forest Service would do better by reducing its open road network through closing or decommissioning unneeded roads in this area.

Forest fires result from, and are driven by, a multitude of factors including topography, fuel loads, the fire history of the environment in question, and most importantly, weather.[24] The overwhelming factors driving large blazes are drought, low humidity, high temperatures and most importantly, high winds. Because weather is often the greatest driving factor of a forest fire, and because

[24] Wilderness Society, 2003, Fire & Fuels: Does Thinning Stop Wildfires?

the strength and direction of the wildfire is often determined by topography**, fuels reduction projects cannot guarantee fires of less severity**. [25], [26] In general, large fires are driven by several conditions that completely overwhelm fuels.[27] It is commonly accepted that reducing fuels does not reliably prevent large fires nor significantly reduce the outcome of large fires.[28] In fact, "Under very moderate conditions, fire behavior may be so benign regardless of fuel bed characteristics that there will be little detectable difference between treated and untreated areas." [29] According to this analysis of fuel reduction effectiveness, in about a third of cases reviewed mechanical fuel reductions *increased* fire spread.

In addition, some research **suggests that fuel reduction actions like fuel breaks may exacerbate fire severity** where projects leave behind combustible slash, open the forest canopy to create more ground-level biomass, and increase solar radiation which dries out the understory. High winds, steep slopes and highly combustible slash contribute to fire severity. The FS's Juncrock EIS notes that without comprehensive follow up to remove slash piles, chances of ignition rise. Considering there is a systemic failure to properly dispose of slash piles forest-wide, please analyze the impact of existing piles (there are many slash piles left over from the Bear Springs timber sale in the project area that are at least 3-5 years old) and future slash.

The effectiveness of fuels reduction is inconsistent, there are places where it appears to reduce fire spread under *moderate* fire weather conditions but tend to fail under *severe* fire weather. With climate change likely to bring more frequent and regular occurrences of severe fire conditions, the FS should not rely on the inconsistent and often counterproductive practice of mechanical fuels reduction. The scoping letter references "surface fuels reduction" **Please further describe exactly what "surface fuels reduction" entails. How is it different or the same as the proposed silvicultural treatments? Does this project follow the Strategic Fuel Treatment Placement Plan and the Wasco CWPP?**

ECOLOGICAL IMPACTS OF PROPOSED ACTION

[25] Carey, H. and M. Schumann. 2003. Modifying Wildfire Behavior–the Effectiveness of Fuel Treatments: the Status of our Knowledge. National Community Forestry Center.

[26] Rhodes, J. and W. Baker. 2007. The Watershed Impacts of Forest Treatments to Reduce Fuels and Modify Fire Behavior. Pacific Rivers Council, Portland Or.

[27] Meyer, G and Pierce, J. 2007. Long-Term Fire History from Alluvial Fan Sediments: The Role of Drought and Climate Variability, and Implications for Management of Rocky Mountain Forests. Jennifer Pierce and Grant Meyer. International Journal of Wildland Fire 17(1) 84–95

[28] Lydersen, J., North, M., Collins, B. 2014. Severity of an uncharacteristically large wildfire, the Rim Fire, in forests with relatively restored frequent fire regimes. Forest Ecology and Management 328 (2014) 326–334

[29] Martinson, Erik J.; Omi, Philip N. 2013.Fuel treatments and fire severity: A meta-analysis. Res. Pap. RMRS-RP-103WWW.Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 38 p.

IMPACTS ON WILDLIFE

Fish

Some subpopulations of redband trout may be genetically unique to the White River subbasin above White River falls. Among the greatest risks to this species is sedimentation of spawning and rearing areas, increased stream temperatures, and loss of habitat complexity. **Any riparian management in the Grasshopper project area should prioritize mitigating these impacts to redband trout habitat and restoring conditions necessary for long-term recovery of this species.**

Marten, wolverine & other wildlife

The White River WA cites evidence of pine marten presence within the Grasshopper project area. *WRWA 6-13*. Martens are associated with dense mature forests, are important indicators of a forest's biodiversity, and are vulnerable to management activities such as fuel reduction treatments that open the forest canopy or remove woody debris. 541 acres of this project are designated as B5 Pileated Woodpecker/Pine Marten Habitat Area that has the primary goal of providing mature and old growth forest habitat blocks of sufficient quality & quantity and distribution to sustain viable populations of pileated woodpecker & pine marten. *LRMP at 4-240.*

The Pacific Northwest Research Station investigated the effects of thinning on marten use of forest stands compared to untreated areas. In this study,[30] twenty-two martens outfitted with GPS collars avoided openings and forest stands that had been treated to reduce small-diameter trees, understory plants, and logs in Lassen National Forest. During the summer breeding and kit rearing season, martens were 1,200 times less likely to be detected in openings and almost 100 times less likely to be detected in areas structurally simplified by fuel-reduction treatments compared to structurally complex forest stands. Marten behavior was more erratic, with increased speeds and decreased complexity of movements, in open and simplified stands compared to forested and structurally complex stands. Martens move 3 to 4 miles daily, which is energetically demanding and increases their vulnerability to predation compared to animals that have a smaller daily range. Since martens selected home ranges with fewer openings and avoided stands with reduced structural complexity, the researchers of this study concluded that populations would benefit from increased stand connectivity within home ranges and at a landscape scale.

[30] Kirkland, John, Striving for Balance, Maintaining Marten Habitat while Reducing Fuels, Science Findings of the Pacific Northwest Research Station, issue 192, 2016

In the White River WA, there is a specific recommendation to retain Pine Marten Reserves 1031M, 1141M & 1131M because these areas are needed to provide a connecting link in a fragmented corridor that runs north-south and east-west through a heavily fragmented landscape. *WRWA at 6-13*. Many of the riparian areas are in poor condition and do not provide the needed habitat by themselves. *Id.*

How will the proposed project ensure that the following Forest Plan standards are met?:

- B5-010: At least 160 acres of mature and/or old growth forest habitat shall be maintained within each 320-acre Management Area. *LRMP at 4-243*.
- B5-011: Each 160 acres of mature and/or old growth habitat should be contiguous. *Id.* B5-012: Habitat improvement projects for mature and old growth species shall be encouraged. *Id.*
- B-5-020, 021: Commercial thinning may occur within the nonmature/old growth habitat component, ie stands less than 100 years of age. Crown closure within the forest canopy shall be at least 50% within commercial thinning activity areas. *Id.*
- B5-032: Open road density shall not exceed 2.0 miles per square mile. *RMP at 4-244.*
- B5-037: At least 24 snags greater than 20 inches diameter shall be maintained within the 160 acres of mature and/or old growth pine marten habitat. *Id.*

Knowing what the science is beginning to tell us about marten habitat, and that high-quality habitat exists within B5 areas, commercial logging in areas designated for management of pine marten that does not comply with all the Forest Plan standards should be dropped from this proposal.

Snag-dependent species

According to the White River WA, the watershed contains several wildlife species which currently have significantly less suitable habitat than in 1855 (the document's historic reference point). These species include flammulated owl, great gray owl, white-headed woodpecker, pygmy nuthatch, loggerhead shrike, fisher, long-eared myotis, and pallid bat. Several of these species depend on relatively open stands of ponderosa pine/Oregon white oak or ponderosa pine/Douglas fir. However, several of these species also require snag habitat which has been shown to be put in a long-term deficit after commercial thinning. Active management which would convert stands within this area into open "parklike" stands may benefit some species listed above, but would reduce habitat suitability for northern spotted owls, martens, fishers and other species over the long-term. Bark supports actions to restore habitat for the above

species, with utmost care given to maintain habitat for northern spotted owls, and with a priority given to non-commercial treatments which retain woody debris and a diverse mix of tree species.

Approximately 20% (34 species) of all bird species in the Pacific Northwest depend on snags for nesting and feeding and the abundance of snag-dependent birds is correlated with the density of suitable snags.[31] Studies show that, "cavity users typically represent 25 to 30% of the terrestrial vertebrate fauna in the forests of the Pacific Northwest."[32] This study goes on to note that a "lack of cavity sites is the most frequently reported threat to "at-risk" species in the Pacific Northwest." Large snags (as well as dense forest surrounding them) are habitat requirements of Westside indicator species like flying squirrels and northern spotted owls[33], and are currently in short supply due to past management. Because there are significantly less snags (as compared to historic numbers) in the planning area, Bark recommends that the Forest Service protect legacy snags where they currently exist. FS should exclude stands with high snag and large living tree densities from any logging and apply buffers on key snags and relatively large trees within proposed units.

As the agency knows, thinning of maturing forest has been shown to significantly delay attainment of MHNF's snag objectives.[34] The LRMP requires that dead wood be maintained to support 60% of maximum biological potential of cavity nesting species (FW-215). According to the FS, this standard and others often cannot be met because of the purpose and need for the project and the on-the-ground conditions present within the stands. In that case, the LRMP requires that any new timber harvest project include wildlife tree prescriptions to compensate for the deficiency.

In the context of snag-depleted ecosystems, a project that increases snag deficit is counterproductive. Research has shown that thinning lowers snag density relative to un-harvested stands.[35] Removal of trees that would otherwise die naturally will not help to meet the Forest Plan standard for snags. Please analyze the proposed action for compliance with the Watershed Analysis'

[31] Boleyn, P., Wold, E., and Byford, K., Created Snag Monitoring on the Willamette National Forest, USDA Forest Service Gen. Tech. Rep. PSW-GTR-181. 2002

[32] Bunnell, F.L., Kremsater, L.L., and Wind, E. 1999. Managing to sustain vertebrate richness in forests of the Pacific Northwest: relationships within stands. Environmental Review, 7: 97-146. Reeves et al. 2006b

[34] USDA Forest Service. 2007. Curran Junetta Thin Environmental Assessment. Cottage Grove Ranger District, Umpqua National Forest. June 2007. Using data from stand exams modeled through FVS-FFE (West Cascades variant) the Umpqua NF found that the actual effect of heavy thinning is to capture mortality and delay recruitment of desired levels of large snag habitat for 60 years or more.

[35] Windom, M. and Bates, L. 2008. Snag density varies with intensity of timber harvest and human access. Forest Ecology and Management 255(7) pp. 2085-2093.

recommendation to "follow the snag guidelines in the Northwest Forest Plan and Mt. Hood LRMP." *WRWA at 6-3.* **Bark requests that FS provide an analysis of and plan for increasing, not decreasing, the number of snags in the project area.**

Northern Spotted Owls

It is unclear from the scoping notice how much of the project area is in northern spotted owl (NSO) critical habitat sub-unit ECN-7. In the NEPA analysis, **please include a map that clearly delineates the relationship of the project area to ECN-7 and shows all the currently suitable and dispersal NSO habitat**. Where there is overlap between the Grasshopper Project area and NSO critical and/or suitable habitat, we request the FS not plan any logging in suitable and dispersal habitat that compromise the forest's ability to provide high-quality NSO habitat, as required both by the Spotted Owl Recovery Plan and the Mt. Hood LRMP at FW-175 ("Habitat for threatened, endangered and sensitive plants and animals shall be protected and/or improved."). Grasshopper, along with other management projects in the Eastside, could exacerbate the degraded habitat conditions for this threatened species that already exist in the watershed.

Unmanaged stands in the eastern portion of the White River watershed have allowed NSOs to persist where logging has greatly reduced suitable habitat elsewhere (before 1855, suitable habitat conditions in the Eastside Zone only appeared on steep north aspects and topographically sheltered areas along perennial streams, whereas now it appears on the uplands as well). The White River Watershed Analysis also recognized that nesting habitat would likely decline over the long-term in the eastern portion of the watershed, and that habitat must be rebuilt in the "Transition and Crest Zones" to the west. To this end the WRWA recommended maintaining existing NSO suitable and dispersal habitat in the Eastside Zone until increases in such habitat have been achieved in the Transition and Crest Zones.

If you do plan on decreasing the amount of suitable habitat, please explain in detail how this will meet the project's need to protect and enhance wildlife habitat, taking into account the research described below that found NSO are far more adapted to fire than they are to logging.

There are several other impacts we ask you to carefully explore, and work to mitigate, in the NEPA analyses relating to the viability of northern spotted owls: 1) the long-term effects on prey species habitat; 2) increased competitive pressure from barred owls; and 3) the new road construction and road re-building on northern spotted owl habitat.

Impacts to Prey species

In addition to reducing the canopy, commercial thinning also decreases the amount of large dead standing and down wood in the present and future, decreasing important habitat for prey species such as the northern flying squirrel, along with the majority of other forest vertebrates. The northern flying squirrel is a major prey of the northern spotted owl. In past NEPA analyses, the FS has acknowledged that flying squirrel densities are reduced by thinning, and suggested that the squirrels shift their distribution into "adjacent un-thinned areas without decline in overall density." However, this assumes the existence of "adjacent un-thinned areas", which are few and far between in the Grasshopper project, given that most of the project area is plotted as contiguous logging units, and in areas that are not Grasshopper units, many have been/will be logged as part of the Rocky sale.

There is a serious trade-off in several aspects of thinning to promote spotted owl habitat: the reduction in snags and down wood and the increased spacing of trees can reduce the productivity of the site for the northern flying squirrel for 20-40 years.[36]

Increased competitive pressure from barred owls

The owl's Revised Recovery Plan identifies competition from the barred owl as an important threat to the spotted owl[37]. Recent project analyses have made no or little mention of combined impacts of logging with the known effects of competition and trophic cascades associated with the barred owl. In the Pacific Northwest, the recent invasion of barred owls with loss and fragmentation of intact forest are combining to reduce population sizes of native species with limited adaptive responses to novel and fast-acting threats. As noted in the comprehensive work, *Population Demography of Northern Spotted Owls*[38], the fact that barred owls are increasing and becoming an escalating threat to the persistence of spotted owls does not diminish the importance of habitat conservation for spotted owls and their prey. In fact, the existence of a new and potential competitor like the barred owl makes the protection of habitat even more important, since any loss of habitat will likely increase competitive pressure and result in further reductions in spotted owl populations.

[36] Wilson, T. 2010. Limiting factors For Northern Flying Squirrels in the Pacific Northwest: A Spatio-Temporal Analysis. Union Institute & University, Cincinnati, Ohio.
[37] USDI, U.S. Fish and Wildlife Service. February 2011. Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls. Region One U.S. Fish and Wildlife Service, Portland, OR.
[38] Forsman, et.al, 2011, published for Cooper Ornithological Society.

In a recently published report, Holm et al. describe the potential trophic cascades triggered by the range expansion of the barred owl in our region. The authors suggest that the addition of the barred owl to PNW ecosystems may result in restructuring of communities or even potential local extinctions. If the rate of increase barred owl population continues, forests could experience a loss of prey species as well as loss of important ecological processes.[39]

Holm et al. discuss several potential indirect effects on ecosystem processes, which include a decline in tree and shrub growth and establishment through increased predation pressure on seed dispersing species as a consequence of barred owl predation. Increases in barred owls could also result in a decline in tree squirrel abundance, which could indirectly lead to reduced recruitment and growth of these forests that rely on spore dispersal. A potential decrease in soil processing may also occur with the expansion of barred owls, since reduced numbers of burrowing small mammals would lead to subsequent declines in the rates of decomposition of organic matter and litter, and mixing of forest soil.[40] These impacts need to be included in the Grasshopper analysis.

Roads impacts to owls

Northern spotted owls on average create an avoidance buffer of 1,312 feet from forest roads.[41] The Grasshopper scoping letter provided no maps of the proposed road work for the project, so it is difficult to assess the impacts of road building and if it overlaps with any suitable habitat. If the owls have a more than 1,000 foot avoidance buffer from roads, how will the logging operations affect their use of the area? And, while Bark knows the FS deems these roads temporary, they will have, at the least, an impact during operations and likely longer. The full impact of these roads, and their use, on owls must be assessed.

To fully address management requirements regarding northern spotted owls, Bark requests that the FS do a full analysis of the potential impact to critical habitat, prey habitat, response of barred owl populations, and roadbuilding in suitable habitat.

IMPACTS TO FOREST STRUCTURE

[39] Holm, S.R., B.R. Noon, J.D. Wiens and W. J. Ripple. 2016. Potential Trophic Cascades Triggered by the Barred Owl Range Expansion. Wildlife Society Bulletin; DOI: 10.1002/wsb.714

[40] Pearce, J., and L. Venier. 2005. Small mammals as bioindicators of sustainable boreal forest management. Forest Ecology and Management 208:153–175.

[41] Wasser, S.K., K. Bevis, G. King, and E. Hanson. 1997. Noninvasive physiological measures of disturbance in the northern spotted owl. Conservation Biology 11(4): 1019–1022.

Mature, previously unmanaged, & fire originated stands

Bark believes that any commercial logging, including thinning mature stands and/or removing mature trees, can reduce the quality of habitat and delay attainment of defining old-growth characteristics such as snags and dead wood that provide essential ecological services, including fish & wildlife habitat, carbon storage, slope stability, and capture-storage-release of water and nutrients. Furthermore, there is new urgency to protect mature forests to store carbon in order mitigate climate change, and to provide additional habitat as soon as possible to increase the chances that the spotted owls can co-exist with the invading barred owl (both issues which extremely important to Bark and are elaborated upon in other sections of these comments).

Bark has seen on the ground that old-growth characteristics often begin to be present in mature stands such as large trees, snags, multiple layers, slope stability, and carbon storage. Scientific literature demonstrates how "(s)ites that do not have the full complement of old-forest characteristics can partially function as old forests for those attributes that are present."[42] When old-growth forests are in such short supply, as they are in the Grasshopper project area, these mature stands act as important "life boats" that will carry closed-canopy dependent wildlife through the habitat bottleneck created by decades of overcutting. Bark has observed that old-growth characteristics, such as large trees, snags, multiple layers, and slope stability, often begin to be present in mature stands (defined here as being over 80 years old).

If retained, mature forest stands in Grasshopper will continue growing and removing carbon from the atmosphere for decades. These mature forests have not yet reached their full potential for carbon storage and will continue to sequester additional carbon in both wood and soil for a long time. Old-growth forests in the moist portions of the Pacific Northwest store more carbon per-acre than any other temperate forests in the world.[43]

In a recent study, Lutz and 95 co-authors compiled detailed forest plot data from 48 sites around the world and found that because large-diameter trees constitute

[42] Everett, R., P. Hessburg, J. Lehmkuhl, M. Jensen, and P. Bourgeron. 1994. Old Forests in Dynamic Landscapes: Dry-Site Forests of Eastern Oregon and Washington. Journal of Forestry 92: 22-25.

[43] Smithwick EAH, Harmon ME, Acker SA, Remillard SM. 2002. Potential upper bounds of carbon stores in the Pacific Northwest. Ecological Applications 12(5): 1303-1317. "The C densities we measured in old-growth forests of the PNW are higher than C density values reported for any other type of vegetation, anywhere in the world. … Results showed that coastal Oregon stands stored, on average, 1127 Mg C/ha, which was the highest for the study area, while stands in eastern Oregon stored the least, 195 Mg C/ha. … the highest C density was at stand CH04 at Cascade Head, ORCOAST, with 1245 Mg C/ha."

roughly half of the mature forest biomass worldwide, their dynamics and sensitivities to environmental change represent potentially large controls on global forest carbon cycling. They recommended managing forests for conservation of existing large-diameter trees or those that can soon reach large diameters as a simple way to conserve and potentially enhance ecosystem services.[44]

Where these mature forest structures exist (large down wood, large snags, large live trees, minor trees), **Bark recommends retaining no less than 60% of the canopy cover, retaining as much mid-story component of the stand as is feasible, retaining the largest trees in the stand, as well as retaining all legacy features.**

IMPACTS TO SOIL HEALTH

A common assumption is that as climate change intensifies, so do the stresses on the forest system, and thus the forest needs to be managed to remove those stresses. This logic often fails to account for the effect that logging has on mycorrhizal growth. Thinning can impact the health and prevalence of ectomycorrhizae in forests, which also help mitigate the effects of drought on individuals trees and increases availability of nutrients to trees included in the common mycorrhizal network.[45] Research has confirmed that the forest's underground fungal networks are vital to the "health & vigor" of an ecosystem.[46]

Additionally, wood debris from current or future fallen snags act as an inoculum for mycorrhizal species and also as a water retention site in the soil. In fact, exporting organic matter out of the forest only limits the ability of mycorrhizae to respond to soil compaction as woody soil debris act as a refuge for certain species. In addition, harvesting equipment compacts the soil, limiting the movement of oxygen *and water* through the soil and destroying soil structure. These effects of soil compaction on forest ectomycorrhizal networks can last up

[44] Lutz et al (2018). Global importance of large-diameter trees. Global Ecology and Biogeography. 2018:1-16. DOI: 10.1111/geb.12747.

[45] Wienscyz AM, Gamiet S, Durall DM, Jones MD, Simard SW. 2002. Ectomycorrhizae and Forestry in British Columbia: A Summary of Current Research and Conservation Strategies. B.C. Journal of Ecosystems and Management 2:1.

[46] Simard, Suzanne, et. al, 1997, Net transfer of carbon between ectomycorrhizal tree species in the field, *Nature,* volume 388, p. 579–582. *See also* Pickles, D.R.B., and Simard, S.W. (2017). Mycorrhizal networks and forest resilience to drought. Elsevier *In: Johnson, N. C., Gehring, C. and Jansa, J. (eds.) Mycorrhizal Mediation of Soil – Fertility, Structure, and Carbon Storage. Elsevier, Amsterdam, pp. 319-339.*

to 45 years.[47],[48]. As you prepare the NEPA analysis, please acknowledge the role of underground fungal networks in helping the forest's resilience to natural disturbances, and the impacts of climate change, and disclose the impacts of logging and road building on the health of the soil.

The WRWA specifically mentions that: "Soil compaction may be significant in Rock-Three mile, Gate Creek & S. half of Boulder", *WRWA at 5-17,* and that most soils in the mid and low elevations of the subbasin can be easily compacted, and are at a very high risk of compaction from use of mechanized equipment. *WRWA at 5-18.* Please carefully consider the ongoing health of the soil as an integral component of maintaining forest health and vigor, and ensure that the easily compacted soils are adequately protected by the Project Design Criteria.

ROADS, ACCESS & ROADLESS AREAS

Closures

The Scoping notice states that "roads will be closed if it is determined that closing the road would enhance, restore and protect wildlife habitat." While Bark appreciates the focus on reducing the amount of road/wildlife conflicts, there are many other reasons to close roads, including the legal requirement to identify and implement a Minimum Road System.

To address its unsustainable and deteriorating road system, in 2001, the Forest Service promulgated the Roads Rule (referred to as "subpart A"). 66 Fed. Reg. 3206 (Jan. 12, 2001); (codified at 36 C.F.R. §§ 212.1 to 212.21). Subpart A of the TMR requires the Forest Service identify the minimum road system needed to meet management objectives adopted in the relevant Forest Plan. 36 C.F.R. § 212.5(b)(1). To close the gap between the agency's limited resources and the maintenance required to keep up its oversized and deteriorating road system, the Forest Service must "[i]dentify unneeded roads to prioritize for decommissioning or to be considered for other uses." Id.

There are two stages in the process of identifying the MRS for each National Forest. First, as directed by the Forest Service's Washington Office, all National Forests were to submit travel analysis reports by the end of FY 2015, which MHNF completed.49; 36 C.F.R. § 212.5(b)(1) ("In determining the minimum road system, the responsible official must incorporate a science-based road analysis

[47] Amaranthus, MP, Page-Dumroese D, Harvey A, Cazares E, Bednar LF. 1996. Soil Compaction and Organic Matter Affect Conifer Seedling Nonmycorrhizal and Ectomycorrhizal Root Tip Abundance and Diversity. US Department of Agriculture Forest Service. Pacific Northwest Research Station, Portland, Oregon. Research Paper PNW-RP-494.
[48] Froehlich, Henry A.; Miles, D.W.R.; Robbins, R.W. 1985. Soil bulk density recovery on compacted skid trails in central Idaho. Soil Science Society of America Journal. 49: 1015-1017.
[49] Memorandum from Leslie Weldon to Regional Foresters *et al.* on Travel Management, Implementation of 36 CFR, Part 212, Subpart A (March 29, 2012).

at the appropriate scale"), and more importantly, the Forest Service must consider the recommendations from its Travel Analysis Report (TAR) in its project-level NEPA analyses for proposed actions at the sub watershed scale or larger in order to identify the MRS and unneeded roads for decommissioning in project areas. Given the amount of roads in the Grasshopper Project area, and the fact that the Forest Service is considering changes to system roads as part of the Project, it is precisely the type of action for which the Forest Service must complete the second step of implementing the MRS.[50]

Identifying the MRS for any given area of the National Forest, however, must accord with the specific criteria established under subpart A, which directs the agency to consider whether each road segment that it decides to maintain on the system is needed to:

- Meet resource and other management objectives adopted in the relevant land and
  resource management plan;
- Meet applicable statutory and regulatory requirements;
- Reflect long-term funding expectations; and
- Ensure that the identified system minimizes adverse environmental impacts associated with road construction, reconstruction, decommissioning, and maintenance.

36 C.F.R. § 212.5(b)(1).

Given that the Mt. Hood NF is considering changes to a number of miles of roads, and given the large geographic scale of this project, this is precisely the type of project where the Forest Service must consider the recommendations of the Travel Analysis Report (TAR) for the Forest and identify the Minimum Road System (MRS).[51] The White River Watershed Analysis, in its recommendations for restoration projects, acknowledges that the Mt. Hood Forest Plan requires MHNF to reduce open road densities to 2.5 miles per square mile in big game summer range, 2 miles per square mile in inventoried winter range, 1.5 miles

[50] Memorandum from James Peña, Regional Forester, to Forest Supervisors on Monitoring Travel Management NEPA Decisions for the Minimum Road System (Sept. 6, 2016) (explaining that "[p]roposals to develop the MRS may be incorporated into landscape level restoration projects or stand alone as a single purpose proposal," and "[t]ravel management decisions related to the MRS that require NEPA include removing a route from the Forest transportation system, decommissioning a route or an unauthorized route, closing roads to vehicular travel, putting roads in storage (converting an open road to a Maintenance Level 1 status) or changing the allowed classes of motor vehicles or time of year for motor vehicle use.")

[51] 36 C.F.R. § 212.5(b)(1) ("For each national forest . . . the responsible official must identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands.").

per square mile in A1 (White River National Wild and Scenic River), B2 (Scenic Viewshed) and B10 (Deer and Elk Winter Range) land allocations. *WRWA at 7-1*. Do the current road densities in the Grasshopper project area comply with these LRMP standards?

Road surface as a vector for sediment

Elevated road use for log-haul greatly increases erosion and sediment delivery on unpaved roads. Research on logging roads has consistently documented that roads used by more than four logging trucks per day generated more than seven times the sediment generated from roads with less use and more than 100 times the sediment from abandoned roads.[52] The Forest Service's own summary of scientific information on roads[53] concluded that "rates of sediment delivery from unpaved roads are . . . closely correlated to traffic volume." Even with a road surface of crushed rock aggregate,[54] documented that elevated truck traffic increased sediment production by 2 to 25 times that on unused roads in western Oregon.

Primary mechanisms for increased erosion and sediment production from road use are the production of highly mobile fine sediment on road surfaces, road prism damage, disruption of gravel or aggregate surfaces, and rutting. On constructed and reconstructed roads, the highly elevated sediment production from roads used for haul is delivered to streams at stream crossings and other points of connectivity between streams and roads, such as gullies and relief drainage features that dump elevated road runoff laden with sediment to areas in relatively close proximity (e.g., less than 300 feet) to streams. This impact of log hauling at stream crossings, alone, will greatly elevate sediment delivery to the stream system. **The Grasshopper analysis should include data regarding the projected increase of sediment from log haul on <u>all</u> roads used.** If it is likely that sediment would increase from wet-weather hauling the FS should also include these projections in the analysis.

Temporary roads

The scoping letter does not discuss temporary roads. We know from our work in other projects that the FS often plans to re-use previously decommissioned

[52] Reid, L.M., Dunne, T., and C.J. Cederholm, 1981. Application of sediment budget studies to the evaluation of logging road impact. J. Hydrol (NZ), 29: 49-62.

[53] Gucinski, H., M.J. Furniss, R.R. Ziemer, and M.H. Brookes. 2001. Forest roads: a synthesis of scientific information. General Technical Report PNW-GTR-509. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 103 p. Available online at: http://www.fs.fed.us/eng/road_mgt/science.pdf

[54] Foltz, R.B. and Burroughs, E.R., Jr. 1990. Sediment production from forest roads with wheel ruts. In: Proceedings from Watershed Planning and Analysis in Action. Symposium Proceedings of IR Conference, Watershed Mgt, IR Div, American Society of Civil Engineers, Durango, CO, July 9-11, 1990. pp. 266-275.

roads. Because many of these roads have been passively decommissioned, the agency claimed it will be achieving a net reduction in road density after the project when these roads are "rehabilitated". Bark has long found that, while this approach sounds good on paper, it does not reflect what happens on the ground. For example, Bark monitored the implementation of the Jazz Timber Sale, and has found many roads that were not properly winterized and/or closed after the work had been complete.[55] Bark's post-logging monitoring also other instances of temporary roads left open, with no erosion control measures, many seasons after logging had been completed, such as in the Swag, Dry, Bass, and Drum timber sales in the Clackamas River Ranger District. The problem is so systemic that when NMFS assessed the Jazz Timber Sale, it estimated that "…approximately 21% of the roads may not be decommissioned after project completion". *Jazz LOC at 25*.

We request that the Grasshopper analysis include a frank assessment of the FS's ability to ensure that "existing" roads are rehabilitated in a way that improves actual conditions on the ground. In addition, please define exactly what "rehabilitated" means, and the timespan in which a re-built, and re-decommissioned, road becomes hydrologically recovered.

Unauthorized Road Access

Post-project road closures are not always effective, any new or reopened road network is likely to be used by hikers, bikers, OHV riders and others. Bark requests a commitment from the agency to enforce effective barricades on roads built or rebuilt for this project when operations are not occurring. *This includes time when the area is still under contract but outside the normal operating season.*

The Grasshopper project area overlaps with the Rock Creek OHV area, along with several roads (and user-created trails) that have been either closed or decommissioned but are likely still in identified in the FS's database for potential templates for temporary roads. Reopening routes which that are currently intentionally closed to OHVs can also reopen the door for illegal and damaging activities if the roads are left open for an extended period of time.

Bark is concerned that building or rebuilding numerous roads for logging in Grasshopper could result in an increase of OHV access and would undo the restoration work done to remedy the damage done by the original entries. While Grasshopper is under contract, roads constructed for the project could provide unregulated motorized access over the course of multiple years, as roads may be needed for more than one season. Bark requests a commitment from the agency to enforce effective barricades on roads built or rebuilt for this project when

[55] This was especially frustrating as it is exactly what we warned the Forest Service would happen in our comments, appeals *and* litigation on Jazz.

operations are not occurring. *This includes time when the area is still under contract but outside the normal operating season.*

We suggest that any final decision should mitigate potential risks associated with future road development by, 1) continuing to firmly limit construction of new roads; 2) ensuring controlled access during the project implementation; and 3) ensuring timely & secure road closure upon the project's completion.

Specific Recommendations for reducing impacts from unauthorized recreational use in the Grasshopper project:

In order to restrict access to temporary roads and skid trails built or rebuilt for this project when operations are not occurring (including between the normal operating seasons if work in sale unit in question is not complete in one season), please consider the following recommendations:

- Between operating seasons *and* at the conclusion of the contract, include seasonal erosion control measures such as waterbar placement, and diversion ditch creation;
- Between operating seasons *and* at the conclusion of the contract, include piling slash on the first few hundred feet of temporary road or skid trail, and placing boulders at the entrance to units from main road;
- Incorporate skips to help obstruct unauthorized OHV use in thinned units. Leave a thick, "vegetated screen" along roads in areas where OHV use is expected based on past and current use. If there are areas within the units in question that would benefit ecologically from skips (such as seeps or other riparian areas), *do not* remove these in exchange for the vegetated screens, but look to achieve both the visual and ecological goals of the skips in these units;
- Provide adequate Sale Administration staffing for workload, so that coverage is available when the assigned Sale Administrator is not working;
- Require the Sale Administrator to discuss all requirements with contractor at pre-work meeting, review all pre-work discussions with contract representatives on site, and reemphasize as unit completion is eminent;
- Require inspection by Sale Administrator before contractor's equipment is moved offsite;
- Require implementation and effectiveness monitoring of PDCs by both Sale Administrator and other specialists, including during the harvest activities;
- After project implementation and before conclusion of the contract, fully implement and monitor effectiveness of the aforementioned activities in order to impede further damage from unauthorized motorized access to units after thinning has taken place.

Inventoried Roadless Area

The Grasshopper Project includes 272 acres of Inventoried Roadless Area (IRA), which is protected by the 2001 Roadless Rule, codified at 36 C.F.R. § 294. According to the Roadless Rule, roads may not be constructed or reconstructed in inventoried roadless areas of the National Forest System, except under very narrow exceptions. 36 C.F.R. §294.12(a). To the best of Bark's knowledge, none of the exceptions detailed in 36 C.F.R. §294.12(b) apply to the Grasshopper project. Similarly, timber may not be cut, sold, or removed in inventoried roadless areas of the National Forest System, except for small diameter timber if needed to improve threatened, endangered, proposed, or sensitive species habitat; or to maintain or restore the characteristics of ecosystem composition and structure. §294.13(a),(b). In the NEPA analysis please explain how any proposed activities within the IRA comply with the prohibitions of the Roadless Rule.

RESTORATION

Restoring beavers to the White River watershed

Historically, beaver-created wetlands were common in the White River watershed and especially throughout the eastern Grasshopper project area. Beaver activity creates productive and complex slow-water habitats for fish, helps moderate both base flows and peak flows, traps sediment and nutrients, and helps maintain riparian hardwood plant communities.

The WRWA makes it clear that the removal of beavers from the watershed resulted in altered ecosystem processes and decreased functionality leading to higher erosion and sediment delivery into streams, changes in riparian plant community composition, changes in stand conditions, lack of hardwoods and hardwood-dependent species, fewer wetlands, and degraded fish habitat. Beaver ponding is no longer significant within the Forest boundary, and many streams and wet areas no longer support cottonwood dominated communities. In some places, conifers have invaded and replaced the hardwoods as a result of beaver removal. See *WRWA* at 4-4, 4-11, 5-21, 5-36.

Several species in the White River subbasin depend on riparian hardwoods including yellow warblers, red-eyed vireos, and downy woodpeckers. Black cottonwoods are especially important to downy woodpeckers for cavity excavation. The lack of beavers within the watershed is correlated to the lack of large cottonwood and alder.

Beaver dams and the habitat they create are considered the foraging habitat for the peregrine falcon, a R6 Sensitive Species. As a R6 Sensitive Species, current policy guides the FS to manage for suitable nesting and foraging habitat for the

peregrine falcon. As beaver populations increase with development of beaver dams and ponds, waterfowl populations increase, which in turn provides increased prey species for the peregrine falcon.[56]

For wildlife advocates and agency specialists, restoring beaver habitat and/or reintroducing beavers into MHNF has been part of a long-term vision for restoring the health of Mt. Hood's ecosystems while creating resiliency against the projected effects of climate change on cascade environments. Bark supports this goal and encourages MHNF to explore the following tools relating to the process of beaver restoration as a part of the Grasshopper project:

The Beaver Restoration Guidebook - U.S. Fish and Wildlife Service

OFWO - Beaver Restoration

Beaver Restoration Toolbox

MidCoast Watersheds Council: Beaver Outreach & Education Materials

Bark volunteers drove up the end of the 4880 road, past Boulder Lake, to survey the wetlands for suitable beaver habitat. To reach the valley bottom, they walked through units 260 and 56, which were wet meadows blooming with wildflowers, with sparsely distributed young conifers. In the valley, the meandering Boulder Creek included several flat, wet areas dominated by alder and willow. The creek itself had many deep pools being used by numerous amphibians and trout. To their surprise, they found an area along both sides of the creek which had sign of old beaver presence. Volunteers found old beaver chew on trees, and an overgrown lodge at the confluence of two tributaries of Boulder Creek. This area should be further explored by the Forest Service for its potential for beaver-related restoration work, including reintroduction.

RECREATION

The project includes 543 acres in the newly designated National Recreation Area. Created by Congress "[t]o provide for the protection, preservation, and enhancement of recreational, ecological, scenic, cultural, watershed, and fish and wildlife values, there is established the Mount Hood National Recreation Area within the Mount Hood National Forest," this NRA limits commercial timber harvest in a manner similar to the Roadless Rule. Projects must be consistent with the purposes of the NRA designation, and also retain large trees, protect ESA-listed species and promote natural fire regimes. Please explain in detail how the project will enhance the protected values – especially recreation.

[56] Baker, B. W., and E. P. Hill. 2003. Beaver (Castor canadensis). Pages 288-310 in G. A. Feldhamer, B. C. Thompson, and J. A. Chapman, editors. Wild Mammals of North America: Biology, Management, and Conservation. Second Edition. The Johns Hopkins University Press, Baltimore, Maryland, USA

In addition, 213 acres of A5 Unroaded Recreation Area are proposed for treatment. With its goal of providing a variety of year-round unroaded recreation in a semi-primitive non-motorized setting and undeveloped forest environment, Forest Plan standard A5-018 prohibits timber harvest. *LRMP at 4-160*. Please be very clear about what your proposals are for this land allocation and detail how they meet the goals of the Forest Plan.

Given these two recreation-focused land designations, Bark requests that the Purpose & Need expand to include protecting and enhancing recreation opportunities in the Grasshopper Project Area.

CONCLUSION

Bark has some key suggestions for moving forward with the Grasshopper project, and request that the agency take these suggestions as separate alternatives or combinations of alternatives which the agency can then assess for their economic feasibility and value. We will be following up shortly with more detailed site-specific observations and will continue to send our members and volunteers out to the area to gather field information.

As the Forest Service is considering the optimal method of accomplishing the purpose and need for the Grasshopper project, please consider that active management is not always the best avenue to achieve forest health. In the comments above, Bark has provided ample suggestions to improve this project – based on our field surveys of the project area and relevant scientific literature pertaining to thinning, roads, and forest health. We anticipate a thorough review of these comments and look forward to the necessary changes made to both the forthcoming PA and the project itself.

Thank you,

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