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RE: Comments on ReThin Scoping Letter

Dear Jim, Jan 23, 2008

Thank you for the opportunity to comment on the ReThin Plantation Thinning scoping letter on the Clackamas Ranger District. This project proposes to commercially thinning approximately 2,000 acres in "matrix, late-successional reserve and the dry upland portion of riparian reserves."

In over ten years of monitoring activity in the Clackamas River watershed, Bark believes the opportunity for active restoration is significant, and we hope that the ReThin project will be a step in the right direction. The scoping letter states that the project will "eventually be split into several timber sales or stewardship projects." As a member of the Clackamas Stewardship Partners (CSP) and a leading member of the subcommittee designing a matrix to prioritize restoration activities in the watershed, we recommend that the ReThin proposal be approved by the CSP. In doing so, Bark will be looking to see that the proposed actions improve fish habitat, wildlife habitat, and/or drinking water quality. Ultimately, funneling the project through the CSP will have greater community support and save the Forest Service (and taxpayers) money.

In addition to stewardship, Bark's Timber Sale Committee (TSC) has several concerns we want addressed in any subsequent analyses of thinning activities and impacts of such activities. We are submitting extensive comments on the topic of Decadence Management, as this is of particular concern to the TSC and has surfaced in numerous Forest Service analyses in recent years.

The TSC also requests:

- Accurate and fully marked maps of the project areas. Riparian areas, LSRs, and management designations, roads, streams, wildlife corridors, and other relevant GIS layers should be clearly marked. NEPA is supposed to allow for informed decision-making and the accuracy of maps is a crucial component. We recognize

that unit maps produced by the Forest Service have improved over time; we hope this trend continues.

- GIS layers developed or utilized in relation to this project and future projects be made publicly available on the Mt. Hood National Forest Data Distribution Library (http://www.fs.fed.us/r6/data-library/gis/mthood/data-library.html).

NEPA

Full Environmental Assessments, not PAs nor CEs should be used. PAs have proven to be misleading in Bark's attempt to rectify proposed actions and evidence in the field. Although the Forest Service has sent out one single scoping letter for all of these timber sales, separate Environmental Assessments (EAs) would be more appropriate. The proposed actions encompass several watersheds, and there are differences in elevation of thousands of feet with markedly different vegetation patterns, soil and earth flow conditions, and existing wildlife; these make the ecological and geophysical scope too broad for project issues to be handled by a single document. In addition, the fairly large size of this project (2080 acres spread out over 8 square miles) poses problems for the public to effectively comment on or participate in the planning process.

Purpose for Action

The scoping letter suggests that the Forest Service may use variable density thinning in the logging projects. We encourage the use of variable density thinning over uniform thinning.

The scoping letter states that one of its goals is to enhance diversity. The Forest Service should provide specific definitions, as well as the scientific basis for this reasoning. *This should include protections for minor trees species, deciduous trees, and habitat retention through decadence management.*

The scoping letter also lists one of the goals is to Increase health and growth. Disturbing an area, increasing cumulative impacts, and removing biomass will not result in increased health. The trees that are left may get bigger faster (although in the short term are more susceptible to blow down), but this alone does not mean a healthy forest. Enhancing LSR and RR implies minimizing impacts: retention of coarse woody debris, snags, no building of new permanent or temporary roads (see section *Roads* below) in these areas.

We believe the FS should commit to this being the final entry for all LSR and Riparian Reserve areas inside the project boundaries. If not, the cumulative impacts of future sales, as well as a timeline, should be included in any EAs conducted in relation to this project.

The Northwest Forest Plan is an ecosystem management plan. While it provides for timber harvest it does so within a framework of maintaining and enhancing the biodiversity. Each EA should specifically address the specific manner in which thinning will maintain and enhance biodiversity with examples from previous studies.

Roads

The 2003 Roads Analysis for Mt Hood National Forest states that the Forest Service cannot afford to maintain or manage the existing road system, having only half the necessary budget to keep it at full maintenance-level standards. Mt. Hood National Forest has more than enough roads. Many of these roads are active threats to the environment, creating entry points for illegal OHV use and invasive weeds, causing erosion, malfunctioning culverts, watershed damage, and fragmentation. More specifically, many of the roads proposed to be reopened, repaired, or used for log haul in other projects in the Clackamas district have also been specifically sited by at least one, if not three, Forest Service documents (the 2003 Roads Analysis, the Clackamas Watershed Analysis, and the 2003 Restoration EA) as problematic, and are recommended for closure, decommissioning, or terminal obliteration.

Since the areas in the project have been logged before, there should be no need for additional road construction. We request that any existing temporary roads be removed or effectively closed. This is a particularly important issue in near the proposed OHV area La Dee Flats. The only exception to this is if a new road is used for a single-entry treatment and directly supports a net loss in road mileage.

The Mt. Hood Resource and Management Plan and the Roads Analysis both call for a scaling back of the numbers of roads on Mt. Hood National Forest. This direction for Travel Management decision-making continues to be waived for site specific projects, with a net result of the continuation of more roads being built across Mt. Hood National Forest, within watersheds that already exceed the guidelines for road density. The misuse of temporary roads is another issue that we feel has been repeatedly overlooked and waived. The FSM states that temporary roads can only remain active for up to 5 years after their creation before they must be considered as part of the open road system (FSM 7701.2). It is problematic that the Forest Service does not consider temporary roads in their road density calculations, even though their impacts are long term, and they are habitually treated as permanent roads in temporary storage. This inappropriate treatment of "temporary" roads simply side-steps guidelines such as road density and construction standards, and FSM guidelines.

Any roads (temporary or otherwise) built or rebuilt, and not obliterated after project completion, should be analyzed for their cumulative impacts, including any planned future projects. Temporary roads that are to be rebuilt should be analyzed for their rate of recovery since the previous logging activity and this information used in determining cumulative impacts into the future.

Finally, we would like to see in each of the project EAs:

- The status of roads within the watersheds including, open road mileage, closed road mileage and roads listed in previous NEPA documents for obliteration that have not been obliterated;
- Roads listed for obliteration in previous NEPA documents that have not been obliterated;

- An estimation of "ghost roads," roads not listed as open or closed but exist and are passable by 4-wheel drive motorized vehicles; and
- Current shortfalls for funding of road maintenance and obliteration within the affected watersheds.

Riparian Areas

ALL riparian areas should be clearly and accurately marked on maps. Accurate, and accurately marked, buffers for streams and wetlands should be shown on maps and in the forest. We suggest providing a 50ft buffer for ALL riparian areas: perennial and intermittent streams should be considered equally. The Clackamas Ranger District is large enough that it can afford to provide an absolute minimum of 50 feet, with a goal of 60 feet or more when feasible.

We would like to see in the EAs the scientific basis for treatment in the riparian areas. We are especially concerned about the Riparian Reserve logging in the Collawash area. The Collawash watershed is very susceptible to landslides. In the past, areas of the Collawash have shown remarkable recovery without human intervention. We are concerned that some of these areas may be far worse off with FS management than without.

The Collawash Watershed

The Collawash watershed is a Tier 1 watershed. Consequently, protection of water quality for the sake of anadromous fish is the overriding objective. Please include in the EA any quantifiable data showing how this project will help anadromous fish.

The Collawash watershed is the most unstable watershed within Mt. Hood National Forest. After the Fish Creek watershed experience, all logging and road building within the Collawash watershed needs to end. Fan Creek has already shown signs of landsliding in the sales area. Moreover, we need to reduce the current negative impacts caused by the existing roads by aggressive road obliteration.

Areas of High Landslide Risk should be identified on all unit maps, especially those within the Collowash watershed, and considered in all Environmental Assessments.

There is ample justification for removing the Collawash from the timber base entirely. It is a Tier 1 watershed, it is the most unstable watershed on Mt. Hood, and it is prime anadromous fish habitat. The mitigation measures for many of the anadromous fish species discussed in appendix J2 of the Northwest Forest Plan suggest the removal of Tier 1 watersheds from the timber base.

Blowdown

The Forest Service must consider precisely the percentage and distribution of trees to be

left after thinning. While the scoping letter states that wind firm trees will be created, treatment areas with a significant percentage of trees removed and with a high percentage of consequent marginal or edge habitat, have a high rate blow down before they can become wind firm. The Forest Service must be explicit in the scientific basis for the creation of wind firm trees as stated in the scoping letter, and evidence that logging will actually decrease risk of blowdown. Each of the EAs done for this projects should detail this issue with specific citations and examples.

Soil

All road building and logging, especially adjacent to riparian areas increases erosion. The sediments are dumped into the streams, a significant concern for all watersheds and of particular concern within a Tier 1 watershed. Each EA should address soil loss mitigation measures.

Soil compaction caused by road building or rebuilding, and soil compaction due to heavy machinery such as tractors significantly reduce an areas growth and re-growth (See Barstool Timber Sale EA). Each EA should address soil compaction mitigation and true soil restoration after temporary road obliteration so that temporary roads are truly gone afterwards.

Again, of particular concern are any units in the Collawash area. The soil in the Collawash is very lose and fragile. Any activity in these units will cause serious erosion of the nutrient –laden topsoil, further exacerbating any forest health problems that do exist.

Invasive Weeds

Invasive weeds are an increasing problem throughout the previously logged areas of the Clackamas River Ranger District. Of particular concern are the large concentrations of Scotch Broom (*Cytisus scoparius*) found on many of the existing logging roads. A casual examination of the area many areas of the Clackamas provide ample field examples of this increasing problem; fields of Scotch Broom result from their seeds having been transported deep within the subwatershed on logging trucks. The problems posed by the introduction of non-native invasive weeds are well documented. EAs should address both the removal of existing invasives from the thinning area as well as document the procedures used to keep another round of invasives from being introduced to each watershed.

Elevation

There are significant differences of elevation between the projects. The EAs should address the differences (botanical, soil, wildlife, hydrology) between the units at different elevations.

Economics

We would like to see an economic analysis, including money that would be applied directly to true restoration activities.

Forest Health Alternative

Finally, we ask you to include a forest health alternative in the EAs. In this so-called forest health alternative, we envision an analysis of other methods for thinning any unnaturally dense stands, such as felling the trees, leaving the trunks for down woody debris and chipping the limbs, done over a much longer period than the usual commercial timber sale. Road obliteration would also be part of this alternative, as would invasive plant removal. Such a project could truly address the any forest health issues, without the incidental – yet serious - damage caused by an intensive commercial harvest operation. It could also serve to provide a sustainable source of employment for timber workers.

Cumulative Impacts

Because past logging made no effort to retain CWD, did not utilize variable density thinning, and riparian buffers were non-existent or inadequate, the areas are likely to be particularly fragile. Several of the units in this proposed project are from timber sales Bark has commented on in the past – this represents a very short return cycle and raises doubts about these areas' level of recovery from past activities. We do not believe such a swift rate of return fits with the goals of the Northwest Forest Plan. EAs for this project should explicitly consider level and rate of recovery in each of the units.

Visual Quality Objectives

Question: Do any of the timber sales fall within areas that the visual quality will be affected and fall below stated objectives?

Wildlife and Habitat

How close do the units come to Roaring River WSA? How close do they come to the Salmon-huckleberry wilderness? Edge effects on these areas should be avoided. Any units that would affect the wildlife or recreational quality of these valuable areas should be dropped from the sale.

One has only to look at a satellite map of Mt. Hood National Forest to realize that, outside of the Wilderness areas, the majority of the forest is a fragmented patchwork of timber harvests. How is yet another disturbance going to affect already disturbed and possibly sensitive species in fragmented habitat? Some of these species may have been moving back into some of these areas, only to be disturbed again. Is there any NSO habitat in these areas?

Many of the streams and rivers within the scope of the project carry salmon and ESA fish species. Sediment from roads and logging are known to negatively impact every watershed in which these activities take place.

Forest Service forest management guidelines include specific protections for species such as those that are TES listed (ESA) to the indicator species found in NFMA and the LRMP. In addition, there is the ecosystem focus found in FEMAT and the specific ecosystem management goals found in the NFP – which amends NFMA/LRMP. Failure to adequately manage decadence, a form of investment in future stand structure and ecosystem function, directly and negatively impacts both species and ecosystem function in violation of all of those planning documents.

Some of our biggest concerns are around decadence management, and the remainder of our comments address the some of these issues:

Decadence Management in Plantation Thin Projects

Decadence management, the management of death and decay in forest stands, presents a challenging topic for Forest employees traditionally focused on green tree rotation and harvest. In traditional harvesting-centered vegetation management, trees infected with pathogens were to be culled, forest stands with trees displaying decadence were to be cleared, and fallen trees were likely given little thought at all except where they interfered with timber movement.

The concept of ecosystem management in the pacific northwest was significantly altered with the Northwest Forest Plan (NFP). Decadence management became codified in a number of areas. While the approach found in the NFP differed from those found in the NFMA, NFMA too sought elements of ecosystem management via monitoring of indicator species and with various codes found within the Forest Plan.

The current condition of the plantation thin units is severely lacking structural diversity. Variable density thinning and other elements (i.e., minor tree retention) will address the lack of structural diversity in the green tree component of the plantation. But, those structural elements due to tree death and decay are also missing and the current plan inadequately addresses them. Specifically, decadence management is needed to address two important structural elements found in a forest ecosystem which are missing or severely depressed in the plantation, standing dead and dying trees (snags/decadent trees) and coarse woody debris (downed trees over 21" at the large end).

In stands regenerating due to a natural disturbance one finds copious quantities of both snags and CWD, so their absence at this point in plantation stand regeneration is unusual and unnatural. In addition, the "released" trees left after the thinning will not have to compete as strongly for the elements they need to grow (i.e., water, sunlight, nutrients).

These trees will be healthier than those typically found in naturally regenerating stands, allowing them to resist those factors that would lead to the creation of snags/decadence (resistance to disease) and CWD (snags naturally falling, blow-down, etc.). These unnaturally healthy stands will further aggravate the dearth of snags/decadence and CWD bringing these areas well outside the range of natural variability. The plantation's current lack of structural diversity is currently being addressed too exclusively in terms of green tree structure.

This will have specific and negative consequence across a broad range of forest ecosystem characteristics. For example, the simplification of forest structure due to the lack of these elements will also lead to plantations devoid or largely missing microclimate diversity and microclimate maintenance; a simplification of habitat diversity; a loss of habitats over time (habitat maintenance); maintenance of species diversity due to the simplification of microclimate and habitat; a loss of mycorrhiza platform which means corresponding losses to vegetation productivity and nitrogen fixing (already diminished due to the industrial forest conversion which skipped the nitrogen fixing roles of pioneer trees and shrubs). None of these issues are trivial and all are fundamentally important to proper functioning ecosystem processes and functions (i.e., ecosystem management).

This lack of ecosystem management violates a variety of provisions found within Forest Service procedure (i.e., management of TES species), the Mt. Hood Land and Resource Management Plan (i.e., indicator species management)), and the NFP. A small number of management steps could easily rectify this problem. Specifically, trees over 21" should not be cut and when they do need to be cut they should be left on the forest floor as CWD. Secondly, some trees within the LSR and RR should be inoculated with native heart-rot pathogens to encourage the growth of naturally occurring snags that have been shown to be significantly superior to snags created by girdling or topping.

Decadence Management: Coarse Woody Debris (CWD -- downed wood greater than 21" diameter at the large end) and Riparian Reserves (RR)

Current status of CWD in Managed Stands

Every Monitoring report from 1999 through to the most recent contains a comment very similar to this:

> Wildlife biologist on the Forest believe that we are meeting the standards and guidelines for snag retention on timber harvest units but we are falling below that guideline for down and woody material.

While the 1998 report was a little more blunt:

> Our down woody conditions are far below our Standards and Guidelines.

Recent planning documents have also taken note of the dearth of CWD in these plantation-thinning units (Cloak, appendix E)

> Large down logs are also lacking in these units due to past logging and fuel treatment practices.

The lack of CWD isn't a big surprise considering the type of old-forest liquidation and conversion to industrial plantation that occurred for the last 70+ years. Recent planning documents from the Clackamas Ranger District describe the CWD that is found in plantation units very similar to the ones that are included in this plan (South Fork Thin, Collawash Thin):

> There is a moderate amount of snags and downed wood in the proposed treatment stands, although much of it is small diameter wood. The stands average 3-4 snags/Ac and 3-4 downed logs/Ac (decay classes 1-5) however, the majority of the downed wood is not in desired decay classes 1, 2, or 3 and the distribution is scattered.

Past CWD management differences between Late Successional Reserves (LSR) and Riparian Reserves (RR).

In the 2007 Thin, within the LSR trees over 20" would not be cut, and if they needed to be cut they would be left in place to help address the lack of this ecosystem component within the LSR. In the RR and Matrix, large trees would be cut and there was no attempt to address the lack of CWD. Worse yet, where the RR and LSR land designations overlap, the RR would not take the more conservative LSR practice of leaving large trees but would instead follow the Matrix practice of taking large trees and leaving none as CWD. This is in direct opposition of the practice found in the NFP where the more restrictive designation had precedence where land allocations overlapped, and it specifically creates impoverished RR that violate the Aquatic Conservation Strategy (ACS) by specifically acting to retard and/or prevent the attainment of ACS goal #8.

Importance of CWD

It is important to view CWD as an investment in the future since decay takes decades, large downed green trees today will decay over many decades providing a host of ecosystem benefits throughout the process. These benefits include, but are not limited to: structural diversity; microclimate diversity and maintenance; habitat diversity and maintenance; maintenance of species diversity; mycorrhiza platform; and nitrogen fixing. None of these issues are trivial and all are fundamentally important to proper functioning ecosystem processes and functions (i.e., ecosystem management).

CWD is required for proper functioning of the forest ecosystem and the consequences of its lack are felt far from the forest where it originates (PNW GTR-229):

> Large, fallen trees in various stages of decay contribute much-needed diversity of ecological processes to terrestrial, aquatic, estuarine, coastal beach, and open ocean habitats in the Pacific Northwest. Intensive utilization and management can deprive these habitats of large, fallen trees. This publication presents sound information for managers making resource management decisions on the impact of this loss on habitat diversity and on ecological processes that have an impact on long-term ecosystem productivity.

Structural Diversity Provided by CWD

The maintenance and reintroduction of structural diversity has become increasingly important to the ecosystem management goals found of the Clackamas River Ranger District. The need to improve the structural diversity is found in the streams themselves since they too lack CWD and the District recognizes that this impairs aquatic ecosystem functions and processes. From the 2007 Clackamas Restoration EA Decision Notice:

> *Streams can be improved by replacing lacking elements or by repairing existing features. Projects include the installation of logs or boulders in streams and rivers and the creation of side channels.*

Just as the lack of CWD in streams has had a negative impact on the aquatic ecosystem function and processes, so too have the forest ecosystem functions and processes been negatively impacted by previous projects that brought structural homogeneity to the forest. Like the Forest management projects that are being implement to bring structural diversity back to forest waterways, so too have recent Forest management projects sought to bring structural diversity back to the forest ecosystem.

You will find this statement in many of the recent projects implemented by the District (e.g., 2007 Thin EA, South Fork Thin EA, No Whisky Thin EA, Upper Clackamas Thin Scoping Letter):

> This action is needed because these plantations lack certain elements of diversity...There is a need for greater variability of vertical and horizontal stand structure.

This homogenization of forest structure found in forest stands that have been converted to plantation includes limited variability of forest floor structure. This lack of structural variability in plantation units is exceedingly well documented on both Forest Monitoring Reports and in timber sale EAs. The lack of this specific ecosystem component found in mature and late-seral forests, downed wood greater than 21" diameter at the large end, prevents the attainment of mature and late-seral stand conditions. While the remaining green trees left in the stands will grow larger faster, they will also not be competing for limited sun, water, and nutrients so they will remain vigorous for many decades longer than typically found in an unmanaged forest. This stand condition consisting of a cohort of aberrantly healthy trees that won't succumb to death and decay for many decades longer than that found in a functioning mature and late-seral forest will significantly retard the attainment of mature and late-seral stand conditions. Even when some of these aberrantly healthy trees are infected with one of the many native pathogens, their superior health will retard the progress of decadence within them. So too will these aberrantly healthy cohorts be wind-firm and physically robust, delaying weather related disturbance to the stand. When they finally fall to the forest floor, only then will the stocking of CWD begin. This will further set the clock back on the attainment of appropriate amounts of CWD in an array of decay classes.

Forest Ecosystem Processes and Functions Provided by CWD

This lack of CWD in an array of decay classes has a large impact on a variety of forest ecosystem processes and functions. The diminution of the ecosystem complexity has direct and measurable impacts on animal species (PNW-GTR164):

Large, fallen trees in various stages of decay contribute much-needed diversity to terrestrial and aquatic habitats in western forests. When most biological activity in soil is limited by low moisture availability in summer, the fallen tree-soil interface offers a relatively cool, moist habitat for animals and a substrate for microbial and root activity.

…dying and dead wood provides one of the two or three greatest resources for animal species in a natural forest . . . if fallen timber and slightly decayed trees are removed the whole system is gravely impoverished of perhaps , more than a fifth of its fauna. (quoting Elton 1966, p. 279)

A broadened philosophical view of management-a forest versus a commodity-is necessary if certain structurally related functions, such as retention of water and cycling of nutrients in large, fallen trees, are to be options in managed forests of the future. (Maser and Trappe 1984)

The diminution of the forest floor structural diversity has direct impacts how the forest ecosystem functions because of its unique role (PNW-GTR229):

The forest floor is the interface between the belowground and the aboveground components of the forest. As a center of intense physical, chemical, and biotic activity, it both influences and reflects ecosystem functions. In turn, ecosystem functions reflect the array and quality of processes resulting from structural diversity.

Decadence Management, CWD Prescription

Avoid cutting all trees over 21" and those trees that do need to be cut are to be left on the ground to help bring the plantation back into the range of natural variation for CWD.

Decadence Management: Snags and Decadence

The recent plantation thinning projects (2007 Thin, No Whisky, South Fork) have taken steps to insure that trees with visible signs of decay and legacy snags are protected via small "skips" created around them. This was an important step in Decadence Management. But it is time to address the issue of the general lack of snags and decadence typically found in a healthy plantation. The awareness of this issue has been around for years which is why you find the topic of snags taking up such extensive portions of FEMAT, NFP, and the LRMP as well as specific snag creation projects found in many of the previous projects that make up this proposal (i.e., girdling snag-creation found in Sorel units).

A number of studies have clearly shown that snags created in a manner that mimic those created by more natural events (pathogens or insects) are superior to those created by girdling or topping. Of those options, heart-rot inoculation is the most easily implemented due to cost and logistical factors. When this issue was presented in the

2007 Clackamas Restoration EA, it was specifically noted that timber sale planning is where this type of project needs to be incorporated.

Active Decadence Management: Snag & Decadence Creation

Decadence management is an important aspect of post-plantation forest ecosystem restoration. As noted by Rose et. al. (2001)[1] (p.580, 581):

> …The ecological importance of decaying wood is especially evident in the coniferous forests of the Pacific Northwest. In this region, the abundance of large decaying wood is a defining feature of forest ecosystems, and a key factor in ecosystem diversity and productivity
>
> …Large accumulations of decaying wood provide wildlife habitat and influence basic ecosystem processes such as soil development and productivity, nutrient immobilization and mineralization, and nitrogen fixation.
>
> …New research over the past three decades has emphasized the significance of decaying wood to many fish and wildlife species, and to overall ecosystem function. The importance of decaying wood to ecosystem biodiversity, productivity, and sustainability is a keynote topic in two recent regional ecosystem assessments in Oregon and Washington. [FEMAT 1993 Chapters III and IV; PNW-GTR-405]
>
> …Intensive forest management regimes have substantially altered the abundance and composition (species, size, decay class) of decaying wood in forest ecosystems in the Pacific Northwest. Managed forests, on average, have lower amounts of large down wood and snags than do natural forests.
>
> …the density of cavity trees selected and used by cavity-nesters is higher than provided for in current management guidelines.
>
> …Effective approaches to managing decaying wood require that dead wood components of wildlife habitats be viewed within the context of the larger interacting ecosystem.

Effective management of decadence in the forest has been demonstrated to not be a simple matter of mechanical snag creation. In short, concentrating on the development of decadence within living trees has shown to be preferable to simple tree death if snag usage is to be linked with "biological potential" and other Forest Plan management goals. Primarily, this is due to the significant role of the pileated woodpecker, the primary cavity excavator of our Pacific Northwest forests. This species has been described as a "keystone species"[2] due to its pivotal role as a habit modifier in the forests of the Pacific

[1] Wildlife-Habitat Relationships in Oregon and Washington, "Decaying Wood in Pacific Northwest Forests," p580-623

[2] http://www.fs.fed.us/psw/publications/documents/gtr-181/023_AubryRaley.pdf; The Pileated Woodpecker as a Keystone Habitat Modifier in the Pacific Northwest; Aubry and Raley; PSW-GTR-181; 2002

Northwest because it is the only animal "…capable of creating large cavities in hard snags and decadent live trees."

> A wide array of species, including many that are of management concern in the Pacific Northwest, use old pileated nest and roost cavities. In addition, pileateds provide foraging opportunities for other species, accelerate decay processes and nutrient cycling, and may facilitate inoculation by heart-rot fungi and mediate insect outbreaks. Because of the potential keystone role of pileated woodpeckers in Pacific Northwest forests, it may be appropriate to give special attention to their habitat needs in forest management plans and monitoring activities.

Beyond the obvious nesting needs of the northern spotted owl and other species associated with the Northwest Forest Plan (common merganser, silver-haired bat, fisher, American marten, the bufflehead, flammulated owl, and Vaux's swift), pileated cavities provide denning sites for the equally important tree squirrels:

- http://www.fs.fed.us/pnw/sciencef/scifi60.pdf[3]

> The flying squirrel is a centerpiece in what's called a keystone complex, a web of animals and food, predators and prey, that is especially important in defining the ecosystem.
>
> "A keystone species such as the flying squirrel is easy to define: it's a species that has a disproportionate influence on the ecosystem relative to its abundance within that ecosys-tem," Andy Carey, a research biologist with the Pacific Northwest Research Station in Olympia, WA, explains. "A keystone complex is a more complicated idea that recognizes a number of essential components that are building blocks of an ecosystem and supporters of its processes."
>
> - http://www.fs.fed.us/pnw/pubs/journals/pnw_1995_carey001.pdf[4]).
>
> An understanding of the factors governing sciurid abundance in the Pacific Northwest is essential for prescribing forest management practices for second-growth forests where recovery of Spotted Owl (*Strix occidentalis*) populations and enhancement of biodiversity are objectives….
>
> Patterns of abundance of the sciurids in old- and managed forests suggests that silvicultural manipulation of vegetation and creative snag or den-tree management could be used in a management strategy to accelerate the development of Spotted Owl habitat in areas where old growth is lacking.

Within the west-side forests of the Pacific Northwest the "keystone ecological functions" of the pileated woodpecker and the various squirrel species necessitate that the implementation of restoration management keeps a focus on their needs. The reason decadence management needs to focus on the needs of the pileated woodpecker is because not all management actions have the same level of success for the pileated. A number of snag creation studies have shown that for creating snags that would be used by pileateds, simple girdling or topping are not effective:

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[3] Squirrles cannot live by truffles alone: a closer look at a Northwest keystone complex; PNW-Science Findings, #60, 2004

[4] Sciurids in Pacific Northwest mananged and old-growth forests; *Ecological Application*s. 5(3), 1995, pp. 648-661, © 1995 by the Ecological Society of America

- http://www.eglimpse.org/Assets/APNpdf/Deadwood%20Symposium/CHAPTERELEVENMANAGEMENT/056_Boleyn.pdf[5] (of 1,267 snags, 85% were topped & 11% were girdled or inoculated, 1.5% of created snags showed pileated excavations)
- http://www.fs.fed.us/psw/publications/documents/gtr-181/014_Shea.pdf[6] ("Six years after pheromone-baiting, 44 percent of the trees in both diameter classes had full cavities compared to no cavities in the girdled treatment groups…")

While the majority of snag creation studies lump pileated woodpecker usage together with other woodpecker use,[7, 8] doing so acts to obscure the specific relevancy of management actions on habitat needs of the pileated. As noted by Rose et. al. (2001):

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

What is it about the pileateds that need specific management actions that are different from those of other, less "keystone" woodpecker species? It appears that the specific driver needed for snags to be of interest to pileateds is the presence of heartwood rot. As noted by Bull, 2002:

- http://www.fs.fed.us/psw/publications/documents/gtr-181/016_Bull.pdf[9]

> …Hollow trees are a unique structural feature in forests. The heartwood in these trees is decayed by heart-rot fungi while the tree is alive (Bull and others 1997). Ninety-five percent of pileated woodpecker roost sites in northeastern Oregon were in hollow trees, and 5 percent were in vacated nest cavities (Bull and others 1992).
>
> …A strong relationship exists between the kind of decay in a tree and what species can use it, particularly for nesting and foraging.

As noted in PNR Science Findings #20 and reinforced in PNR Science Findings #57 in a discussion regarding the pileated woodpecker:

- http://www.fs.fed.us/pnw/sciencef/scifi20.pdf[10]

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[5] Created Snag Monitoring on the Willamette National Forest; Bolyn, Wold, Byford; PSW-GTR-181; 2002

[6] Girdled versus Bark Beetle-created Ponderosa Pine Snags: Utilization by Cavity-dependent Species and Differences in Decay Rate and Insect Diversity;Shea, Laudenslayer, Ferrell, Borys; PSW-GTR-181; 2002.

[7] Long-term monitoring of wildlife leave trees in clearcut harvest units on the Siuslaw National Forest, Northwest Oregon, 1987-2000; Schreiber; Unpublished report. Siuslaw National Forest files. 29pp.; 2000.

[8] Cavity-nester habitat development in artificially made Douglas-Fir snags; Brandeis, Newton, Cole; The Journal of wildlife management; vol. 66; 2002

[9] The Value of Coarse Woody Debris to Vertebrates in the Pacific Northwest; Bull; PSW-GTR-181; 2002

[10] Dead and dying trees: essential for life in the forest; PNW-Science Findings; #20, 1999

> Because the hollowing process is quite specific, it has to begin early in the life of a stand, and start on a living tree, according to Parks; an already dead tree not previously infected with heart-rot fungi will not become hollow.

- http://www.fs.fed.us/pnw/sciencef/scifi57.pdf[11]

> "One of the reasons roost sites may be more limiting for pileateds than nest sites, is because hollow trees are relatively rare in forests; they are created only by the process of heartwood decay occurring in live trees over a long period of time," Raley explains.

Also noted by Rose et. al. (2001):

> …strong excavators, such as Williamson's sapsuckers, pileated woodpeckers, and black-backed woodpeckers, select trees with a sound exterior sapwood shell and decaying heartwood to excavate their nest cavities.
>
> …The soften heartwood of trees colonized by heart-rot fungi provides suitable conditions for excavating a nest chamber, and the living sapwood functions to maintain the tree's structural integrity.

Beyond the needs of the pileated, heart rot fungi have an important role in forest development independent of their interaction with pileated woodpeckers:

- http://www.fs.fed.us/r10/spf/fhp/top20/Heart-rot.pdf[12]

> Heart rot fungi may also facilitate the change from the maturing even-aged stage (i.e., understory reinitiation, to use Oliver and Larson's (1990) terminology) that is in transition to the true old- growth stage. Mortality of dominant trees may be necessary for this transition or at least it speeds the rate of change.

An additional advantage of using heart-rot inoculation is the slow speed of the fungus growth. This allows the tree to continue growing, this is of great importance when inoculating trees in the 12"-20" dbh size range typically found in mid-seral plantations. This is important because in order for pileated excavations to occur and be of value they need trees at least 20" dbh – a tree in short supply in most mid-seral Doug-fir plantations.

Further, recent research has shown that once established the excavating and sounding behavior of the pileateds will act to further spread the fungal spores, making subsequent snag creation activities in the same project area unnecessary (assuming an original inoculation was successful). Removing the need for multiple similar projects in the same area is a clear advantage over mechanical snag creation that would need to be revisited again. The financial incentive to work towards an ecosystem that manages itself is obvious (in spite of inoculation costs that appear to be similar to those for mechanical snag creation[13] without the safety concerns involved with topping trees), and the rewards

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[11] Coming home to roost: the pileated woodpecker as ecosystem engineer; PNW-Science Findings, #57, 2003

[12] Are Heart Rot Fungi Major Factors of Disturbance in Gap-Dynamic Forests?; Northwest Science, Vol. 69, No. 4, 1995

[13] http://www.ingentaconnect.com/content/saf/wjaf/1998/00000013/00000003/art00006; Creating Snags and Wildlife Trees in Commercial Forest Landscapes; Western Journal of Applied Forestry; Volume 13, #3

can be fully realized in those management areas where further active timber management is not anticipated, such as Riparian Reserves and Late Successional Reserves. If topping of trees is going to be pursued, it should be in addition to heart-rot inoculation and following the guidelines developed in the Siuslaw National Forest described by Rose et. al. (2001):

> Trees topped above two branch whorls survive and develop new tops. Continued diameter growth in these trees provide higher values as wildlife snags. Large crooks formed in these trees also provide platform nest sites and create future breaking points to form a tall snag.

Girdling trees should not be performed since it kills the tree outright and weakens the structural integrity of the snag making it more likely to fall. As noted by Lindenmayer and Franklin (2002):[14]

> Girdling is problematic, however, because (1) sap rot occurs before heart rot, and (2) treefall can occur before there is sufficient top and heart rot to make the snag useful for cavities.

Implementing decadence management in previously thinned areas will maximize the restoration effectiveness of those previous thinning projects. Coupling the recent variable density thinning projects in Riparian Reserves and future projects located in Late Successional Reserves will allow those areas whose management objective is the accelerated development of late seral characteristics to have the best chance for success.

In order to maximize the effectiveness of inoculations, a variety of approaches could be pursued. While there is some evidence that indicates "clumping" may be more beneficial for working with pileateds:

- http://www.fs.fed.us/psw/programs/snrc/staff/laudenslayer/1998_laudenslayer.pdf[15]

> Clumping of snags in small patches has been shown to benefit some species, especially pileated woodpeckers.

There isn't really enough data at this point and some hedging of specific procedures would be prudent.

[14] Conserving Forest Biodiversity: a comprehensive multiscaled approach; Lindenmayer and Franklin, Island Press, 2002

[15] Califonia Forest Stewardship Coordinating Committee: Forestland Steward; Winter, 1998

Thank you for the opportunity to comment on this project. As stated above, we are concerned about the forest habitat, road construction, high road density, watershed stability, and other resources that are at risk as a result of this sale. We are particularly concerned about Decadence Management practices and would like to this taken into serious consideration for this and future projects. We are concerned about the geographic, geophysical, and ecological scope of this project, and for this reason we ask that unique Environmental Assessments for each area be prepared, and that issues raised in this letter be specifically addressed. We would like the opportunity to work with you to turn this project into a truly restoration-based proposal and are interested in working together with you to make this kind of project possible.

Sincerely,

Charlie Ferranti, Paula Hood, Matthew Mavko
(on behalf of the Bark Timber Sale Committee)