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RE: Hunter Integrated Resource Project PA comments

Dear Jim,

As you are aware, Bark's mission is to bring about a transformation of public lands on and around Mt. Hood 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 forests surrounding Mt. Hood, including the areas within the Hunter project area, for a wide range of uses including, but not limited to: clean drinking water, hiking, nature study, non-timber forest product collection, spiritual renewal, and recreation. We submit these PA comments on behalf of our supporters.

Through implementation of the Hunter Integrated Resource Project (Hunter) in the Upper Clackamas Watershed, the Forest Service (FS) intends to pursue activities which emphasize "enhancing forest health and stand growth, improving critical habitat for northern spotted owl (NSO), enhancing Late-Successional Reserves and Riparian Reserves, and providing early-seral habitats. The project also includes changes to the transportation system to address areas of resource concern, improve road conditions along specific road segments, and identifying the maintenance level appropriate for project area

[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.

roads." Bark volunteers and supporters have extensively visited the Hunter project area, and our recommendations arise from issues that we have found while walking through the project area.

Bark submitted comments on the 2016 Hunter scoping letter, which we continue to urge the FS to consider while moving forward with this project along with the following comments. We request that you actively engage with the substance of these comments and use both the scientific and site specific information herein to create a better restoration project for the Upper Clackamas watershed.

"FIRE-ORIGINATED" STANDS

Logging in previously "unmanaged" forest stands is being proposed for 260 acres, a significant portion of the Hunter project. Bark has visited these native stands and found that tree species, as well as ages and sizes, vary and that legacy trees are common. This differs significantly from what the PA described as "trees of mostly the same age class and with a single canopy layer." Bark believes that the best way for the FS to ensure that there is an overall increase of high quality old growth forest habitat in the future is to let mature native forests grow unmanaged. Logging these stands does not meet the purpose & need of the project. Furthermore, there is new urgency to retain mature forests to store carbon in order mitigate climate change, and provide additional habitat to increase the chances that spotted owls can co-exist with the invading barred owl.

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.

In 2016, the FS and the Bureau of Land Management (BLM) released a bibliography, complete with annotations, compiling studies that examined the impacts of thinning in mature forest stands[2] which was recently reviewed by Paul Reed, a PhD student at the University of Oregon.[3] Overall, the bibliography managed to address a variety of characteristics of old-growth forest structure. While there is some reason to believe that thinning could positively affect certain aspects of late-successional development, there is generally a lack of, or

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

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

inconsistency in, evidence. This is especially true regarding the mid & long-term impacts of thinning on the abundance and size of snags and downed wood; these old-growth structural features are largely overlooked though available data suggests that thinning does not do an adequate job managing for these features. According to Reed, because of the lack of compelling evidence, it is appropriate to implement a precautionary approach towards managing and thinning mature forest stands.

Bark has seen on the ground that old-growth characteristics, such as large trees, snags, multiple layers, and slope stability, often begin to be present in mature stands (over 80 years old). 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."[4] When old forests are in such short supply, as they are in the Hunter 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.

The FS recognizes that thinning improves residual tree health and it may take longer for these residual trees to die in the Proposed Action scenarios than with No Action. Many other studies show that thinning lowers snag density relative to un-harvested stands.[5] Although the agency admits that timber harvest has undisputed negative effects on standing dead trees, it often claims that thinning will produce more structural diversity in the future. This claim is inherently inaccurate in regards to future snag recruitment, especially in native forest.

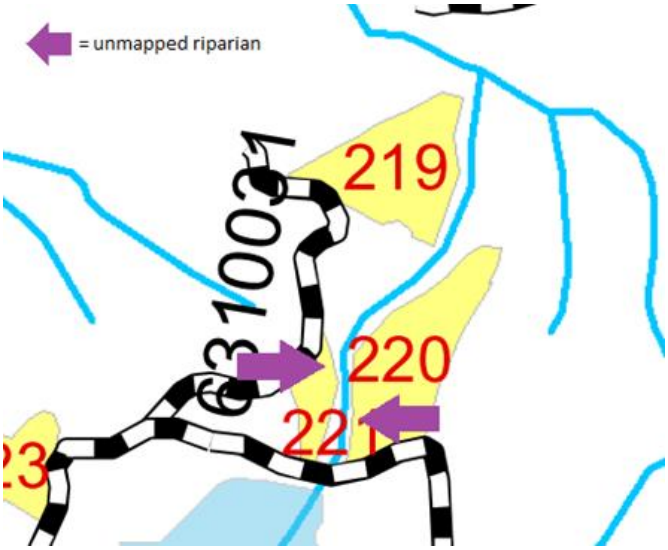
Large snags (as well as dense forest surrounding them) are required for the habitat requirements of Westside indicator species like flying squirrels and spotted owls[6], but are in short supply due to past and present management. Within Critical Habitat for the owl, the FS should exclude stands with high snag densities (in both native and plantation stands) from any commercial logging and apply buffers on key legacy snags.

Fire Origin Units 209 & 210 display several characteristics of a healthy mature multi-aged stand. Like other units we visited there are several large legacy trees and snags mixed in, and a gathering of down woody debris within the Granite

[4] 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.
[5] 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.
[6] Cline, S.P., Berg, A.B., Wight, H.M., 1980. Snag characteristics and dynamics in Douglas-fir Forests, Western Oregon. Journal of Wildlife Management 44, 773–786.

Creek tributary stream channel. Yew and Western red cedar grow in this riparian area which houses the most structural diversity within the units. As in several of the other native stands, Bark volunteers found individuals of *Hemitomes congestum*, which specializes in, and is adapted to, closed-canopy forests with healthy soils and mycorrhizal network connectivity. Deep organic soils, a closed canopy, and down wood are especially important in these stands since they include some of the steepest units within the Hunter project (in some areas >45%). These stands are entirely within NSO Critical Habitat and much of Unit 209 is within a Riparian Reserve. A logging prescription that removes existing canopy, decreases structural complexity, and adversely impacts soil stability does not meet the purpose and need of this project. Because of all these reasons, and those intermingled throughout these comments, Bark asks that the FS does not apply a commercial logging prescription to Units 209 & 210.

Bark also recommends dropping Fire Origin Units 219, 220, and 221 from the commercial logging proposal. All these units include legacy trees and snags, as well as an abundance of tree ages, down wood and healthy soils containing several species of *Ramaria* (indicator of old forests). Unit 220 contains an unmapped riparian area with a distinctly different plant community, which then channelizes and flows into the mapped Granite Creek tributary. At the northwestern section of Unit 221 Bark volunteers found an additional unmapped wet area feeding into the main channel of the same Granite Creek tributary from the opposite direction. Logging amongst these wet areas and their openings scattered on steep slopes seems even more unnecessary and potentially damaging given the road slumping clearly visible on 6310-220 as it crosses the top of these units. Building a new road into Unit 220, which already includes so much structural diversity, geologic instability, and unmapped water, should not be included in this project. This grouping of the fire-originated stands is mostly surrounded by young plantations or recent thins, making the older closed-canopy structure even more important to the landscape. Much of these units are within functional Riparian Reserves and all three are within Critical Habitat. Logging these units does not meet the purpose & need of this project, and they should be dropped.



The ecological rationale for logging in Fire Origin unit 217 is especially hard to understand. This is one of the smallest units in this project, and seemingly focused on an area containing legacy trees and steep slopes necessitating cable-logging. It is neither economically or logistically practical to carefully enter this steep, native stand with existing diverse structure in any way that will improve the stand, and should be dropped.

In several units, signs of past fire are evident on older snags, and on surviving Douglas firs and Western redcedars, some of which were upwards of between 50-60 inches DBH. There are numerous smaller down trees between 10-15 inches in diameter, suggesting that the stands are in the process of self-thinning. Valuable large-diameter down wood also exists in several of these stands, amongst large old conifers which reflect the age of the stand before the last disturbance. Units 206 and 215 also contained notable amounts of large standing and dead wood, some individuals of which were nearly 60 inches in diameter. Actively managing Unit 215 would involve reopening the previously "Decommissioned" Rd. 4650-170, which is experiencing channel erosion in the multiple stretches that don't contain waterbars. While Bark supports re-stabilizing this road using methods that would decrease this type of erosion, logging within native forest is not necessary for such road improvement to occur.

Fire-originated Units 203 & 204 (on steep slopes ~35% which will require cable-logging) contain noticeable mammal burrows, signs of pileated woodpecker and sapsucker foraging, some natural canopy gaps, with heavily thinned forest ("Y Thin") to the south & east, and suitable old forest habitat to north. Abundant wildlife habitat exist within these stands, which is concentrated in its standing and down wood, and arboreal nests that were found by Bark volunteers (flagging here) in Unit 204.

Units 203, 204 and several other fire origin stands contain a mid-story of smaller hemlocks (important structural occlusion for arboreal mammals), but an understory that contains few herbaceous plants except in gaps where trees have fallen. We would expect more gaps like these to form stochastically, adding to the complexity of the stands and diversifying the understory. The natural cycle of falling trees achieves structural complexity much better than commercial logging.

Fire Origin units 213 & 214 require one mile of new temporary road and include approximately 120 acres of thinning. Bark is concerned about the new roads entering an area with virtually no existing roads (contiguous ~2135 acres

surrounding Burnt Granite). This area is entirely in NSO Critical Habitat that would be opened up for an endless treadmill of unnecessary active management by putting in additional road access. Due to the imminent and obvious change in access, forest structure, habitat, and character, please **drop this new roadbuilding from the Hunter proposal**.

Again, we have visited the Fire Origin units and can find no immediate "forest health" crisis that requires active and heavy-handed managing these ecosystems in order to create less-ecologically valuable thinned stands which resemble stands largely surrounding these units**. Bark recommends that the agency pursue an action alternative that excludes commercial logging within the types of native forest conditions described above.**

EFFECTS TO NORTHERN SPOTTED OWLS

Section 7(a)(2)of the ESA requires the FS, in consultation with and with the assistance of the Secretaries of the Interior and Commerce, to insure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. 16 U.S.C. 1536(a)(2). The U.S. Fish & Wildlife Service recently updated the definition of destruction or adverse modification of critical habitat to mean: a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species.

There are **33 known owl sites** that have suitable habitat present within 1.2 miles of proposed project activities in the Hunter Timber Sale. Several of the proposed units have a multi-storied structure, large diameter trees and are close to having appropriate levels of snags and down wood required for NSO habitat. The proposed project would adversely modify this future owl habitat by reducing the forest canopy well below 60% and remove down wood, shrubs and snags, which provide habitat for important prey species.

In addition to the ESA's prohibition on destruction or adverse modification of Critical Habitat, the rule that designated this section of the forest as Critical Habitat determined that *all* of the unoccupied and likely occupied areas in this subunit are *essential* for the conservation of the species to meet the recovery criterion that calls for the continued maintenance and recruitment of northern spotted owl habitat. Increasing and enhancing northern spotted owl habitat is necessary to provide for viable populations of northern spotted owls over the long

term by providing for population growth, successful dispersal, and buffering from competition with the barred owl.

The 2011 Recovery Plan for the Northern Spotted Owl, the blueprint for management of this species on federal lands in the region (USFWS 2011), contains the proviso that long-term benefits to spotted owls of forest thinning treatments must clearly outweigh adverse impacts from commercial logging for fuels reduction. (USFWS 2011).

On February 17, 2017 Judge Mendez in the Eastern District of California ruled in favor of Conservation Congress' lawsuit against the Smokey Timber Sale on the Mendocino National Forest. The Smokey Timber Sale area is significant in that the vast majority of the project is in a Late-Successional Reserve and designated Critical Habitat for the Northern spotted owl. The judge stated the FS violated NEPA because of an inadequate range of alternatives; inconsistent Limited Operating Periods; failure to address past monitoring practices; and failure to take the requisite "hard look" at the project.

The lawsuit also forced the FS to re-consult with the US Fish & Wildlife Service multiple times, resulting in the establishment of two new Activity Centers for the spotted owl. The FS had inaccurately designated this area as foraging habitat instead of nesting habitat. It also misrepresented the critical habitat claiming it was marginal habitat that needed logging to "improve" it when the area has many large old growth tress providing excellent owl habitat.

In addition, several recent court cases from the Federal District Court for Oregon have confirmed that adverse impacts to Northern Spotted Owls and Critical Habitat is indeed significant under NEPA and requires analysis with an EIS. *See Cascadia Wildlands v. U.S. Forest Serv.*, 937 F. Supp. 2d 1271, 1274, 1283–84 (D. Or. 2013), *Or. Wild v. Bureau of Land Mgmt.,* 2015 WL 1190131, *9-10 (D. Or. 2015). Please follow the clear direction of the court and prepare an EIS to determine the extent of environmental impacts of the Hunter Project.

The Northwest Forest Plan assumed that eventually 80% of the agency-designated reserves would grow old and provide late successional habitat, while at any given time approximately 20% of the reserves might be affected by disturbance. As a result of climate change these proportions are likely to shift toward greater disturbance and younger forests. The FS should mitigate for this by adopting a decision for Hunter that truly protects ALL suitable and soon-to-be suitable owl habitat that there is, so it may become a larger part of the landscape given a chance to grow old and provide complex habitat for owls.

The Watershed Analysis includes the key recommendation of "Harvest outside of owl home range." *WA at 61*. The document goes on to predict that "(w)ithin 10 to 20 years conceivably at least seventeen of the Matrix owls could be subject to take. This could potentially affect 37% of the current owl population in the watershed." *WA at 48*. We asked the question in scoping: where are we at now in terms of owls already taken in the Hunter project area?

The Hunter project area includes 54,890 acres (over half the watershed) of spotted owl critical habitat. FS regulations require measures for preventing the destruction or adverse modification of critical habitat. *36 CFR § 219.27 (a)(8).* "Critical habitat" is defined in the ESA as "[t]he specific area within the geographic area occupied by a species . . . on which are found those physical and biological features (I) essential to the conservation of the species, and (II) that may require special management considerations or protections." Id. § 1532(5)(A)(i). "Destruction or adverse modification" of critical habitat is defined as "direct or indirect alteration that appreciably diminishes the value of critical habitat[,] . . . includ[ing], but . . . not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical." *50 C.F.R. § 402.02*. "Conservation" is further defined as "to use and the use of all methods and procedures necessary to bring an endangered species to the point at which measures provided pursuant to this Act are no longer necessary." *16 U.S.C. § 1533(3).* These statutes and regulations provide strict requirements for habitat protection that must not be violated under the proposed action. In addition, the MHNF LRMP requires that habitat for threatened, endangered and sensitive plants and animals *shall be protected and/or improved.* FW-175 (emphasis added).

Under the ESA, the FS has the responsibility to "insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species." *16 U.S.C. § 1536*. Hunter, along with other thinning projects in the CRRD, could immediately exacerbate the degraded habitat conditions for this species that already exists in the watershed. The near absence of any recent information from surveys or monitoring of this listed species makes a reasonable analysis of how this project and others proposed will cumulatively affect these species appear uncertain.

There are three other components not always carefully explored within project analyses as they relate to the viability of northern spotted owls. One is long-term

effects on prey species habitat and another is increased competition and initiation of trophic cascades resulting from the expanding range of the barred owl. The last is the impact of new road construction and road re-building on northern spotted owl habitat.

Impacts to northern flying squirrels

According to agency cited research, thinning stands within Hunter could reduce the suitability of the site for the northern flying squirrels for 30 to as much as 100 years. Northern flying squirrel (a principle spotted-owl prey) populations in mature and second growth forests decline after the stands are thinned and remain at low levels. Research has found that squirrel populations in un-thinned patches are larger than the thinned, and even those decline after *adjacent* areas are thinned.[7] Predation seems to be the most limiting factor – thinning seems to open the stands and result in a period of several decades when squirrels are too vulnerable to predation, so the population remains very low. Prescriptions that retain visual occlusion in the mid-story layers would be best suited for maintaining squirrel populations.

Variable-density thinning appears to keep squirrel populations suppressed, and may do so for several decades until long-term ecological processes (which are often also suppressed during thinning) provide sufficient structural complexity in the mid-story and over-story favorable to squirrels. Since recommendations for managing forest include retaining some areas of high stem density, retaining the mid-story, and retaining a contiguous closed canopy, we are concerned about the capacity of thinning, especially in native stands, retaining these key features. A strategy of maintaining adequate area and connectivity of dense, closed-canopy forests within managed landscapes by leaving areas of young forest un-thinned has been recommended by researchers to maintain northern flying squirrel populations[8].

In a 2013 paper by Todd M. Wilson and Eric D. Forsman, the Management Considerations includes the idea that: "It may be possible to develop new thinning prescriptions that keep moderately high populations of arboreal rodents in young forests while still achieving long-term management objectives for the stand." In the case of Hunter, one long-term objective is the viability of spotted owls in Critical Habitat. One such approach would be

[7] Wilson, T.M. 2010. Limiting factors for northern flying squirrels (Glaucomys sabrinus) in the Pacific Northwest: a spatio-temporal analysis. Ph.D. dissertation. Cincinnati, OH: Union Institute & University.

[8] Manning, T.; Hagar, J.C.; McComb, B.C. 2012. Thinning of young Douglas-fir forests decreases density of northern flying squirrels in the Oregon Cascades. Forest Ecology and Management. 264: 115 –124.

developing prescriptions in plantation stands that focus solely on skips (patches of trees left unthinned) and gaps (removal of patches of trees). This strategy is in marked contrast with most current prescriptions that typically thin throughout a stand (with or without delineated skips or gaps)." For this, Wilson and Forsman's research recommends keeping gaps small (100-400 m^2).[9]

Increased interactions with barred owls

The owl's Revised Recovery Plan identifies competition from the barred owl as an important threat to the spotted owl[10]. 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*[11], 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.

The *Population Demography* found, "[o]ur results and those of others referenced above consistently identify loss of habitat and barred owls as important stressors on populations of northern spotted owls. In view of the continued decline of spotted owls in most study areas, it would be wise to preserve as much high quality habitat in late-successional forests for spotted owls as possible, distributed over as large an area as possible."

Dugger et al. modeled extinction and colonization rates for spotted owl pairs in the South Cascade Demographic Study area where barred owls were detected on

[9] Wilson, Todd M.; Forsman, Eric D. 2013. Thinning effects on spotted owl prey and other forest-dwelling small mammals. In: Anderson, Paul D.; Ronnenberg, Kathryn L., eds. Density management for the 21st century: west side story. Gen.Tech. Rep. PNW-GTR-880. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station: 79–90

[10] 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.

[11] Forsman, et.al, 2011, published for Cooper Ornithological Society.

some home ranges[12]. They found that extinction rates for spotted owls increased with decreasing amounts of old forest in the core area, and that the effect was 2 to 3 times greater when barred owls were detected. They found that colonization rates for spotted owls decreased as the distance between patches of old forest increased (i.e., increased habitat loss and fragmentation) and that barred owl presence similarly decreased the rate of colonization of spotted owl pairs. They concluded that conserving large blocks of contiguous old-forest habitat was important for reducing interference competition between the two owl species.

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.[13] Increased predation pressure on traditional prey of the northern spotted owl by the barred owl could indeed result in a local decline of species present in the area of the Hunter project such as northern flying squirrels and red tree voles.

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.[14] These impacts need to be included in the Hunter decision.

[12] Dugger, K.M., R.G. Anthony and L.S. Andrews. 2011. Transient dynamics of invasive competition: barred owls, spotted owls, habitat composition and the demons of competition present. Ecological Applications 21(7): 2459-2468.

[13] 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

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

Impacts of road construction

Northern spotted owls on average create an avoidance buffer of 1,312 feet from forest roads.[15] 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 effects to northern spotted owls from this project, Bark requests that the FS do a full analysis of the impacts of the reduction in prey habitat, increase in barred owl population & competition, and impacts of roadbuilding in critical habitat.

FORAGE ENHANCEMENT

We have visited several of the frost pockets proposed for "forage maintenance and enhancement" and found they vary in size, plant mix and structure. Some of these units overlap land allocations Wild and Scenic River, Late Successional Reserve, and Riparian Reserve. Please make clear in your analysis how maintaining these openings using the methods described is consistent with the desired conditions of these land allocations.

As in other managed openings on the Forest, some of these openings already have non-native plants present such as scotch broom, oxeye-daisy, and tansy ragwort which the agency is presumably planning on removing. When we asked the FS during scoping whether these prescriptions would include use of herbicides to remove these plants, the reply we received was that herbicide use was "not included in the proposed action" at that time. Now herbicide spraying of oxeye daisy in forage unit 416a is "likely to occur". Please specify in the Decision which of the 10 herbicides identified in the "Site-Specific Invasive Plant Treatments for the Mt. Hood National Forest and Columbia River Gorge National Scenic Area in Oregon, including Forest Plan Amendment #16" FEIS the agency is planning on applying to this or any other sites. Even though an EIS has already been prepared for these herbicides, it is relevant to the overall impact of the project which chemical will be used.

In some of the frost pocket units we visited (such as Unit 462), we saw large Doug firs that are still alive, mostly residual trees from the time that the unit was originally cut. These trees could provide habitat for native species for several

[15] 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.

decades if left alive on site, and would unlikely successfully reseed the units (sapling trees, especially the hemlocks, found in these units consistently had signs of yearly die-back typical with hard frosts). Since one of the proposed actions is to remove encroaching conifers from these areas, in scoping we recommended only removing small encroaching conifers (<8 in diameter). We also recommend retaining the large down woody debris that currently exists within these units, as it will add to the diversity of wildlife able to utilize these areas. Please incorporate these recommendations into the Project Design Criteria

"FORAGE CREATION"

To the best of Bark's understanding, Hunter is the first project to incorporate large scale "regeneration harvest" for at least a decade (although we have seen larger and larger "gaps" on the ground in recent projects as part of "variable density thinning" prescription, with mixed results in regard of forage response). In the Hunter PA, the FS points out that commenters referred to Unit 102 as a "clearcut". Agency funded research found that for a number of microclimatic and ecological attributes, as well as public perceptions of scenic beauty, 15-percent green-tree retention resulted in responses to harvest that are not significantly different from those in a clearcut.

After not planning regeneration harvests in the District in over a decade, it is troubling that you are bringing them back with a controversial 98-acre unit. The Forest Plan states that forest openings created by the application of even-age harvest methods **should not exceed 60 acres** in the westside-Cascade Douglas-fir forest type. FW-349 The proposed action can only happen if the FS exempts itself from FW-349. According to the FS, Unit 102 was identified because it has many plant indicator species which are important for deer and elk foraging and may be reduced temporarily if the stand's canopy continues to close. FS also states that forage has declined since the peak of clearcut logging on the District. In large part, this is due to the continued policy of full fire suppression on the District, which were the historic source of forage openings.

FW-352 states: "Corners of created openings that touch shall be considered one single opening. Blocks of land separating created openings shall be large enough and contain a stand structure appropriate to meet resource requirements" According to the FS, the option of deleting a middle section of the unit to create two separate units of smaller size that would not touch, was considered but was not fully developed.

In the PA, the FS described this unit as flat, dry, and structurally uniform. This is an incorrect characterization of the unit. Unit 102 varies significantly over its

98 acres in both forest structure and topography. Volunteers measured the canopy to jump frequently between 40-80% canopy cover. There are snags measured at 39 inches DBH near the east unit boundary. Conifer diversity was noted, as volunteers identified Douglas fir, western hemlock, mountain hemlock, noble fir, Engelmann spruce, silver fir, and western white pine within the unit. Examples of large diameter trees included a 30 inch DBH Douglas fir, 25 inch DBH Western hemlock, and a 17.5 inch DBH noble fir.

Bark volunteers observed several hummocks and forest openings resulting from rock outcrops or other topographic origins, some with associated 18 degree slopes. Bark volunteers also found indicators of healthy soils and dynamic mycorrhizal communities underfoot, as shown by the presence of several individuals of Hemitomes congestum and Monotropa hypopitys, both mycoheterotrophic plants mostly found in mature forests with well-accumulated organic soils. Wildlife was also noted within the unit, with regularly observed deer and rodent scat, douglas squirrels, snowshoe hare, coyote scat, pileated woodpecker activity, and pacific tree frogs. Far from being "flat", Unit 102 covers both sides of a ridge, which the FS acknowledges in its rationale to exempt itself from FW-349: "Unit 102 is located on both sides of a ridge so that the entire unit would not been seen from one viewpoint."

The "Danger Trees" Unit 303 adjacent to the road re-building associated with Unit 102 is disconcerting given that most of the mature standing trees within this unit are large trees (some live, some broken tops and some snags) which are adding diversity and wildlife habitat to this mostly previously-logged area. Furthermore, it appears that it would only be necessary to take down old trees along a road that is currently decommissioned because of the plan to rebuild the road to access the southeastern portion of Unit 102. Removing old trees to allow this roadbuilding hardly seems justifiable, especially given the fact that the adjacent Unit 102 is slated for a type of logging that would likely result in the long-term removal of the majority of forest structures preferred by cavity nesters and other vertebrates dependent on standing dead and dying trees. We recommend pursuing future management at this intersection in a way that does not require removing old and ecologically valuable trees for the sole purpose of rebuilding roads that are stated to only be temporarily utilized.

"Regeneration harvest" tends to leave few or no snags,[16] and even when logging retains snags, the usual prescription is to have a minimum per acre which can be considerably fewer than needed for cavity-nesting animals. As snags decay,

[16] Lindenmayer DB and McCarthy MA. 2002. Congruence between natural and human forest disturbance: a case study from Australian montane ash forests. Forest Ecol Manag 155: 319–35.

they provide a long-term nutrient and water supply, and their removal obstructs nutrient cycling on the site. As such, this practice can reduce the species richness and key ecological processes associated with early-successional ecosystems.

Natural early-successional forest ecosystems have unique characteristics, including high species diversity, complex food webs and ecosystem processes[17]. Compared to historic conditions (i.e. before industrial-scale logging was common on public lands), this type of habitat is currently lacking on the public forest landscape, mainly because of the decades federal agencies have suppressed fires, and programmatically "salvage" logged the areas where fires do occur and replanted conifers, quickly taking away any early-seral habitat value.

In our scoping comments Bark pointed out that logging designed to emulate a natural disturbance has a different effect on soils, water, wildlife habitat, and biodiversity than the disturbance it attempts to step in for. As an alternative we recommended reintroducing fire back into the landscape (as the agency is with the meadow burning prescriptions in this project), which would improve deer & elk forage while also benefiting a host of other species. We encouraged the agency to look to existing openings to take advantage of what forage opportunities these conditions provide, including identifying additional locations for prescribed burning.

Bark has worked over the years to leverage public support in ending the destructive practice of clearcutting on Mt. Hood's forests, and interprets the sheer size and prescription of this proposed action as the agency going too far, too fast. **While Bark supports use of a prescribed burn on 11 acres of natural meadow (to promote early-seral habitat and species), we do not support the use of large-scale "regeneration harvest" as part of this project, and do not believe it best meets the goals of enhancing deer & elk habitat (much less other values) in the long term. Please drop unit 102.**

UNAUTHORIZED ACCESS IN HUNTER PROJECT AREA

On September 19, 2016 Bark notified USFS Law Enforcement Officers of a user-created trail we found starting at the intersection of FSR 4660 and 4661. The trail goes through the Unit 88 then connects with 5731-120, which is closed with a berm that has been circumvented from the side (Reported on August 20, 2015).

[17] Swanson, M. E., et. al. 2010. The forgotten stage of forest succession: early-successional ecosystems on forest sites. Frontiers in Ecology and Environment: 10.1890/090157

One could guess that individuals take the trail and then loop back past Devil's Ridge and back down the 4661. Here is another photo of the trail in Unit 88.

The 5731-120 road was slated to be "decommissioned" as part of Increment 2, and is currently labeled on Hunter maps as closed. It has been circumvented by a OHVs, and needs additional barricades for the closure to be effective.

If this illegal trail and road closure breach are not addressed, we are concerned that this activity may increase within this area. We have noticed a pattern of temporary road closures not being implemented by contractors in a timely fashion (as determined by projects' contracts), leaving access open to forests in units otherwise unreachable by the public. If and when Hunter is under contract, roads reopened for the project could provide unregulated motorized access over the course of multiple years if the roads will be needed for more than one season and there are not effective barriers placed on the entrances. Since there is an existing unauthorized trail network already in existence within this unit, we recommend that utmost care be given (see below recommendations) to preventing more trailbuilding from occurring (after this trail is destroyed).

A similar situation exists nearby on FSR 5731-116 accessing Unit 68, where an existing closure has been breached at its junction with roads 5731 & 5720. If additional road re-opening and roadbuilding occurs off the 5731-116, we would expect these associated areas to be explored further if effective and timely closures are not implemented.

Avoidance of further OHV related impacts

In 2015, FSR 6311-130 was rebuilt as a temporary road to access Bass Timber Sale units 6, 8, 12, & 14. The original metal barricade was not replaced with an effective substitute (the aluminum guardrail was simply laid across the road entrance). In early fall 2015, Bark observed that it had been removed, and the units had already been accessed by motorized vehicles (the temporary roads into the units off the -130 road itself were also not closed). After being made aware of situations like these, we hope the agency acknowledge what to likely expect with and without barriers to access on roads that are not intended to be accessed by the public during NEPA projects.

We have seen these types of circumstances in other projects proposed by the FS across the district. Bark is concerned that building or rebuilding numerous roads for logging in Hunter could result in an increase of OHV access, and would undo the restoration work done to remedy the damage done by the original entries. We are especially concerned about unauthorized access in the Peavine area (4660, 4661, 5731, 5720 & surrounding). This part of the forest experiences

more unauthorized trail building and road closure breaches than surrounding project area.

Some road closure and trail rehabilitation projects completed recently within the District's Goat Mountain project area have been effective in reducing unauthorized target shooting, OHV use, and garbage dumping in stands proposed for thinning. Restoration actions have included boulders and slash being placed along the road, berms, obliteration, re-contouring/de-compacting, re-vegetating, and the removal of trash. We believe these actions where implemented have been effective and encourage the FS to employ these types of strategies within the Hunter project.

While Hunter 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 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 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 Hunter 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.

Recently, we asked that the FS clarify the method to close the 4200-389, which is not visible from the 42. We raised a concern that simply cutting back the trees and constructing a berm may invite more harm than good if not done thoughtfully (the road being on flat ground, which usually creates situation where berms are easily circumvented).

At multiple CSP meetings, Bark requested that the FS pay extra consideration to effective closures on temporary roads in the Peavine area (4660, 4661, 5731, 5720 and surrounding). This area experiences more unauthorized trail building and road closure breaches than the surrounding project area, so the FS should work to rehabilitate all temporary roads and system road closures, and take

steps to deter future trail building or entry by OHVs during project implementation.

PLANTATION UNIT 108A/108B

Planation Unit 108a is adjacent to and contains one unmapped tributary into Last Creek (smaller, flowing in early September, and to the east of the mapped tributary on unit map), which contains federally listed fish species. The unit is situated on steep slopes and contains thin erosive soils which volunteers observed moving, even under foot. The unit structure is diverse, with canopy cover varying tremendously, pockets of conifer mortality creating openings, vigorously growing trees (volunteers commonly measured 25 inch diameter Doug firs). Unit 108b (embedded in 108a) is an open brushy meadow, which volunteers used to travel by foot from east to west. The access to this unit would evidently require extending the closed 4660-140 and building a new road alignment south.

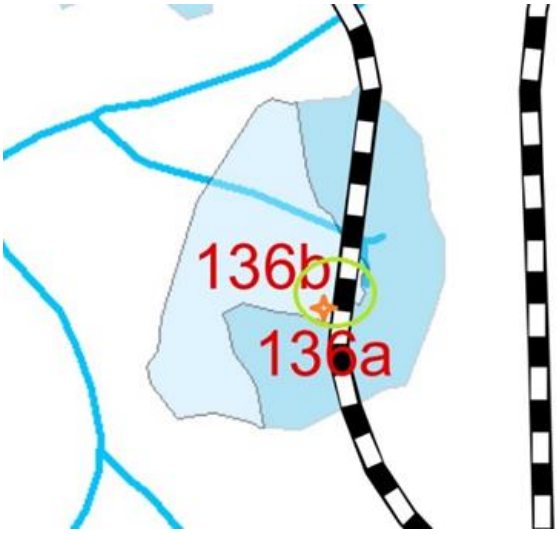
The 4660-140 road closure has already been breached, so both rebuilding and extending this road terminating in the already structurally diverse, steep Unit 108a is concerning given our past experience with unauthorized, opportunistic use of roads reopened or built for timber sales in the CRRD. With all the issues raised above, the overlying land allocation being Late Successional Reserve, proximity to listed fish habitat, as well as being within Critical Habitat, **Bark recommends dropping unit 108a/108b from the Hunter proposal.**

PLANTATION UNIT 124/124B

In Unit 124, we noted that several existing gaps were scattered about the unit, and in them existed increased species diversity. In an area labeled on the Hunter scoping maps as 124b (Plantation Thin/Brushing) existed a cherry tree grove with bustling songbirds and evidence of recent ungulate activity. While the intent or prescription is in Unit 124b is unclear, we see no ecological reason to enter the area with heavy equipment and alter an existing pocket of diversity within the larger Unit 124. Since there are existing pockets of reduced canopy cover within unit 124, we recommend looking to these and assessing their value before creating additional gaps (especially as much of the forest directly adjacent to Unit 124 includes an open canopy either resulting from age or recent pre-commercial thinning.)

PLANTATION UNIT 136

This unit, placed above Berry Creek (containing listed fish), is also along 4600-330, which is proposed to be closed as part of the Hunter project. Also along the 4600-330 are several previously thinned units with little understory regeneration. Where 136b meets the -330 road, Bark volunteers found several wetland plants including Drosera (sundew) within diverse, open areas inside the unit that contained completely saturated soils in early September (of 2016 – a very dry year). The map unit below marks the wetland complex (green circle) and the specific location where Drosera was found (orange star). The wetland likely extends beyond the green circle however.



Bark submitted this information to the USFS Westside botanist late last summer. These wetlands extended on both sides of the road and were marked by cottonwood trees and openings in the forest canopy. This wet area in Unit 136 should be excluded from the Hunter proposal, as it is restricted in its purpose and need to several actions, but nothing relating to wetland management.

North of the wetland, Bark volunteers noted two additional stream crossings, pictured here and here. These streams should be buffered from any future management proposal in this area due to its proximity to listed fish habitat.

PLANTATION UNIT 52

Much of unit is in Riparian Reserve, and is one of the most structurally diverse plantation units, with less densely spaced trees and several openings in canopy. There is an abundance of wildlife use, two streams adjacent (the southern with steep slopes leading down) with deep pools and existing down wood. The Riparian Reserve designation makes thinning in this unit, which is already providing habitat and structure not seem prudent to achieve the Purpose and Need of the Hunter project and to comply with the ACS. For these reasons **Bark recommends dropping this unit from the Hunter project.**

FS MUST "RIGHT-SIZE" THE UPPER CLACKAMAS WATERSHED'S ROAD SYSTEM

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 FS must consider its Travel Analysis Report (TAR) for the Forest, and identify the Minimum Road System (MRS).[18]

In 2015, the FS released its TAR, a synthesis of past analyses and recommendations for project-level decisions regarding changes in road maintenance levels. Included in this report was a list of roads "not likely needed", with the objective maintenance level being "D-decommission".

The Hunter analysis fails to discuss the need for a minimum road system, much less assess what the minimum road system for the project area might look like or whether the proposed road related actions work towards that minimum road system. To identify the minimum road system, the FS must consider whether each road segment the agency decides to maintain on the system is needed to meet certain factors outlined in the agency's own regulation.[19] Here, the FS should consider whether each segment of the road system within the project area 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.

In assessing specific road segments, the FS should also consider the risks and benefits of each road as analyzed in the travel analysis report, and whether the proposed road management measures are consistent with the recommendations from the travel analysis report. To the extent that the final decision in this project differs from what is recommended in the travel analysis report, the FS must explain that inconsistency. *See, e.g.*, *Smiley v. Citibank*, 517 U.S. 735 (1996).

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[18] 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.").

[19] 36 C.F.R. § 212.5(b)(1). *See also* Attachment A ("analyze the proposed action and alternatives in terms of whether, per 36 CFR 212.5(b)(1), the resulting [road] system is needed"); ("The resulting decision [in a site-specific project] identifies the [minimum road system] and unneeded roads for each subwatershed or larger scale").

In the Hunter project area, there are several of these “not likely needed” (Objective Maintenance Level being D-decommission) roads. The FS states that some roads identified in the travel analysis report as “not likely needed” were found to be needed in the near future. PA at 21. The FS should explain the timeframe it considered when analyzing whether a road is needed or unneeded within the project area, and it should explain the need. Bark requests the FS reconsider decommissioning in this project for these roads (included in list hyperlinked above), some of which were brought up in Bark’s scoping comments.

The FS notes that past decisions approved decommissioning of roads within the Hunter Project area, and that the Hunter Proposed Action will not include roads with existing NEPA decisions to either close or decommission. These prior decisions set up the baseline for this project. Knowing that, the FS should explain how many of those miles were actually physically decommissioned to date. The way the FS presents its previous work on roads, it appears to claim credit for prior, unrelated decisions which may or may not have been acted upon. This presents a false starting point and is likely to confuse the public, precluding meaningful comment.

We brought up several site specific road issues in our scoping comments. The FS mostly responded by saying that they are not interested in revisiting past NEPA which authorized decommissioning roads that are currently not yet decommissioned. Listed below are roads where we recommended reinforcing existing closures so the roads would not be illegally accessed before the roads are actually decommissioned. This was not a request to revisit old NEPA on decommissioning roads, however it was a request that the FS address illegal activity that it knows to be occurring within the Hunter project area (doing this may require the berms proposed in this to not simply be "similar to the berms previously constructed on these roads").

- 4660-140 – This road was meant to be “Decommissioned” as part of Increment 2, but is now labeled on Hunter maps as open. Currently this road has a breached berm (Fig. 1), and accesses an area that Bark notified Law Enforcement Officers (LEOs) about an illegal hunting perch installed directly over bait. This road, if left as is, would also provide access to areas in which new roadbuilding is proposed in Hunter. Since the berm has been pushed in (and insufficient flat areas surround the berm for circumvention), reconstructing a larger berm with inclusion of boulders would suffice to block access during the time between Hunter project implementation and when this road actually becomes decommissioned.

- 4660-170 – This road was meant to be "Decommissioned" as part of Increment 2, but is currently labeled on Hunter maps as open. Currently this road has circumvented berm, with a user-created road accessing the main system road. The terrain around this closure is flat and open, making it difficult to block access to this road. However, reconstructing a larger berm and placing an additional berm (on unauthorized entrance) with boulder placement could suffice to block access around the original berm during the time between Hunter project implementation and when this road actually becomes decommissioned.
- 4660-120 – This road was meant to be "Decommissioned" as part of Increment 2 currently labeled on Hunter maps as closed. The road needs larger berm or other barricade to prevent further attempts at breaching
- 5731-120 - "This road was meant to be "Decommissioned" as part of Increment 2 currently labeled on Hunter maps as closed. It has been circumvented by OHVs, and needs additional barricades for the closure to be effective

FSR 6311-130

Bark brought up the 6311-130 road (on B8 Earthflow) to the FS in a recent CSP meeting. We requested at the meeting that the agency address erosion at the stream crossing just past the junction with 6311-140, which is experiencing channelization and is carrying road fill towards the stream. We recommended using waterbars, outsloping or other method. We were assured that this issue would be resolved because timber sales maintain the roads that are used to access them, including addressing existing erosion issues.

This comes after we observed the 6350-120 (accessing Drum Unit 88) containing channel erosion (shown further downslope here) leading into three culverts on the north side of the road. We observed this after the thinning in the unit had occurred. The most eastern culvert is delivering sediment directly into a mapped adjacent stream channel (in photo: road fill (L) stream channel (R)). The other two culverts are partially buried in road fill (middle culvert; and west culvert) . There was absolutely no erosion control measures implemented on this road leading up to the winter of 2015/2016. Clearly the reassurance that the road-related erosion at the 6311-130 road would be automatically fixed by the logging-funded road work is not always warranted, and so Bark would like to express this concern again.

MISTLETOE UNITS

The Hunter project includes masticator treatment of 81 acres of forest within the project area that contain native dwarf mistletoe. In these stands the FS proposes to "remove brush as well as the stunted, small diameter hemlock trees and to plant the stands with species not susceptible to the parasite". The stands are located in critical habitat for the northern spotted owl, and the agency postulation is that they are not likely to develop into suitable owl habitat *without* this proposed activity.

The eastern portion of Unit 230 currently has some areas suitable for use by owls and other late-successional wildlife. Volunteers measured scattered Doug firs which were up to 47" DBH, and hemlocks up to 22" DBH. This unit appears to have no history of logging, and contains several tree species other than stunted western hemlock: lodgepole pine, silver fir, western white pine, Doug fir, and mountain hemlock. The canopy varies from 85% to 40%. Deer scat, sapsucker holes, bear scat, and several species of songbirds use this habitat.

We acknowledge and appreciate the agency's direction to actively promote forest structure which benefits owls. However, Bark also values - and must again draw attention to - the variety of ecological benefits of mistletoe such as food, cover, and nesting platforms birds and other small animals[20]. Mistletoe has been a natural component of a healthy forest ecosystem for thousands, if not millions, of years.

During this project planning, the ecological benefits of mistletoe should not be under-estimated, and prescriptions should reflect these benefits. For example, it has been suggested that mistletoe is a "keystone species" in many vegetation communities. The abundance and diversity of birds is correlated with the degree of mistletoe occurrence, and avian vectors seem to prefer infected hosts.[21]

It has also been noted that mistletoe brooms provide important habitat for relatively high densities of flying squirrels (important prey for spotted owls and other carnivores).[22] This function of mistletoe brooms is quite valuable in typical stands that are deficient in large snags.

[20] Watson, D.M. 2001. Mistletoe — A keystone resource in forests and woodlands worldwide. Annu Rev Ecol Syst 32: 219-249.
[21] Aukema, J.E. 2003. Vectors, viscin, Viscaceae: Mistletoes as parasites, mutualists, and resources. Frontiers in Ecology I(3): 212-219.
[22] PNW Research Station. Rocky to Bullwinkle: Understanding Flying Squirrels Helps us Restore Dry Forest Ecosystems. Science Findings. Issue Eight. February 2006. http://www.fs.fed.us/pnw/sciencef/scifi80.pdf

The fruit, foliage and pollen of dwarf mistletoe are a food source for numerous bird, mammalian and insect species. Dwarf mistletoe of all types alters the growth patterns of infected trees, creating structural complexity within forests in the form of witches brooms and snags, both which are used by numerous wildlife species (including some species of owls) for nesting, roosting and cover.

Research suggests that greater bird diversity is associated with increased mistletoe infestation; the key limiting resource for the birds in this situation may be snags. Management Strategies for Dwarf Mistletoe: Silviculture describes mistletoe control treatments in which infected trees were killed but left standing for woodpeckers and other cavity-nesting animals. Although these snags are used, they remained standing for only a few years. Studies of broom use by wildlife include work by Hedwall[23], and Garnett[24]. These studies identify which birds and mammals use witches' brooms, how they use it (for nesting and roosting), and what kinds of brooms are preferred. This information is useful to determine if retaining certain brooms is a potential benefit for a favored species. Still lacking are specifics of how the number and distribution of snags and brooms relates to levels of mistletoe infestation, and to wildlife populations and the dynamics (rates of generation and loss) of these features.

Knowing the contribution that dwarf mistletoe brings into high quality wildlife habitat, we ask that *larger hemlocks be retained on site* to ensure these values carry over through the transition this stand will experience through the Proposed Action.

Unit 240 of the hemlock dwarf mistletoe treatment overlaps with a portion of the Burnt Granite #595. In our scoping comments, we brought up the value of quiet recreation in the CRRD, and the contribution that this and other hiking trails offer the local recreation economy. The FS responded that this trail was identified as "sensitivity level 3" in the Mt. Hood Forest Plan, and that volunteers may choose to clear debris from the trail upon completion of the Hunter project. We find this solution to be dismissive of the individuals who use this trail, even more so when taking into account that the FS has since scoping cancelled the closure of multiple road segments that it lacks funding to maintain in order to satisfy forest users elsewhere. Please take steps to ensure that this trail is clear of logging debris so it can be enjoyed by forest users post-project implementation.

[23] Hedwall, S. 2000. Bird and mammal use of dwarf mistletoe witches' broom in Douglas-fir in the Southwest. MSc Thesis, Northern Arizona university, Flagstaff, AZ.

[24] Garnett, G. N.; Chambers, C. L.; Mathiasen, R. L. 2006. Use of witches' brooms by Abert squirrels in ponderosa pine forests. Wildlife Society Bulletin 34:467–472.

CLIMATE CHANGE

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. Last summer, 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 an executive order titled "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 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 FS must continue to carefully consider the effects of GHG emissions and climate change in all of its decisions.

The Hunter analysis does not attempt to quantify carbon emission or sequestration. The FS has claimed the short-term carbon emissions and the difference in long-term carbon storage that could be 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 has 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.

A report released by the Center for Sustainable Economy, Geos Institute and Oregon Wild late last year reveal that these emissions have averaged between 9.75 and 19.35 million metric tons carbon dioxide equivalent (MMT CO2-e) per year since 2000 on forestlands in western Oregon. This represents between 16% and 32% of the 60.8 million MMT CO2-e "in-boundary" emissions estimated for the Oregon by the latest (2012) GHG inventory (Making the forestry sector Oregon's #2 contributor to greenhouse gas emissions). While it is helpful to have the context of what the Hunter project's emissions will be compared to Portland's daily vehicle emissions, if the public is to understand the FS's role in climate change it would be even more helpful to place this project's emissions in the context of its contribution to the total timber sale emissions by the FS in Oregon.

It should also be noted that thinning of forests does not increase the rate carbon is added to forests. It does allow the remaining trees to grow faster and become larger faster, but one must remember that it does this for fewer trees. The claim that thinning increases forest production is really based on the amount harvested, not the amount of carbon entering the forest: these are two completely different things.[25]

Removal of biomass from any forest limits that forest's ability to sequester carbon for a period after the disturbance and can even turn the forest into a carbon source.[26] Not only has that, but the act of removing trees required carbon emission. *Id.* Most forms of logging, especially clearcutting, reduce the carbon sequestration capacity of the forest simply because trees that were once there capturing and storing carbon dioxide are no longer present. For clearcut forests, carbon sequestration capacity is not only reduced to zero but actually transforms sites from net carbon dioxide sinks to net carbon dioxide emitters for a period of 10-15 years.

Moreover, reducing tree densities increases weatherization of dead biomass, which would increase carbon emissions from the forest more. Current enthusiasm for wide-scale thinning must be tempered with a

[25] Mark E. Harmon Testimony Before the Subcommittee on National Parks, Forests, and Public Lands of the Committee of Natural Resources for an oversight hearing on "The Role of Federal Lands in Combating Climate Change", March 3, 2009.

[26] Harmon ME, Moreno A, Domingo JB (2009) Effects of partial harvest on the carbonstores in Douglas-fir/western hemlock forests: a simulation study. Ecosystems, 12, 777–791.

realization that removing too much fuel makes forests hotter, dryer, and windier which increases decomposition rates, which conflicts with carbon storage and other objectives. Certainly, forest fires do release CO_2, but only a small fraction of the total forest biomass is lost to the atmosphere. Due to the incomplete combustion of large wood, 70-80 percent of the carbon in tree stems remains after forest fires and, globally, 23 times more carbon is captured by photosynthesis than is emitted by fires.[27] [28] [29]

The FS insists that the scale of climate impact is inherently global, missing the fact that local actions have an impact on global climate trends. However, it is absolutely possible to quantify the amount of carbon sequestered in the project area at Hunter. The FS should be quantifying greenhouse gas emissions from its projects. Then it could take it a step further and provide active mitigation measures to offset the carbon emitted and the loss of carbon sequestered by the sale.

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.

Research suggests that increased atmospheric CO2 may increase tree growth through increased water use efficiency but this will depend on the local factors limiting tree growth. Using a spatially comprehensive network of Douglas fir chronologies from 122 locations that represent distinct climate environments in the western United States, Restaino et al. show that increased temperature decreases tree growth via vapor pressure deficit (VPD) across all latitudes. As temperature continues to increase in future decades, we can expect deficit-

[27] Gower, S.T., A. McKeon-Ruediger, A. Reitter, M. Bradley, D. Refkin, T. Tollefson, F.J. Souba, Jr., A. Taup, L. Embury-Williams, S. Schiavone, J. Weinbauer, A.C. Janetos, and R. Jarvis. 2006. Following the Paper Trail: The Impact of Magazine and Dimensional Lumber Production on Greenhouse Gas Emissions. Washington, D.C.:The H. John Heinz III Center for Science, Economics and the Environment

[28] Smith, J.E., L.S. Heath, K.E. Skog, and R.A. Birdsey. 2006. Methods for Calculating Forest Ecosystem and Harvested Carbon with Standard Estimates for Forest Types of the United States. U.S. Department of Agriculture, Forest Service, General Technical Report NE-343. Newtown Square, PA: Northeastern Research Station.

[29] Wayburn, L.A, F.J. Franklin, J.C.Gordon, C.S. Binkley, D.J. Mlandenoff, and N.L. Christian, Jr. 2000. Forest Carbon in the United States: Opportunities & Options for Private Lands. The Pacific Forest Trust, Inc., Santa Rosa, CA.

related stress to increase and consequently Douglas fir growth to decrease throughout its US range.[30]

Climate change will not only affect natural systems, it will also intensify the 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.

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. 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 to 45 years.

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.

Organisms can respond to climate change by existing in less affected microclimates, by adapting, or by migrating. By assisting the abilities of

[30] Restainoa, C.M., D. L. Peterson, and J. Littell. 2016. Increased water deficit decreases Douglas fir growth throughout western US forests. PNAS 2016 113 (34) 9557-9562

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.

The FS may be missing opportunities to practice adaptation planning, which could allow harm from climate change to occur on sensitive wildlife habitat in the future. The FS can: (1) increase or maintain carbon sequestration by avoiding forest removal, replanting forests, and restoring ecosystem function; and (2) facilitate response to climate change by sustaining genetic and species diversity through more forest preservation, enhancing landscape connectivity for migration/dispersal of plant and animal species, and by aiding dispersal to favorable climates. Id.

The Paris Agreement reached at the 21st Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC COP21) recognized the importance of ensuring ecosystem integrity and the role of forests in sequestering and storing carbon. The World Conservation Congress, at its session in Hawai'i, United States of America, 1-10 September 2016 encouraged States, the private sector and international financial institutions to "avoid loss and degradation of primary forests, including intact forest landscapes". These ecosystems were identified as irreplaceable in terms of biodiversity conservation and ecosystem services including clean water. Native forests in the Pacific Northwest contain globally significant carbon stocks, and these significantly more carbon than degraded and fragmented forests. As such Bark advocates for no logging in mature, never-logged forest stands in the Hunter project and elsewhere.

In 2008, the FS released its Strategic Framework for Responding to Climate Change, followed in January 2009 by a directive on the importance of addressing climate change in NEPA analysis. In this document, then FS Chief Abigail R. Kimbell characterized the Agency's response to the challenges presented by climate change as "one of the most urgent tasks facing the Forest Service" and stressed that "as a science-based organization, we need to be aware of this

information and to consider it any time we make a decision regarding resource management, technical assistance, business operations, or any other aspect of our mission."

The FS's *Climate Change Considerations in Project Level NEPA Analysis* provides the agency guidance on how to integrate climate change into NEPA analysis and documents. The guidance document discusses several aspects of the NEPA analysis and climate change:

According to the above document, the FS must fully analyze the cumulative and incremental impacts of the Hunter project, especially as the Proposed Action may increase emissions contributing to climate change. The National Highway Traffic Safety Administration failed to do so and was rebuked by the U.S. Court of Appeals for the Ninth Circuit in *Center for Biological Diversity v. National Highway Traffic Safety Administration*, which observed that "[t]he impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct." (538 F.3d at 1217).

The agency also has the responsibility to account for beneficial ecological services, as well as the negative impacts as part of this cumulative effects analysis. The FS must consider cumulative ecological and economic impacts of allowing a timber sale, such as harm to beneficial ecological services - including carbon storage.

Further, the FS needs to discuss all the effects that the Hunter project will have on climate change, as instructed in the service's *Climate Change Considerations in Project Level NEPA Analysis*. (p. 3). This discussion needs to include analyzing the impact on the carbon cycle and any increase or decrease in emissions arising from commercial logging, among other effects.

The FS must also discuss the impact that climate change will have on the project area. *Climate Change Considerations in Project Level NEPA Analysis*. (p. 3). There must be a discussion of how possible shifts in rainfall and snowfall and other expected climate changes will affect the goals of this project.

The FS needs to fully explore all possible "cause-effect relationships . . . between the proposal and climate change" pursuant to the *Climate Change Considerations in Project Level NEPA Analysis* instructions. (p. 3). Also in accordance with service policy, it should not "prematurely dismiss climate change issues as 'outside the scope' of the analysis." (p. 3).

In the Hunter analysis, there should be discussion of the contribution to climate change of the proposed project in terms of total and annual emissions AND in comparison with other emitters, consistent with the *Climate Change Considerations in Project Level NEPA Analysis*. (p. 6)."

CONCLUSION

Bark has several suggestions for improving the Hunter Project, and requests that the agency review these suggestions and create alternatives that meaningfully incorporate these suggestions – singly or together – to assess their economic feasibility and ecological benefit and to create a project that better achieves the purpose & need for the Hunter Project:

1. Remove new roadbuilding proposed into the currently un-roaded Burnt Granite area;
2. Remove Fire Origin units 203, 204, 209, 210, 217, 219, 220, 221;
3. Retain large trees and down wood in all Forage Enhancement units;
4. Remove regeneration harvest (Unit 102);
5. Obliterate existing unauthorized trails, and take steps to prevent additional unauthorized routes from emerging as a result of the Hunter Proposed Action;
6. Remove Plantation Unit 108a/108b;
7. Buffer all currently unmapped riparian areas within Plantation 136a/136b;
8. Remove brushing unit 124b;
9. Remove Plantation unit 52;
10. Reinforce existing closures to address illegal breaches that the FS knows to be occurring within the Hunter project area;
11. Address Bark's erosion concern on FSR 6311-130;
12. Ensure larger hemlocks be retained on site within Mistletoe units; and
13. Ensure that Burnt Granite #595 trail is clear of logging debris post-project implementation

Please include the following in the Hunter project EA:

1. Consider Mt. Hood's Travel Analysis Report, and identify the Minimum Road System for the Hunter project area;
2. Identify herbicide will likely be used within unit 416a;
3. Include discussion of the contribution to climate change of the proposed project in terms of total and annual emissions and in comparison with other emitters

4. Discuss the impact that climate change will have on the project area as it relates to the Proposed Action

As the FS is considering the optimal method of accomplishing the purpose and need for the Hunter 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 survey of both the project area and the scientific literature pertaining to aquatics, wildlife, roads, and forest health. We anticipate a thorough review of these comments and look forward to the necessary changes made to both the forthcoming decision and the project itself.

Thank you,

Michael Krochta
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