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To Jim Roden:
Over the past six months, Bark volunteers devoted almost 600 hours to groundtruthing the Jazz Timber Sale area. Bark staff and volunteers led multiple hikes to the planning area, introducing 138 people to the area, and organized a campout in which 17 Bark volunteers spent three days visiting and documenting units and road conditions. In addition, eight Bark volunteers have read the Jazz Preliminary Assessment, extensively researched related scientific articles, and contributed to the writing of these comments. Over 2,000 people signed letters expressing their concerns about the environmental impacts of the Jazz timber sale and urging it to be withdrawn.

I relate the above information to provide context for the comments below, and to request 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 Collawash watershed.

Introduction
The science and implementation of restoration treatments in young-managed forest landscapes is in its infancy. As recognized by the Pacific Northwest Forest Restoration Learning Network, while retrospective studies and models suggest active restoration is warranted, there are few long-term studies which help managers clearly identify "best management practices" for thinning projects. (Davis, 2008). In fact, a common debate is whether forests should be actively restored (e.g., thinned) and how management of road systems interact with thinning to affect ecosystem recovery at watershed and landscape scales. Moreover, as forest managers begin to implement active restoration in degraded forest landscapes, specific prescriptions for treatments have been extremely diverse. With limited practical experience, managers often are struggling to interpret the scientific literature and develop treatments that are both operationally feasible and consistent with long-term ecological objectives. (Davis, 2008).

Such is the case with the Jazz Timber Sale. Bark and the Forest Service can agree that the Collawash Watershed is an area significantly degraded from decades of poor management. As discussed in the Jazz Preliminary Assessment (PA) and Collawash/Hot Springs Watershed Analysis (CHSWA), past logging and road building activities have resulted in extensive habitat degradation and adverse impacts to water quality throughout the watershed. The Collawash Watershed is in need of restoration.

However, Bark diverges from the Forest Service concerning the best path to forest recovery. As noted above, there is yet to be scientific consensus about how, or whether, forests should be actively managed to achieve restoration objectives. With the Jazz Timber Sale, the Forest Service heartily embraces active management, with the twin goals of growing bigger trees faster and meeting timber volume targets, despite only nine acres of the project area in designated timber emphasis.

While there may be some benefits to active management, Bark believes that the environmental tradeoffs, especially in a watershed as important and unstable as the Collawash, far outweigh the conjectured benefits.

As a general pattern, however, the PA fails to provide quantifiable information about these actual environmental impacts of the project. For example, vague analysis such as "[t]he thinning projects would result in temporary reduction of tree canopy, which would very slightly increase peak flows" (*PA at 84*) simply leads to more questions: How much reduction in canopy? How long is "temporary"? How much is a "very slight" increase? How was this determined? The PA is full of such fact-free conclusory statements, that serve no purpose but to thwart the public's review.

Thinning Science

The Jazz Timber sale is premised on the assumption that thinning grows bigger trees faster and that this outweighs the ecological impacts of increasing soil compaction, sedimentation, and peak flows while decreasing wildlife habitat, down woody debris and snags. This assumption is neither fully supported in scientific literature, nor apply equally to every stand of trees in the Jazz project area.

As noted above, the concept of active thinning to restore forests is fairly new, and yet proven. One important body of research on restoring young forests has come from the Pacific Northwest Coastal Forest Restoration Learning Network. The Learning Network was created in an effort to facilitate communication between managers and scientists, and catalyze growth in practical restoration knowledge. The learning network includes members from restoration projects within young-managed forest landscapes throughout the Pacific Northwest Coast (SE Alaska, British Columbia, Washington, Oregon, northern California) and parts of the West Cascades, North Cascades, and Pacific Ranges.

Far from making the sweeping claims that the Forest Service presents in the Jazz PA, the Learning Network has identified several remaining questions about the impacts of thinning. (Davis, 2008). Of particular interest to the Jazz sale are the following questions identified by the Learning Network, followed by suggestions for further research:

How will stands develop if they are left unthinned?

We are not certain how stands will develop if they are left unthinned. Because so much of the landscape remains in a younger condition (under 80 years), we still have little empirical data on the development of unthinned stands. Often, the decision to

thin a stand or not thin a stand is a decision based on operational logistics, economics, and expectations of improving ecological conditions of the system.

How do treatments interact with the natural processes of the forest system?
It is not clear how restoration treatments may interact with or change disturbance regimes or alter hydrologic regimes. For example, it is possible that thinned trees may become wind-firm and reduce the amount of windthrow patches in the future stand. Alternatively, thinning could encourage increases in forest pathogens (e.g., Annossus root rot in western hemlock) that may prevent the stand from reaching a late-seral state. In addition, thinning can alter wildlife behavior (e.g., increase bear damage, alter ungulate browse). These may have unanticipated impacts on stand development and should be considered from the outset.

If a young stand is treated, what type of treatment should be used?
Knowledge on the impacts of variable density thinning and the inclusion of skips and gaps, including size and spatial arrangement, is still unknown. Results from most studies that have investigated these are still in early stages of development, so long-term trends remain clouded. The tradeoffs of one entry versus multiple entries are also unclear. Many believe that multiple entries may be necessary to achieve late-successional habitat, especially where western hemlock is prevalent. However, the repeated disturbance from tree felling and harvesting equipment on other elements of stand structure and composition are not known. (Davis, 2008).

Bark echoes these uncertainties about thinning and requests that the Forest Service engage with this scientific uncertainty rather than making unsupported, sweeping conclusions about the unequivocal benefits of thinning.

In addition, other research on thinning urges forest managers to approach such projects cautiously, acknowledging their uncertainty and ecological tradeoffs. A team of six scientists recently considered large scale thinning and identified many concerns about the practice. They found that even when confined to previously harvested stands, thinning treatments must be evaluated carefully and implemented in such a way as to avoid negative impacts. (Carroll, 2009). Ground based methods and associated machine piling, burning of activity fuels, construction and increased use of roads and landings can increase soil erosion, compact soils, and elevate surface runoff. (Carroll, 2009).

They concluded that no evidence exists to support the contention that an extensive thinning program will hasten restoration of historic patterns of forest heterogeneity on a landscape scale. Hence, thinning treatments should be applied cautiously and only where ecologically warranted. Thinning should not be considered a cure-all for forests degraded by fire exclusion or other human activities. (Carroll, 2009). As discussed below, Bark requests that the Forest Service engage with these questions and cautions and develop more reasoned and scientifically supported restoration-based alternative for inclusion in the Environmental Assessment.

Inadequate Range of Alternatives

In the context of this scientific uncertainty about thinning projects, it is all the more important that the Forest Service present a range of alternatives that recognizes the different approaches to restoration, with a comparison of the costs and benefits of each approach.

The purpose of the National Environmental Policy Act's alternatives requirement is to "sharply defin[e] the issues and provid[e] a clear basis for choice among options by the decisionmaker and the public." 40 C.F.R. § 1502.14. All reasonable alternatives must receive a "rigorous exploration and objective evaluation…, particularly those that might enhance environmental quality or avoid some or all of the adverse environmental effects." Id. § 1500.8(a)(4). If there are no unresolved conflicts concerning alternative uses of available resources the EA need only analyze the proposed action and proceed without consideration of additional alternatives. 36 CFR § 220.7(b)(2)(i). However, this is not the case at present.

With only one proposed action, the Jazz PA does not provide alternatives that "sharply define the issues" and "provide a clear basis for choice". In Bark's scoping comments, we made it clear that there are several unresolved conflicts concerning alternative uses of resources, and specifically requested that the Forest Service drop all units in Late Successional Reserves and High Earthflow areas. To comply with NEPA, the Forest Service should have prepared alternatives that incorporated and assessed these two concerns, as they are reasonable alternatives to achieving forest restoration in the Collawash Watershed.

Instead, the Forest Service dismissed these alternatives through the biased lense that active management is the *only* way for the watershed to recover ("This option was not fully developed because it would not provide the benefits . . .and because the effects of thinning were not found to be substantial." *PA at 37*. While the Forest Service is entitled to its opinion about the costs and benefits of thinning, the very purpose of the alternatives section is to thoroughly discuss different approaches to resource management so as to create a clear basis for choice among the options. A fully developed alternative that used a lighter touch in Bark's areas of concern may have met the Jazz purpose and need with fewer adverse environmental tradeoffs – but as it is, the public is left guessing.

While Bark did request alternative actions in its scoping comments, the duty to develop reasonable alternatives lies also with the agency. As courts have found, [i]n respect to alternatives, an agency must on its own initiative study all alternatives that appear reasonable and appropriate for study at the time, and must also look into other significant alternatives that are called to its attention by other agencies, or by the public during the comment period afforded for that purpose." *Dubois v. U.S. Dept. of Agric.*, 102 F.3d 1273, 1291 (1st Cir. 1996) (quoting *Seacoast Anti-Pollution League*, 598 F.2d at 1230).

By only analyzing one action alternative, the Jazz PA fails to meet the standards established by NEPA and the courts, and provides little to no room to discuss different approaches to public land management. Throughout the following comments, Bark makes several suggestions for alternative management in the Jazz project area. To comply with NEPA, the Forest Service should develop alternatives in the EA that "sharply defin[e] the issues and provid[e] a clear basis for choice among options by the decisionmaker and the public." 40 C.F.R. § 1502.14.

Lack of Information about Prescription

NEPA exists to provide the public access to high quality information about the impacts of projects on public land so that they can, in turn, provide meaningful comments to the federal agencies about these projects. To that end, "federal agencies shall to the fullest extent possible: (b) implement procedures to make the NEPA process more useful to decisionmakers and the public, (d) encourage and facilitate public involvement in decisions which affect the quality of the human environment." Id. at §1500.2. To best facilitate good decision making, "[a]ccurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA." 40 C.F.R. §1500.1(b).

Rather than providing the high quality information NEPA requires in a way that invites public understanding and participation, the Jazz PA was organized so as to make it very difficult to understand exactly what the impacts of the silvicultural treatments would be in any given unit. In the "Proposed Action" section, the reader is told that the prescription would vary unit by unit, that the way of measuring tree density would vary unit by unit, that the size and amount of skips and gaps would vary unit by unit (*PA at 15*) . . . all of which provides the reader very little information about is actually going to happen, thus little way to assess the accuracy of the analysis that follows.

Piecing together the prescription by pulling out different parts of the PA, Bark guesses at a general prescription: Stands currently have a Relative Density of 55-85 (*PA at 45*) and will be logged to an RD of 20-25 in matrix and 20-40 in LSR (*PA at 16*). After stands are logged, they will have canopy closure of less than 40% in the matrix and closure of an unknown amount greater than 40% in the LSRs (*PA at 105*).

While the PA offers no specific details about the prescription for each unit, nor discusses the relationship between RD and percent canopy closure (both of which are used to discuss prescription and to assess impact), Bark knows that this information must exist to inform the future stand markings. Failure to provide them in the PA impedes our ability to provide informed, site-specific comments and analysis and thwarts the purpose of NEPA.

In its rich examination of active management and thinning, the Learning Network advised that regardless of what type of prescription(s) is used, **the prescription development process should be thoroughly documented.** This should include pre-treatment inventories and/or description of initial conditions, rationale for decisions

and treatment, prescription(s) applied, description and map of treated area (even a coarse sketch can be useful), and auditing/monitoring efforts as well as photos and other pertinent information. If different treatments are used throughout the stand, these should be well documented (e.g., what these are, approximately how big they are, and how they are spaced). Finally, when possible, **treatments should be set up to increase learning**; not all treatments need to be a well replicated experiment, but well documented observations can be very valuable for future management. (Davis, 2008, emphasis included).

Bark thoroughly agrees with this advice and requests that the Forest Service provide much more accurate information about its planned prescription in a unit by unit basis. Failure to do so not only violates NEPA, it prohibits both the Forest Service and other stakeholders from better documenting and monitoring such projects.

Stand Productivity

Throughout the PA, the Forest Service describes the forests in the Jazz planning area as dense, over-crowded, experiencing growth suppression, etc. From Bark's on-the-ground experience in the project area, many of the units actually have a rich diversity of life on the forest floor, with Oregon grape, vine maple, ferns and rhododendron. In many respects, this forest does not fit into the description of an impaired plantation stand that might benefit from human intervention. Indeed, most Jazz units have a much healthier and diverse understory than nearby areas that have already been thinned.

Jazz Unit 44: showing a great deal of diversity and openness

Post-logging unit of the nearby Roman Timber Sale

In analyzing Stand Productivity, the PA says little to no direct or indirect effects to stand growth or productivity from thinning. *PA at 47*. However, peppered throughout the PA are discussions of several negative impacts, including increased windthrow from to edge

effects, understory damage and subsequent suppression due to soil compaction, damage to leave trees, loss of standing and downed dead wood, loss of understory vegetation and damage to mycorrhizal relationships.

Water Quality

1)Current Conditions
The Collawash watershed is a Tier 1 Watershed, indicating it is prime anadromous fish habitat. Many threatened anadromous fish depend on the quality of this watershed for survival. Winter Steelhead represent "the strongest stock of wild anadromous fish in the watershed". *CHSWA, 3-24*. Surveys show that 50% of the run present in the subbasin above Two Rivers used the Collawash watershed as a spawning area. This species is considered a "stock at risk" and any alteration of their habitat will greatly impact the viability of the species. *CHSWA, 3-24.* Late Run Coho, also a "stock at risk," are found in the watershed. In fact, this population is probably the last wild population of coho found in the entire Columbia River Basin. Late Run Coho is on the Region 6 Sensitive Species List and "one of the three classes of this stock is very weak and has a high potential for extinction". *CHSWA, 3-24.*

The Collawash's tendency for flash flooding, elevated sediment production and summer low flows are a direct result of the extensive road system veining the watershed. As indicated by the Mean Monthly Flow Chart (CHSWA, 3-12), the Collawash River is much flashier than the Upper Clackamas River and Fish Creek, which are highly comparable in other regards. This is confirmed in the Jazz PA, that shows Turbidity measured at 37 NTUs in February, compared with .3 in August & October. *PA at 74.* The PA's acknowledgement that the February sample "may have come during a run-off event" simply goes to show the frequency of such events under the current baseline conditions.

According to the Background Sediment Regime Map of the CHSWA (2-16), many of Jazz are in or adjacent to areas of the Collawash Riverbank categorized as "Ancient landslide (active and dormant), Streambanks, Unstable Drainageways, Rapid Stream Downcutting, Debris Slides and Flows in Major Drainageways, Soil Creep, Slope Undercutting" (2-16). The relative hazard rating is based on: (1) susceptibility of landform type to mass-wasting events and (2) likelihood of sediment from that event reaching a defined channel. From comparing unit maps with the CHSWA map, it appears that Jazz units 16, 18, 20, 28, 32, 34, 40, 46, 60, 64, 68, 69, 86, 90, 92, 94, 150, 154, 156, and 144 are either adjacent to or overlap streams of this unstable soil type. Additionally, "turbidity levels in the Collawash River are consistently higher and persist longer when compared to any other streams in the Clackamas subbasin" (CHSWA, 3-19).

Bark groundtruthers found many current examples of poor water quality in the project area. For example, where Slide Creek runs through Unit 16 and 18 there are currently multiple places where the stream bed is jumping channels, essentially

moving down the hill slope. On field visits in October of last year we found the water running quite milky though both Cap and Peat Creek along 6311. This milky nature shows that there is already a higher than normal level of turbidity in the stream. Because of the highly unstable nature of the proposed units, clearly and consistently indicated by the CHWA, increased sediment delivery from Jazz to streams will worsen water quality, regardless of the alleged forest stand condition improvements.

2) Increased Sediment from the Jazz Timber Sale
The CHSWA recommends to "reduce the road contribution to flashy streamflows" (CHSWA, 1-6). "Existing management related sediment production and delivery in the watershed comes primarily from the road system; some sites are chronic producers. Pathways for sediment transport and delivery have been expanded by road related drainage" (CHSWA, 1-6). The CHSWA continues, "[this causes] potential loss of aquatic habitat, with effects manifested downstream of this watershed" (page 1-6). The CHSWA further recommends that the Forest Service reduce human causes of erosion/sedimentation, related to timber harvest and roads, by decommissioning roads not needed. (CHSWA, 1-6).

The Forest Service recognized the importance of removing roads from the Collawash Watershed in its recent Increment 2 Road-decommissioning project. The Increment 2 Preliminary Assessment acknowledged that "until a road is removed and natural drainage patterns are restored, the road will likely continue to affect the routing of water through watersheds. *Inc. 2 PA at 33*. And that, [t]he sediment contribution to streams from roads is often much greater than that from all other road management activities combined, including log skidding and yarding." *Inc. 2 PA at 34.*

Despite Bark's best efforts to support the Forest Service in meeting its Access & Travel Management Plan and decommissioing 49% of system roads, the Forest Service unfortunately chose not to decommission all the roads identified in the preferred alternative of the Increment 2 EA. By selecting Alternative 4 rather than the preferred alternative, the Forest Service only decommissioned 170 miles instead of 255 miles. While the Jazz PA talks at length about the roads that will be decommissioned, it does not admit that the choice not to decommission 85 miles of roads will result in an additional 156 stream crossings being left on the landscape and an additional 571 tons of sediment delivered into the Collawash Watershed. Inc. 2 EA at 63. Many of these roads were kept open to facilitate the Jazz timber sale. In this context, re-opening more than eleven miles of road - even if only "temporarily" - will have a cumulative impact that is never captured by the Jazz PA.

a) Road Repair
Thinning projects still have an impact on the hydrology of the area, including soil compaction from hauling and landings, road building, sediment from hauling, etc. It is well-documented that road-building and landings greatly elevate soil loss in a persistent fashion. The loss of topsoil via erosion irretrievably reduces soil productivity. (Beschta et al., 2004; Karr et al., 2004). It is likely that the increased area of disturbed soil resulting from re-opened roads, temporary roads,

and landings necessary to accommodate thinning will significantly affect aquatic health (Carroll, et.al., 2009)

It appears that for its determination of system vs non-system roads, the Forest Service simply relied on existing maps and did not field check the roads and that several of the "open system roads" are mischaracterized and would more accurately be listed as existing road alignments that need to be rebuilt. For example, "road" 6300180 in unit 62 has 15 feet alders growing in the road bed that make the alignment nearly indistinguishable. In addition, 6311130 which runs through units 8 to 14 is passively decommissioned. Grass and native forbs are growing the length of the road (see photo). This road, which is shown as "system road" on the map, is in the same condition as the "existing alignment" in units 12 and 14.

Bark has checked all the roads and requests that the EA better reflect what exists on the landscape, and the level of road work actually required for this logging project.

This is "road" 6311-130, which has passively decommissioned itself.

In addition, of the system road repair that the Jazz PA touts as a positive benefit to the watershed, Bark has found at least 16 miles of road repair has already been completed through other contracts. Please correct this information in the EA and make clear that the all listed road repairs do not depend on the Jazz sale moving forward.

b) Road rebuilding and new roads

In a watershed where roads have significantly contributed to the degradation of water quality and habitat, and the Forest Service is currently undertaking a major effort to decommission roads, Bark is very disappointed that the Jazz Timber Sale, as proposed, will reopen many miles of actively or passively decommissioned roads. Roads going into Units 2, 8-14, 60, 64, 70, 74, 80, 100, 110, 112, 132, and 137-140 have all been closed. And all will be re-opened for the Jazz sale.

Specifically, the Forest Service has already decommissioned roads in units 60, 64, 70, and 136 through 140. Roads along 6330 leading into units 110 & 112 are

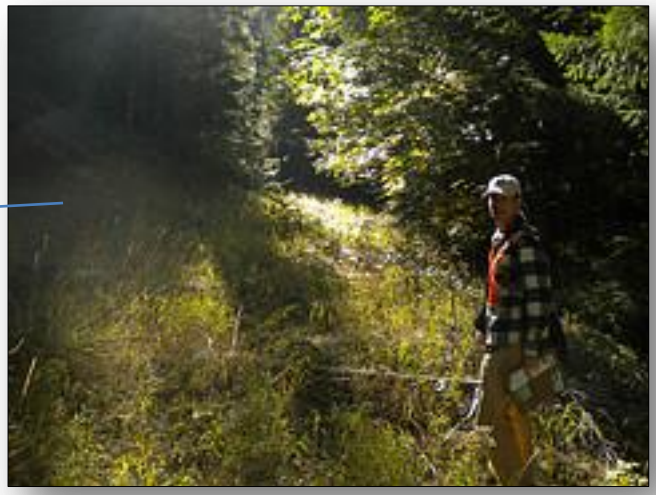
beautifully ripped and have created a wet, rocky habitat supporting riparian species of plants like Saxifraga sp., Valeriana scouleri, etc. These roads are also surrounded by old growth trees. The same is true for the decommissioned roads into units 138 and 140. Of particular concern is the "road alignment" going to Unit 18 which does not, in fact, exist. On a Jazz Field Trip with the CSP, Jim Roden joked how no one would even know it is there without him pointing it out. This should be characterized as a "new" road – one which requires a creek crossing directly adjacent to old growth cedars. Perhaps the Forest Service is trying to mask or minimize the real impacts of wasting time and money to rebuild roads it already decommissioned – many so successfully that they have been restored to proper function – but Bark requests a more accurate assessment of the extent to which these "existing alignments" do, in fact, exist.

More substantively, Bark believes that the economic and environmental impact of re-opening already decommissioned roads far outweighs the slight benefits of the proposed thinning project, and requests that the Forest Service prepare an Alternative that does not include re-opening any previously decommissioned roads.

Even when temporary roads or haul routes can be rejuvenated with minimal earth movement, significant and long-lasting environmental impacts occur. Forest health doesn't automatically return to its prior level as soon as a road has been decommissioned, just because the Forest Service removes the road from its inventory. It often can take 20 years to successfully re-vegetate a road; in the meantime, the environmental impacts of the road remain. This is especially true when "decommissioned" roads are never intended to disappear, but are essentially stored for future projects which further compact soils and re-impact the area. This type of "decommissioning for storage" negates many of the claims of ecological recovery touted in the assessment.

The only analysis that the PA provides concerning the impact to water quality due to road construction, reconstruction, maintenance or obliteration is the vague and inconclusory statement that "[t]he probability of any impacts to water quality or fisheries resources caused by sedimentation . . . is extremely low." *PA at 55.* This fails to disclose that twelve stream & seep crossings will be need to be reconstructed (*see PA at 19-20*) and the completely expected and unavoidable increases in sedimentation that building roads over streams will have. Please provide a more thorough, honest and quantified assessment on the impacts to water quality in the EA.

The berm in foreground is preventing traffic into Unit 70. This road has been ripped significantly at 3 separate stream crossings - done just last year! It would be immensely wasteful to reopen this road.



This segment of the decommissioned road in unit 34 is already starting to recontour to the landscape.

This giant western red cedar would be at risk if the road is punched through to get to unit 18.

c) Increased Sediment from Hauling

From reading multiple fish consultation documents for the Mt. Hood National Forest, Bark has learned there is a high probability that the use of haul roads will introduce some sediment into ditch lines and in some cases to streams. The amount of sediment eroded from the road surface depends on the amount of traffic, the durability of the aggregate, the level of maintenance, the condition of the ditch lines and the amount of precipitation. The Jazz PA also acknowledges that "log hauling has the potential to introduce sediment in small quantities into streams." *PA at 77.* Again, this is the type of vague statement that frustrates public review. How much potential? How much is "small"? When taking into account the over 80 miles of

roads used for hauling, is it a "small" amount overall, or "small" amount per mile – which could be quite significant. In an already heavily impacted watershed, what is the impact of adding even a "small" amount of sediment from hauling (as well as sediment from road construction, landing, erosion, etc)?

Hauling and other road use greatly increases the negative impact of the road network on sediment delivery and runoff effects on affected streams. (Reid and Dunne, 1984; Potyondy et al., 1991). The amount of sediment significantly increases when a dormant, revegetated road becomes a resurfaced haul route. (Rhodes, 2002). Please provide more specific and quantifiable information in the EA.

The PA states that there no native surface roads that have hydrologic connections to streams. However, paved and rocked roads also contribute to sediment from hauling and Bark has identified several places on the landscape where there is a hydrologic connection between roads and streams that the Forest Service must address in the EA. Specifically:
a) On 6310, between units 48 and 44 an inboard ditch dumps right into the headwaters of Paste Creek;
b) An inboard ditch along 6340 dumps into a small seasonal stream about 100 yards up 6340 from the 63 juncture only a ¼ mile from the Collawash;
c) On 6310 just south of unit 52 there is an inboard ditch running north and dumping into headwaters of Peat Creek;
d) On 6380, just north of the 6380-120 juncture, an inboard ditch dumps directly into a creek.

Up 6330 this small stream is running right across the surface of the road

Found along 6310 on the headwaters of Paste creek, where it runs just south of Unit 44. The water on the right side of the picture running down the hill is the creek. The water flowing from the bottom of the picture is the inboard ditch on 6310

3) Logging in Riparian Reserves

We are concerned about the large amount of Riparian Reserve logging included in this project. Not only is the Collawash watershed very susceptible to landslides, but the Riparian Reserves in these units are recovering quite well. All the streams we have seen were covered in healthy riparian plant species, and most units had a vibrant understory – including western red cedar – growing up. The Jazz units appear to be a perfect example of an area that is capable of recovering on its own. This observation is supported by the CHSWA, which affirms that "along many of these affected streams [those affected by past management], deciduous vegetation has reestablished and now provides sufficient shading" (CHSWA, 3-20). The proposed logging will have a detrimental impact on the riparian areas.

Riparian reserve thinning would occur on approximately 506 acres of the Jazz timber sale. *PA at 55.* The PA states that "Water temperatures would not be affected by the proposed action, because no vegetation would be cut except for some narrow skyline corridors and hazard tree removal along roads within the primary shade zone along perennial and intermittent streams. *PA at 71.* Bark fails to understand how 48 skyline yarding corridors over perennial streams up to 15 feet wide each, and up to 5 corridors per 1000 feet, would not result in an increase of water temperature. In addition, the project will reopen at least 12 stream crossings on decommissioned roads, many of which have re-grown riparian vegetation. These are all distinct canopy openings that can and should be quantified in terms of potential to increase stream temperature on this already degraded watershed.

There are very few data on the impacts and benefits of riparian thinning, and what is available is highly ambivalent or indicates net harm to water quality (Reeves et al. 2006b). This suggests that the risk of inadvertent adverse effects on water quality and aquatic biodiversity from an extensive mechanized thinning program is high (Rhodes 2007).

In addition to temperature increase, thinning in Riparian Reserves also can lead to increased sediment. The Environmental Analysis for the Collawash Thinning project, also in this watershed, admitted that "thinning within riparian reserves is a ground disturbing activity that has the potential to cause a temporary reduction in water quality by allowing sediment to enter the stream channel from surface erosion or run off." This fact, combined with the turbidity levels in Collawash which are higher and persist longer than those of surrounding streams, points to the presence of greater impacts than acknowledged by the PA.

4) Peak Flows

The Jazz timber sale is located in the Transient Snow Zone, in which removal of canopy could increase snowpack and during the inevitable rain-on-snow events, increase peak flows. The PA gives this fact a slight nod (*see PA at 66, 84*) but fails to adequately quantify all of the openings created by this project and acknowledge the site specific impacts of decreased canopy closure and increased flows. Nowhere does the peak flows analysis discuss the 61 acres of roads, skid trails and landings that

would be constructed (*PA at 94*) or the 50 acres of bare skyline corridors (*PA at 94*) or the 25 acres of clearcuts for elk (*PA at 16*). These 126 acres of deforestation, in conjunction with the overall decrease in canopy closure as much as 40% over more than a thousand acres, will absolutely increase peak flows on local creeks in the project area.

In addition, the PA does not disclose how long it will take Jazz units to hydrologically recover after the canopy is decreased to an undisclosed percent. This information is crucial to making informed decisions.

Bark groundtruthers found numerous examples of streams that are already channelizing streams from peak flows, such as Slide Creek in units 16 and 18 which also shows signs of channel jumping. They also found numerous other examples of channelizing streams along Paste Creek in Unit 40, along Blister Creek near unit 144, and Peat Creek in Unit 34. Increased peak flows will exacerbate these conditions.

Peat Creek in Unit 32. Note how the channel is experiencing significant downcutting.

Slice Creek is Unit 18 – note the wide channel because of peak flows

Logging in Late Successional Reserves

Approximately 726 acres of the project are in Late Successional Reserves LSRs). PA at 10. LSRs are to be managed to protect and enhance conditions of late successional and old growth forest ecosystems. Although the Northwest Forest Plan sets the general target that the LSRs should be 80% late successional forests, few are at or above that threshold. One of the closest is the Collawash LSR, with 74% late successional forest. North Willamette Late Successional Reserve Assessment (NWLSRA) at 4-36. Confusingly, the PA states that the "LSR is currently at approximately 45% late-successional habitat" and is below the desired future condition level of 70% late successional habitat. *PA at 107.* As the PA never specifies

which pages of the NWLSRA it is relying on to inform its analysis, Bark is unable to check the accuracy of the PA, or understand why the numbers vary from our understanding of the NWLSRA.

If, indeed, the LSR is already at 74% late-successional habitat, with only 4% mid-seral habitat, is it honestly necessary to actively manage that 4% and incur the negative environmental tradeoffs, including increased edge effect and decreases snags and down woody debris?

All of the LSR units of the Jazz proposal are adjacent to rare remaining old growth forests, many of which are newly designated wilderness. Units 70, 74, 76, 82 and 78 are all next to the Bull of the Woods Wilderness expansion. Historic checkerboard harvest patterns led to fragmentation of late-successional old growth (LSOG) patches and reduced their ability to contribute to conservation goals. LSOG stands may function as islands of habitat for old forest associated understory species. Effects of thinning on landscape connectivity, spread of invasive species and other spatial processes need to be considered in the context of the configuration and degree of fragmentation of remnant LSOG stands. Logging operations increase the edge impacts around the mature forests that are currently providing ideal habitat for the northern spotted owl and create opportunity for species like the horned and barred owls to move in on the territory of the spotted owl. Dispersal and establishment of some plants may be especially limited among old growth stands because edges of old growth patches may be unsuitable for many plants due to altered microclimate (drying) and increased seed predation (Jules et al. 1999, Jules and Rathcke 1999, Talmon et al. 2003, Jules and Shahini 2003).

Edge effects have been documented to commonly penetrate 100 m into a forest stand (Chen et al. 1992). Even when edge is conservatively defined based on a 60 m zone, a high proportion of existing old-growth stands are largely edge habitat and would be subject to indirect effects of thinning of adjacent stands. (Carroll, et.al., 2009). Strong edge effects also subject remnant LSOG patches to increased propagule pressure from non-native species, making them more at risk for invasion by diseases such as Port Orford Cedar root rot (Hansen et al. 2000, Kaufmann and Jules 2006), as well as exotic flora that grow into the forest canopy (e.g., cape ivy (Delaria odorata)) or dominate understories (e.g. Himalaya blackberry (Rubus discolor))(Merriam et al. 2006, Keeley 2006). The Jazz PA contained no analysis of the impact of increasing edge effects in LSOG stands through logging in LSRs.

Another detrimental impact of logging in the LSR is the loss of existing snags and snag recruitment. Regarding snags, "The NWLSRA recommended retaining down wood cover at a rate of 10 to 15%. To achieve this in plantations, most of the trees that need to be cut down to achieve thinning objectives would need to be left on the ground. The cost of creating down wood at these rates would not allow for an economically viable timber sale. Since no other funding is available to implement the thinning project, the benefits gained in terms of accelerating the development of other

late successional characteristics would not be realized." *PA at 107*. Bark suggests that the Forest Service use a Mature drop and leave (MDL) prescription, which includes thinning conducted in stands where trees are large enough to be of commercial value which are not sold, but are left on the site. This alternative would obviate the need to build any roads, landings or skid trails to and in the LSRs, and the money saved could balance out the lost income.

One of the most unique features about the LSR units is the diverse understory in many of the plantation stands, which speaks against the need to thin. In many of the units, particularly those that are in, adjacent to or near to mature stands of native forest, the trees have maintained considerable distance and have facilitated new growth without choking out other plant species. There are Douglas fir and cedar saplings growing amongst Oregon grape, vine maple, rhododendron, willow and red alder. For example, in Unit 2, a very small unit, there is a rapid transition of plant communities. At its highest point we found chinquapin and rhododendron and at its base, the community changes to skunk cabbage and Veratrum. This particular unit contains many of the common plants associated with low elevations and displays no need for active management.

Wildlife Impacts

1) Northern Spotted Owl

The Forest Service has not surveyed for owls in the Jazz Project area since 1994 – *over fifteen years ago*. Despite the utter lack of knowledge about how many Northern Spotted Owls are present in the area, and where their nest sites are, the Jazz PA makes that claim that this project is Not Likely to Adversely Affect (NLAA) Spotted Owls. In addition to no actual information on the ground, there exists a logical inconsistency between the factual reality that the Jazz sale will decrease snags, decrease canopy cover, decrease prey, increase competition and predation and increase noise and the Forest Service's assertion that Jazz is NLAA. *PA at 101.*

The PA did acknowledge one of the key environmental tradeoffs in logging spotted owl dispersal habitat: Flying squirrel populations in second growth plantations decline after the plantations are thinned and remain at low levels. *PA at 105*. The northern flying squirrel is the principle prey of the spotted owl. Additional research has found that squirrel populations in unthinned patches are larger than the thinned, and even those decline after adjacent areas are thinned. (Wilson, T. 2010). 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 until new growth reaches 10 meters. Prescriptions that retain visual occlusion in the mid-story layers would be best suited for maintaining squirrel populations. (Wilson, T. 2010).

While acknowledging that thinning reduces flying squirrel populations for 20-40 years, the PA failed to acknowledge that squirrel populations also decline in areas

adjacent to thins, and failed to quantify what the affect of a decrease in its principle food source would mean for the spotted owl.

As there are no surveys and thus the Forest Service cannot be sure where Spotted Owls are nesting, the USFWS developed "disruption distances" based on distance to the nest cannot possibly guarantee that nesting owls will not be disturbed by noise from the timber sale. *PA at 104.* Also, no surveys of owls means no surveys of Barred Owls - though the PA admits that they are thought to be increasing in the area. *PA at 103.*

Also, the PA states that 26 units of Jazz are in designated Critical Habitat. *PA at 105.* Which units are these? Can the Forest Service guarantee that none of these units will lose dispersal habitat? Can the Forest Service guarantee that it is conserving the Spotted Owl, and protecting its habitat, as required by both Section 7(a)(1) of the ESA and the Mt. Hood Forest Plan?

2) Sensitive Species: Columbia Duskysnail

For Region 6 of the Forest Service, Sensitive Species are defined as those plant and animal species identified by the Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density and habitat capability that would reduce a species' existing distribution (FSM 2670.5). Management of sensitive species "must not result in a loss of species viability or create significant trends toward federal listing" (FSM 2670.32). The Regional Forester is responsible for identifying sensitive species and coordinating conservation management strategies necessary to avert the need for Federal or State listing as a result of National Forest management activities.

Unfortunately, the Forest Service has not managed forest habitat so as to prevent the need to list sensitive species under the Endangered Species Act (ESA). In October, 2011, the U.S. Fish & Wildlife Service found that listing 29 mollusks under the ESA, many of which are currently Forest Service Sensitive Species, may be warranted due to the present or threatened destruction, modification, or curtailment of its habitat or range. (90-Day Finding, Federal Register, October 2011).

Of particular concern in the Jazz Timber Sale is the Columbia duskysnail – a Sensitive Species that was included in the recent 90-day finding. The Jazz PA admits that the Columbia duskysnail is known to exist in the project area, but that surveys were not done. *PA at 58.*

The Columbia duskysnail often occurs in very small springs and is negatively impacted by timber harvest and road construction. Aquatic mollusks require clear, cold water with high dissolved oxygen levels. Logging degrades aquatic habitat via loss of shade, increased water temperature, decreased levels of dissolved oxygen, and increased sedimentation. Sedimentation can suffocate aquatic mollusks, interfere with their food supply, and kill their eggs. (Frest and Johannes 1995a, p. 185; Furnish and Monthey 1999, Sect. 4, pp. 13, 14; Duncan 2005b, pp. 11, 12).

Very low mobility makes it difficult for terrestrial mollusks to recover from habitat disturbance because they are unable to relocate even if suitable areas of undisturbed habitat are available nearby. Because of the extremely limited dispersal ability of these animals and their sensitivity to environmental conditions like temperature and humidity, recolonization of unoccupied habitat is extremely slow, and historical factors leave their signature in current distributions. Suitable habitat may remain unoccupied for indefinite periods of time. (USDA USDI 2007 SMR FSEIS p. 246).

The Columbia duskysnail is also a Survey & Manage species, but not covered by the Survey & Manage protocol in the Jazz sale because of the Pechman exemptions. This means that pre-disturbance surveys and mitigation measures are no longer required to protect this species during timber harvests or other habitat-degrading activities. In the FSEIS for Survey and Manage removal acknowledges that some known sites for the Columbia duskysnail are likely to be lost without the Survey & Manage mitigations. (SMR FSEIS p. 259).

The Jazz PA dismisses the need for surveys and protective buffers by relying on best management practices and riparian reserve standards. However, if following the riparian reserve standards adequately protected the Columbia duskysnail from impacts of logging and road construction, they would neither have declined in the past 15 years to the point of requiring protection under the ESA, nor require the added measures of Survey & Manage to protect habitat. These are clearly not enough to protect the duskysnail, and prevent attainment of both Forest Service Handbook and Mt. Hood Forest Plan standards.

The Forest Service Handbook specifically tasks the District Rangers to "[e]nsure compliance with legal and biological requirements for the conservation of threatened, endangered, and **proposed species** in district land management and project planning; ensure compliance with procedural and biological requirements for sensitive species." (FSH, 2670.46, emphasis added). Moreover, the Mt. Hood Forest Plan requires that the Forest Service plan Biological Evaluations for all planned, funded, executed or permitted programs and activities for possible effects on endangered, threatened or sensitive species and that habitat for endangered, threatened or sensitive species shall be protected and/or improved. (FW-174, FW-175).

While the PA mentions a biological evaluation in its discussion of other sensitive species (*see PA at 109*), it does not include such reference for the Duskysnail. As the District Ranger is required to ensure that the biological requirements for conservation of proposed species are maintained, and - in the absence of surveys and specific protections this requirement cannot be met for the Columbia duskysnail, Bark requests that the Forest Service conduct surveys and provide the necessary buffers for the Columbia duskysnail.

3) Elk clearcuts

The Jazz timber sale would result in 3-5 acre clearcuts in five different units, resulting in up to 25 acres of clearcuts in the sale area. *PA at 16*. This raises several questions for Bark, including: What monitoring, if any, has the Forest Service done to determine whether or not elk are using the gaps created in recent projects, like the 2007 Thin? What is the demonstrated need to create such gaps? Is there really a limit in forage? Are elk going hungry? Or is there a lack of elk in the ecosystem, and the Forest Service believes more may be recruited with more forage? Are such gaps the best way to provide forage? Why wouldn't the gaps naturally created from laminated root rot suffice? The PA does not address the necessity nor the effectiveness of these clear cuts.

While the PA notes that openings are very valuable for elk (*PA at 120*), it offers no support for its premise that actively clearing forest land provides quality forage for elk. In fact, creating small clearcuts to increase browse for elk is discredited in scientific literature. Biomass of edible browse in clearcuts is often less than that of grass in meadows and is therefore not actively sought out for foraging. (Weckerly 2005) Small clearcuts will only promote the ultimate succession of browse and conifer trees, not grasses, and, as noted above, are usually avoided by elk for their relatively small biomass availability. Moreover, herbaceous plants existing in clearcuts have been found to be less nutritious to grazing animals because these plants have higher tannin levels, which inhibit the absorption of nutrients and protein (Happe et al. 1990). Browse that grows in late-successional forests, by contrast, has lower tannin levels and greater amounts of leaves, succulence, and proteins than members of the same species found in clear cuts (Happe et al. 1990).

There is ample reason to believe that small clearcuts will not actually benefit elk in terms of forage. First, it has been found that elk avoid contact with areas associated with human traffic such as recently used forest access and logging roads and main throughways, and preferentially seek out areas with increased topographic complexity and distance from open roads (Lyon & Jenson 1980, 358; Long et al. 2008). Second, elk prefer to forage on species that inhabit covered forested areas, as species in clearcuts are often unpalatable (Happe et al. 1990). Additionally, species of grasses and forbs in clearcuts reach their dormant period earlier than their conspecifics in shade due to increased sun exposure, which would negate the creation of clearcuts for creating food for elk in the fall (after summer senescence) to promote hunting (Long et. al. 2008). As such, Long et al.'s study in northeast Oregon found unmanaged areas of forest to provide better foraging opportunities for elk in summer and into the fall months (2008). Furthermore, small clearcuts will resort to forest undergrowth relatively quickly, and grass species, if they do exist in the clearcuts will be out-shaded within a few years making the utility of these clearcuts short-lived, if there exists utility at all.

Several landscape features already offer early successional habitat for elk forage. There is a powerline corridor that goes through the area that is required to be kept in

kept in a permanent clearcut, and the View Lake Fire on the east side of the Bull of the Woods wilderness recently created significant early seral habitat.

An additional twenty five acres of clearcuts in the project area increases impacts on earthflows, peak flows, invasive species and habitat loss for other species – none of which were analyzed in the PA. Bark requests that these elk clearcuts be either substantially justified and analyzed or removed from the project.

4) Unnecessary and detrimental loss of snags

Dead wood habitat is associated with the abundance or presence of approximately one quarter to one third of vertebrate wildlife in Northwest forests. At least 47 species deemed sensitive or special-status have associations with dead wood such as downed logs and snags. (Hagar 2007). At least 20% of birds in the western Oregon Doug-fir forests depend on snags for feeding or nesting (Cline et al. 1980). Pileated woodpeckers play a crucial keystone species role in Oregon's forests, and are directly affected by snag habitat availability. Over two dozen bird species have been shown to use cavities that have been previously excavated by Pileated woodpeckers. Species which subsequently use pileated-created cavities to nest or roost include the flammulated owl, the bufflehead, and Vaux's swifts, which are on sensitive species lists or are considered priority species in Oregon or Washington. Other vertebrate species include the northern flying squirrel, which is the primary prey of the northern spotted owl, as well as the common merganser, silver haired bat, and fisher, and American marten. (Aubrey and Raley 2002).

The Northwest Forest Plan's standards and guidelines (S&Gs) for maintaining viable populations of pileated woodpeckers emphasize monitoring. This includes: "implementation monitoring to determine if S&Gs are being followed, effectiveness monitoring to determine if they are achieving desired results, and validation monitoring to determine if underlying assumptions are sound" (Aubrey and Raley 2002). Monitoring of 106 randomly selected harvest sites on Forest Service managed land in Oregon since 1996 found that compliance with the snag S&G guidelines was lower than compliance with the guidelines overall, due to a widespread lack of clarity among staff concerning definitions, what snag levels are required to support 40% of the population potential of cavity nesting birds, and the guidelines themselves. (Aubrey and Raley 2002). Monitoring of these guidelines by the Forest Service was inadequate to ensure that pileated woodpeckers and the species that depend on them, such as the spotted owl, were adequately protected in thinning projects. While snag retention strategies are now guided by the DecAid model, it is still unclear how clearly snag retention procedures are communicated to staff, or makring crews and loggers, or how accurately or consistently they are being implemented.

Evidence suggests that thinning lowers snag density relative to un-harvested stands. (Windom and Bate 2008). Windom and Bates (2008) suggest no-harvest buffers around snags to increase retention rates. Plantation stands in Jazz contain few large snags, and snag densities are far below historic levels, and have less than half of the desired snag density. *PA at 113*. Since large snags are required for the habitat

requirements of certain species (Cline et al. 2008) but are in short supply due to past and present management the Forest Service should exclude stands with high snag densities from harvest, or utilize buffers in order to protect snags, particularly legacy snags. The Windom and Bates (2008) study also suggests that ease of human access, along with timber harvest, had a significant negative impact on snag density. In their study, stands which were thinned retained snag densities approximately three times lower than in stands with no history of logging. Also, snag densities in forest stands adjacent to roads were approximately three times lower than those not adjacent to roads. (Windom and Bate 2008). These findings do not bode well for future snag densities in the Jazz timber sale if logging is allowed to proceed as planned. Existing high road densities combined with the addition of reopening so many miles of road miles will further reduce already depleted snag resources.

The Jazz PA does not take the necessary steps to protect or retain snags, and so exacerbates current snag deficits. For example, the PA states that "all non-hazardous snags will be retained" but that it is likely some snags would be cut down for "safety". *PA at 115*. Since snags are not clearly buffered, and skips do not reliably encompass even clusters of snags, this project does not ensure that any particular snag will be protected. Most snags could be considered a safety hazard if logging takes place nearby, or they could simply be knocked over during logging. This project fails to aid in meeting snag density guidelines or target goals, and does not address how the Forest Service will maintain an adequate snag density to provide for even minimum wildlife habitat needs. Particularly in the wake of already reduced snag densities due to past management practices and numerous recent timber sales, a general statement of 'trying' to retain snags which lacks any actual accountability is insufficient to address the current snag deficiency crisis, or to ensure that the snags that are still left are protected and retained. Similarly, the Jazz PA states that "to increase the likelihood that key snags would be retained, they may be included in skips". Again, this does not ensure that any snag is retained, regardless of size, uniqueness, importance, age, or decay class. The PA states that snags may be created within the sale area, possibly by topping live trees. However, little evidence exists that snag creation, particularly snags created from tree topping, are used by wildlife at the same rate as naturally created snags, or even that they remain standing at the same rates. (Boleyn et al. 2002).

Bark requests that stands containing high densities of snags and legacy features, or multiple pockets of snags, be specifically excluded from logging. In Jazz units, no-cut buffers around legacy snags or pockets containing multiple snags should be implemented. No-cut buffers should be clearly defined and large enough to guarantee the retention of key snags so as to avoid situations in which they are felled due to safety regulations. In addition, "key" snags should be clearly defined and identified so that adequate communication with contractors can be maintained in regards to retaining these features, and monitoring efforts can accurately ascertain retention rates. In our scoping comments, we highlighted units 4 and 18 as containing legacy snags that we observed during ground-truthing. Please buffer these legacy features.

Bark is currently engaged in snag-retention monitoring work in relation to the Wildcat timber sale. While several positive interactions and discoveries have come out of this work, it also has raised questions about the Forest Service's ability to adequately implement and monitor snag retention strategies. For example, during our recent monitoring work in the Wildcat timber sale, none of the Forest Service staff we met with were able to guarantee that any snag would be retained, regardless of size, decay class, or habitat importance. Forest Service staff were unable to give a single example of a snag that was clearly defined as a "key" snag during our multiple meetings within the Wildcat sale, even though the FS Wildcat CE letter stated that "[t]o increase the likelihood that snags would be retained, green trees will be marked as leave trees where their live crowns touch certain key snags" (FS 2005). Bark found at least two instances in unit 6 of the Wildcat sale in which legacy snags had adjacent small diameter (less than 4") "take" trees whose crowns were touching the snags, putting the snags at risk of being knocked down during harvest or taken down due to safety regulations. In addition, it was unclear if skips and gaps had been created within the timber sale, as was outline by the FS planning documents, and no one we talked to at the FS was able to tell us whether or not variable density thinning had been implemented as was intended.

While we were very pleased that the FS was willing and able to address some of our concerns within the Wildcat sale, it seems likely that with an area as large as the Jazz timber sale, many more such oversights in relation to special habitat protection and snags will go unnoticed and unprotected. For example, in unit 6 of Wildcat the Forest Service addressed our concerns about an area containing numerous legacy snags surrounded by "take" trees. Forest Service staff contacted the purchaser and arranged to leave most of the previously marked take trees which were interspersed in this legacy snag cluster, and replace them with other volume throughout the sale. While we were impressed and pleased that the Forest Service staff and the purchaser were cooperative and amicable to these suggestions, this area should have been buffered by the Forest Service during the planning process. If oversights like this exist in such a comparatively small sale such as Wildcat, what does that say about a much larger sale such as Jazz? We believe it would help if buffering legacy snags, and particularly clusters of snags and legacy snags, was a standard guideline, rather than an exception. With such biologically rare but crucially necessary habitats as these very large legacy snags of varying decay classes, guidelines and buffers that guarantee their retention should be required.

Wildcat Unit 6: Legacy snag with crown of adjacent small diameter (4") "take" tree touching

Wildcat Unit 6: A "key" snag? No one we met with from the FS could tell us. No buffers or guarantees of protection were given to this legacy feature.

During our Wildcat monitoring work, Bark observed that high retention rates are possible when the importance of preserving snags is emphasized, and that buffer zones can be created in order to protect legacy features. While we have not yet completed our post-logging count of retained snags, preliminary observations are seem to suggest a fairly high retention rate. Several of the small diameter "take" trees adjacent to legacy snags were simply not harvested, even though they were marked for harvest. Leaving these trees may have aided in the preservation of several of the large legacy snags in the unit. Most of the larger legacy snags seemed to be retained, and so we know that it is possible to harvest in such a way as to preserve these trees. Why not, then, commit to guidelines that ensure that more of these large legacy features will be preserved?

One unfortunate post-logging observation in the Wildcat sale monitoring was that many of the "smaller" (< 15-20') legacy snags in more advanced stages of decay were knocked over and destroyed during logging. (All monitored snags were at least 10" in diameter and 6' tall) This is unfortunate because a variety of snag sizes and decay classes are needed in order to provide habitat for the different species that depend on them (Cline et al. 1980). Since large diameter snags take many years to develop and be recruited, timber harvest practices that do not protect these features are in danger of creating shortages of this key habitat for decades to come. Indeed, Cline et al. (1980) also found evidence that thinning can have long-lasting and negative impacts

on snag natural production due to a reduction in diseased, topped, or decayed trees that would eventually become snags (Cline et al. 1980).

The Jazz PA tries to mitigate the loss of snags by saying that after thinning, the trees will grow faster quicker – leading to larger snags in the future. *PA at 115.* This does not account for the time lag needed for the growth, death and decay necessary for these new snags to serve as functioning habitat for cavity nesters. Neither will the creation of snags as a part of the Jazz Timber Sale address the immediate need of snag-dependent species that will lose their homes and food sources as a result of this action. Again, there is a time lag between the creation of snags and their utility as habitat. A study on the use of created snags found trees killed within the last 10 years had little decay and had neither ant colonies nor adequate nesting or roosting cavities. (Boleyn, et. al., 2002).

Botany and Invasive Weed Management

"The risk level for the introduction or spread of invasive plants/noxious weeds is high for this project." *PA at 142.* The severity of invasive weed promulgation in Mt. Hood National Forest has been considered a major concern for Bark and stakeholders for years and has recently been prioritized for management by the agency. While we appreciate the emphasis put on invasives in the Jazz PA, very little information was provided about what specific design features will put the project in compliance with management plan amendments from the Regional Invasive Plant ROD.

As noted in the PA, Canada thistle, bull thistle, Scotch broom, St. John's Wort, and tansy ragwort are all present in the planning area. *At 142*. These plants are included on the ODA invasive plants list and management objectives are to control infestations. Bark volunteers have observed the widespread nature in the project area, and found St. Johns Wort growing along many of the decommissioned roads including the road heading west into unit 70. They also found Scotch broom along both of the already decommissioned roads heading to unit 110 and 112. Reopening these roads and connecting skid trails into these units, and significantly opening the canopy will inevitably increase the presence of invasives.

We have also noticed that invasive plants such as Bull Thistle, Knapweeds, and St Johns Wort become increasingly present after logging in the adjacent Bonanza timber sale, despite similar BMPs that the Forest Service plans to use for Jazz. Further, as they are still present seven years after logging, it is obvious that this is a long term problem with no simple solutions.

As the PA states, "invasive plants can reduce biological diversity, displace native plant communities, decrease and degrade wildlife habitat, alter fire regimes, change hydrology, disrupt mycorrhizal associations, alter nutrient dynamics, and increase soil erosion." *PA at 142.* With this litany of reasons to not further spread invasive plants in the area, coupled with the fact that the project inevitably will increase invasives, that will persist on the landscape, how will the Forest Service ensure that

this area does not become further contaminated with the very invasive species that the agency is currently trying to remove?

One plant species that could be further threatened by the proposal is the Sensitive Species Sisyrinchium sarmentosum, which was found in Unit 32. Sisyrinchium sarmentosum grows in seasonally wet meadows and is only found in Clackamas County in Oregon. As many of the headwaters of the creeks in the planning area finger into these wet areas, we are concerned about this species in the area. We have found potential habitat for S. sarmentosum south of Unit 2, between Units 2 & 4, throughout Units 16 and 18, and in Unit 32. The most serious threat to the species is invasion of its habitat by trees and shrubs. Timber harvest and recreational activities are also potential threats. Road maintenance and altered hydrology could also impact the species at certain sites by increased peak flows which would further drain moisture from the landscape. According to the LRMP "Habitat for sensitive plants shall be protected or improved. (LRMP 4-69). Please explain how logging would improve habitat for this Sensitive Species?

The PA also notes that Pseudocyphellaria rainierensis is present in Unit 68. This lichen, also known as "oldgrowth specklebelly", is generally only found in the few patches of remaining old-growth forest in the Pacific Northwest and is rare to find in these younger stands. We are curious what about this stand offers habitat to this generally old growth species? Pseudocyphellaria rainierensis is potentially vulnerable to land management activities, and the risk for maintaining species viability is high. This species apparently reproduces primarily through the production of asexual lobules, which fall from the thallus and become established nearby. Because of the size of the lobules (0.5-3 mm), dispersal distances are probably small, limiting this species' dispersal capabilities. Only one fertile population is known, suggesting that apothecia are very rare and sexual reproduction is uncommon (Sillett in press). "Threats to Pseudocyphellaria rainierensis are those actions that disrupt stand conditions necessary for its survival, or treatments or activities that may directly or indirectly impact populations. This includes stand treatments that result in changes in forest structure or changes in microclimate conditions (e.g. temperature, humidity, radiation)." Survey and Manage Protocols for Component 2 Lichens. As P. rainierensis is present within a unit we are concerned that limited skips will be inadequate to protect the species, and request this unit be dropped.

Another interesting discovery was a wet meadow between units 2 and 4 that is getting filled in with cattails. To the sides of this cattail field are giant old growth Cedar stumps, indicating that at one time there was a cedar forest along the bank of a creek. As cattails are normally only present as early successional species it appears that logging in the riparian areas hugely altered the landscape. And the fact that the Cattails persist many years after logging show that this disturbance has caused a situation where the condition is persisting on the landscape. This is a reminder that logging practices can radically change the landscape for years to come in many ways we are not able to predict.

Cattails are also beginning to take hold along Slide Creek in Units 16 and 18. Slide Creek is obviously slumping in many places and jumping channels as well. The cattails seem to be thriving in this wet disturbed environment. Logging in these riparian areas or abandoned stream channels is likely to alter more habitat along this restless creek.

Bark is also concerned about the potential seeding of grass for erosion control after timber harvest. Seeding grass can have a negative effect on indigenous ectomycorrhizal communities and compete with trees for water and nutrients. These effects are not seen with native grasses, and are exaggerated with exotic, non-mycorrhizae forming weeds such as canary grass, which is already present in the landscape.

Impact on Soil

1) Earthflows and landslides

The Collawash watershed contains some of the most geologically unstable terrain in Mt. Hood National Forest. *PA at 81*. Thirty-one units of the Jazz timber sale are in High Earth Flow areas. *PA, Appendix A*. Most of the rock is of volcanic origin and in ancient landslide deposits known as "earthflows". Earthflows are large, naturally occurring slow-moving landforms that occur on gentle to moderate slopes and can be over 100 feet deep and cover hundreds of acres. They are like glaciers of soil that are moved by gravity very slowly down hill carrying standing trees with them. The topography can be hummocky with ponds and can cause trees to grow crooked and cracks to form in roads.

The movement of earthflows may be affected by climatic cycles particularly during wet periods. When the ground materials become saturated with enough water they will start flowing. Speed can range from being barely noticeable to rapid movement. The velocity of the flow is dictated by water content: the higher the water content is, the higher the velocity will be. Because of the dependency on water content for the velocity of the flow, it can take minutes or years for the materials to move down the slope. *Earthflow movement may be accelerated by management activities such as road construction and timber harvest.* (Revised CHSWA, 2003, emphasis added).

Since each earthflow has different characteristics and different rates of movement, they are broken into high, medium and low risk categories. Earthflow management is described in the Mt. Hood Forest Plan (Four-261) and in the Northwest Forest Plan Standards and Guidelines (B-24). The Watershed Analysis process used existing geographic information system (GIS) data that was developed in the late 1980's. Since then, earthflows have been remapped, using aerial photographs and field investigation. New mapping increases the amount of High Risk Earth Flow in the Collawash Watershed. (Revised CHSWA, 2003).

While mass wasting and sediment production is a problem under normal conditions, the CHSWA admits the escalation of this hazard as a result of forest management activities such Jazz. "Management activities on these landforms [those with an

inherent risk of mass wasting, including many of the Jazz units]," the CHSWA states, "increase the relative hazard for inducing landslides and mass wasting occurrence" (CHSWA, 2-21). The CHSWA further recommends that roads built on unstable topography be removed in order to "maintain or restore natural flows" (CHWA, 1-7). Yet this project proposes to reopen at least 11 miles and construct 0.75 new miles of roads.

The B8 Earthflow designation under the Mt. Hood National Forest LRMP gives explicit guidance for areas of high earthflow, including: "Ground machine yarding of logs should not occur." (B8-036); "Soil Compaction should not exceed 8%." (B8-40). Bark objects to the Forest Service specifically exempting itself from these two key guidances in the Jazz Timber Sale

Bark groundtruthers observed how geologically unstable the area is when visiting units along 6311. They witnessed the major slumping that occurred last season along Peat & Cap Creek. Multiple stream crossings of FSR 6311 required major work at an expense of $16,360. The PA for Increment II the analysis noted that the road could have been completely decommissioned for only $30,000.

Almost every road Bark groundtruthers ventured up had landslides or significant slumping. In the fall of 2011, they found 7 such instances. For example, in Unit 118 which has 70% slopes through much of the unit, a Bark volunteer found a landslide on 10/31/10. It was about 100 feet across and slid approximately 70 feet taking trees and boulders down with it.

Last November, Bark volunteers headed up FSR 6330 about 3 miles from the juncture with Road 63 and found a major landslide on the upslope of the road.

Another outing brought us to 6320 in an attempt to visit units 136-140. We found significant slumping on FSR 6320 at the Fan Creek crossing

Also at 1.65 miles up the same rd (6320) there is another patch of slumping. Here the road is peeling back about two inches and sliding down the hillside.

Barkers also found significant slumping on 6340, and another landslide on 6310 between units 42 and 44. This slide is about 50 feet tall and 100 feet wide and then another landslide in an old clearcut just north of Unit 78. This slide is about 50 – 100 feet wide.

The PA suggests that repair of system roads would greatly reduce the risk of resource damage from those roads. *PA at 83.* However, in earthflow areas such as the Collawash, it is conceivable that entire road prisms, and all the aggregate and pollutants they contain, will fail and slide. A good example of this phenomenon is the 6300 road, which unexpectedly failed in 2009 after it had just received resurfacing and patches. Its culverts and crossdrains were reportedly functioning fine prior to the blowout. The Forest Service cannot predict the movements of earthflows, and any projects that decrease canopy and increase soil compaction could lead to similar blowouts *even after* road repair.

All this to say that this is a highly unstable landscape!! And that roads and slopes are moving, and will continue to move, and that the Jazz Timber Sale is exacerbating all of the factors that activate earthflows. Bark strongly believes that continuing the pattern of active management in this unstable watershed is going to continue the occurance of slumping, sliding and failing roads and slopes. The Forest Service should adhere to its statement in the PA that "known unstable or potentially unstable areas have already been deleted from the proposed thinning units" (*PA at 84*) and remove all units in High Earthflow areas, as they are inherently unstable.

2) Soil Compaction

Soil conditions strongly influence long-term forest productivity, the composition and condition of vegetation, rates of vegetative recovery after disturbance, sediment flux, and the quantity, timing, and quality of water produced by watersheds, which, in turn, affect aquatic populations and habitats (Beschta et al., 2004). Because soil conditions strongly influence future forest vegetation conditions, soils profoundly affect the functionality of forest vegetation with respect to ecosystem processes.

The majority of observable ground disturbances in the Jazz sale area are heavily compacted old skid trails, landings and temporary roads from the logging 40-60 years ago. *PA at 95.* All ground based units still show signs of skid trail compaction,

without substantial recovery – even on gentle slopes. Id. The soil remains detrimentally compacted far in excess of Forest Plan standards. Yet, despite the heavy compaction already present on these unstable and degraded soils, the Jazz timber sale would increase compaction across the landscape.

As noted above, earthflow areas, soil compaction should not exceed 8%. (LRMP B8-40, FW-018). In the Jazz sale area, detrimental soil conditions ranged from 9-30%, with an estimated increase of 2-6% as a result of ground based yarding. The Jazz Timber Sale proposed to exempt itself from these Forest Plan standards: 1) to allow already over-compacted soil to be further damaged; and 2) to allow ground-based yarding in earthflow areas. (LRMP B8-36, FW-020). The reason given is that "stands continue to grow well" even with compaction, and that "in areas not disturbed again" natural recovery would continue.

This is not the first timber sale in the Collawash watershed that has high compaction, and exempted itself from compliance with Forest Plan rules. Recent timber sales in the area have similarly exempted from the standards, including 2007 Thin, Rethin, and Collawash. The 2007 Thin EA and the Rethin EA use the *exact same* boilerplate language for the exemptions. See 2007 Thin EA at 131, Rethin EA at 88. This clearly shows that the Forest Service is not making a thorough, site specific determination that this exemption is warranted. Bark is very concerned that the Forest Service will continue to exempt itself from Forest Plan standards in each and every timber sale, *and* will be disturbing the areas again.

Rather than a timber sale that allows for almost triple to amount of compaction in earthflows, Bark suggests that the sale be modified so that NO new skid trails, landings or temporary roads are constructed in high Earthflow areas. With this alteration, ground-based yarding could occur only if it takes place on pre-existing alignments and results in no additional compaction.

3) Impact on Mycorrhizal Fungi

Though well established as one of the most important components of a forest ecosystem, which is adversely impacted by logging related activities, the Jazz PA contains no information about the impacts on Mycorrhizal fungi. If the Forest Service proposes to manage this stand for the forest health, it should definitely discuss the impacts to mycorrhizae—indeed 80% of **all** plants have mycorrhizal connections. The failure to discuss Mycorrhizal fungi is a glaring omission.

Mycorrhizal fungi mainly reside in surface layers of soil and organic matter. Removal of the forest floor, soil compaction, prescribed and/or natural burns, and even recreational activities can alter the floor composition, thereby preventing or altering colonization of new seedlings by ectomycorrhizae, and limiting abundance and diversity of mycorrhizal species. (Wienscyz AM, et. al, 2002).

Timber cutting impacts the forest floor on a variety of levels. It decreases available organic matter that can be colonized by mycorrhizae and utilized for its water-

retention properties. During times of drought, fallen trees may be a refuge for mycorrhizal activity. Logging-related activities also compact soils, especially in places like the Collawash, with easily compacted volcanic ash soils. Soil compaction degrades soil structure and restricts movement of oxygen and water through the soil, which prevent plants from forming feeder roots most closely associated with mycorrhizae colonization. Recent studies show that the effects of compaction can last up to 45 years. Ectomycorrhizal root tips were reduced over 60 percent in areas of high compaction by the tractor coupled with high organic material removal (whole tree or whole tree and surrounding organic matter). In heavily compacted areas, the number of ectomycorrhizal root tips was greatest in areas of highly decomposed woody debris. (Amaranthus, MP, et. al 1996).

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 (Amaranthus et al 1996). 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 (Amaranthus et al 1996). 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 (Amaranthus et al 1996; Froehlich et al 1985).

Bark groundtruthers found calypso orchids in unit 44, which are hemiparasites - meaning they tap into the already established existence of a healthy mycorhyzal relationship. The Jazz project area also hosts an amazing amount and variety of fungi, showing how the forest is naturally restoring its soil communities. In comparison, recently thinned sales adjacent to Jazz, such as Bonanza, have literally no fungi (and look like hell). If forest restoration is truly the goal of this project – the first concern should be to protect soil health and michorizzal networks, not to erode, compact and scar the soil – destroying the essential fungal relationships that maintain forest health.

4) Increased Erosion

"Soil erosion would increase with the proposed action because bare soil would be exposed during implementation"; "Ground based yarding systems result in greater amount of ground exposure than skyline or helicopter systems"; "A total of 111 acres would have potential increased erosion as a result of thinning activities"; Disturbed areas would be potential chronic sources of sediment until they are revegetated successfully. *PA at 94.* These are all very disturbing (if unquantified) acknowledgements of impact, and lead to many more questions: How long will it take to revegetate successfully? What amount of erosion will occur during the time lag? What is the impact of this erosion on an unstable landscape?

The PA also admits that skyline yarding on steep slopes with highly erosive soils (units 30, 34, 44, 80 and 82) have the potential to become "chronic sources of erosion and sediment" unless water is diverted to the side. *PA at 94*. What is the Forest

Service doing to ensure that such waterbarring not only occurs but is successful at diverting water over the revegetation period?

The PA does not account for the inevitable time lag between project implementation and soil revegetation when it concludes that there will be "little effect to erosion" from the project. By not quantifying the amount of soil that will be lost, and the time necessary for revegetation, the PA does not capture the true impacts from soil erosion. Please correct this omission in the EA.

Inadequate Climate Change Analysis

In 2008, the Forest Service 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, Forest Service 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."

Locally, the Oregon Climate Change Research Institute just released an extensive report, available at http://occri.net/ocar, which discusses significant changes in our rain patterns. The consensus is that the future will bring larger storms and longer periods of drought to the west side of the Cascade Mountains. The landslide risk in the Collawash is incredibly high already. Climate change will have significant impacts for both the road network and the hydrological functions of the Collawash and points to the need for the active decommissioning of as many miles of roads as possible.

The evolving analysis on climate change within the EA 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.

Removal of biomass from any forest limits said forest's ability to sequester carbon for a period after the disturbance and can even turn the forest into a carbon source (Harmon 2009). Not only that, but the act of removing trees requires carbon emission (Harmon 2009). Moreover, reducing tree densities increases weatherization of dead biomass, which would increase carbon emissions from the forest more.

The Forest Service insists that the scale of climate impact is inherently global, missing the fact that local actions have an impact on global climate trends. It is absolutely possible to quantify the amount of carbon sequestered in the project area at Jazz (see, for example, the BLM's Airstrip Thinning EA in which it did just that). Using the numbers from Airstrip, Bark extrapolated that the acres logged by Jazz currently sequester 3,089 tonnes of carbon annually. Wow! That's almost as much carbon as one square mile of residential Portland emits every year. Again

extrapolating the numbers from Airstrip, we can predict that the logging and hauling operations of the Jazz sale will release 705 tonnes of carbon over the course of the project, and an additional 1,645 tonnes over the short term, in addition to decreasing the overall annual carbon sequestration capacity of the forest. Now, wouldn't it have been helpful if y'all had simply done the math yourselves? Perhaps the Forest Service can learn a bit from the BLM about quantifying climate change numbers, then take it a step further and provide active mitigation measures to offset the carbon emitted and the loss of carbon sequestered by the sale. Please do so in the EA.

Impacts to Recreation

This extremely brief section of the PA read like an afterthought, and not an actual examination of the impacts of this project on recreation. A brief mention that "several roads access wilderness trail heads and Bagby Hotsprings" does no justice to how many people actually rely on this area for quiet recreation, nor what an impact hundreds of log trucks and the sounds and sights of heavy machinery – including helicopters – would have. We know that Mt. Hood National Forest has recreation specialists. Please have one write a real analysis on the impacts to recreation for the EA.

Forest Service needs monitoring & implementation plan for BMPs

Regulations implementing NEPA require that agencies "state whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not. A monitoring and enforcement program shall be adopted and summarized where applicable for any mitigation." 40 C.F.R. § 1505.2(c). With the Jazz sale, the Forest Service assumes that the implementation of BMPs will sufficiently mitigate any problems that the proposed project will have on aquatic systems, but offers no proof of this assertion.

A USDA Office of the Inspector General Report concluded that reliance on speculative mitigation measures in order to reach a FONSI significantly compromised environmental quality. The OIG concluded that:

"Applicable mitigation measures contained in 10 of 12 decision notices and referenced environmental assessments reviewed, were not always implemented. In addition, mitigation measures were either omitted or incorrectly incorporated into 4 of 12 accompanying timber sale contracts. These mitigation measures are designed to reduce the adverse impacts of timber sale activities on the environment. Generally, mitigation measures were not implemented due to district personnel (a) not being familiar with the mitigation measure contained in the environmental documents, (b) not adequately monitoring actual implementation of the mitigation measures, (c) not comparing timber sale contract clauses with the applicable environmental documents and, (d) oversight. As a result, streams, wildlife habitat, heritage resources, water quality, and visual quality were or could be adversely affected. In addition, "Findings of No Significant Impact" conclusions (i.e. that there was no significant effect on the quality of the human environment) were questionable…Timber sale field visits disclosed that mitigation measures designed to

protect key resource areas were not adequately implemented. The measures involved mitigation of riparian areas and stream management zones, wildlife habitat, heritage resource sites, visual quality, and soils."

In the same report, the OIG Inspector found that the Forest Service could not ensure the integrity of its environmental decisions and the supporting environmental assessments. Specifically, (a) mitigation measures intended to limit environmental damage associated with timber sales were either not implemented or not incorporated into the timber sale contract, (b) more timber was harvested than permitted by the environmental documents, and (c) timber stand numbers could not be reconciled between the timber sale contract and the environmental documents. As a result, the credibility of the Forest Service suffers when promises, in the form of mitigation measures, are not kept and the published position of the agency conflicts with on-the-ground reality. Further, the environment suffers when Forest Service employees overlook sensitive resource issues and fail to protect threatened, endangered, and sensitive species, heritage resources, and water quality.

While these are systemic issues throughout the Forest Service, Bark believes that they are also at play in the Mt. Hood National Forest. Failure to transfer information to marking and logging crews results in BMPs not followed and increased environmental harm. Refer back to our discussion of the small Wildcat timber sale above – if the Forest Service personnel had such difficulties ensuring that BMPs were implemented on a sale that is less than 100 acres, how can you possibly guarantee they will be followed through the entire Jazz project area?

As this sale is almost certainly going to be implemented through a Stewardship Contract, with a Designation by Prescription, it is imperative that the Forest Service create specific monitoring points to ensure that the private company tasked to complete the project thoroughly understands variable density thinning, and complies with every single BMP, and throughout the marking, logging, hauling and completing the project.

Large Sales Thwart Site Specific Review

Not only does the size of the sale make it difficult for Bark to provide accurate public scrutiny, a project of this size is extremely challenging for the Forest Service itself to accurately analyze. Like Bark, expert agencies find themselves in a bind when a project area is as large as Jazz. In its NEPA documents, the Forest Service does not list key landscape features within the units, likely because the size of this project made it impossible to field check it in its entirety. As evidenced in the previous sections of this comment, the Forest Service has not provided specific or accurate information in the PA, making it impossible to comply with NEPA's requirement to "insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken." 40 CFR §1500.1(b).

NEPA engagement is crucial to Bark and our supporters because it allows the public to better understand the true nature of proposed actions and their impacts on the

Mt. Hood National Forest. As described above, it is clear that the sheer size of Jazz and the fact that "final" environmental analysis will not emerge until the public has lost the ability to comment, has made it impossible for us to adequately review this proposal.

If the Forest Service, with its resources and expertise, cannot adequately field check the project prior to issuing the PA, it is unreasonable to expect members of an engaged public to do so. Because Bark has an amazing team of committed volunteers, we were able to groundtruth almost every unit of the Jazz timber sale, though it took almost 600 hours. However, Bark is not the only stakeholder on the Mt. Hood National Forest, and it would be impossible for any one person (or organization who is not as thoroughly awesome as Bark) to visit the entire sale.

We request that this project be withdrawn until all logging units have been field checked by Forest Service personnel and documents redrafted with specific information. When an EA is issued for the project, we request that the Forest Service open an additional 30-day comment period to allow the public to offer our comments on what we hope will be a much more thorough analysis of the environmental effects and alternatives to the proposed action. This would allow the public time to determine whether the mistakes in the PA have been corrected. It would also help create a transparent proposal so the public can have a meaningful say in their public lands, and the agency can help foster trust with the public.

Cumulative effects of the Jazz Timber Sale

Several projects in the Collawash and Clackamas watersheds have cumulative impacts, which are defined as "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions." 40 C.F.R. § 1508.7. When these impacts are significant, an EIS is required. Id. § 1502.4. Under NEPA, "significance exists if it is reasonable to anticipate cumulatively significant impacts on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts." 40 C.F.R. § 1508.27(b)(7). NEPA also makes clear that "cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement." 40 C.F.R. § 1508.24(a)(2).

To the best of our knowledge, it appears that active logging could occur on part or all of the timber sales covered by the following NEPA decisions: Collawash Thin, No Whiskey, South Fork Thin, Cloak, 2007 Thin, Upper Clack Thin and ReThin – together these sales impact over 10,000 acres in the Clackamas River Watershed.

Many units of the Jazz timber sale are directly adjacent to units of other thinning sales – thus increasing the impact of the sale. The PA tries to minimize the cumulative impacts in two ways; 1) by understating the direct impacts of the Jazz sale, especially to water quality, soils, wildlife and invasive plants, and 2) by only discussing cumulative impacts on a resource by resource basis – so the real impacts to all the resources from all the projects is never quantified or discussed.

Bark groundtruthers have found many units of other timber sales, both logged and unlogged, throughout the Jazz planning area. On FSR 6340 are 8 units of the Jazz timber sale, and the unlogged Pin Sale. On FSR 6330 are 5 units of Jazz as well as the unlogged Hot Timber sale. On FSR 6320 are 4 Jazz units and the unlogged Fan and Pink timber sales. On FSR 6310 are 9 units as well as the recently logged Roman timber sale. On 6311 are 13 Jazz units as well as the recently logged Bonanza Sale.

As many of these timber sales have not yet been logged, and could be logged, yarded, hauled, etc. concurrently with Jazz, the actual impact to the watershed is far greater than ever analyzed in the PA. Until the actual impacts of the extensive concurrent logging already planned in the Clackamas watershed are actually known, the Forest Service cannot possibly make an accurate assessment of the additional impact of the Jazz sale. Planning yet another landscape level project in the Clackamas while there are thousands of lingering acres from projects past presents an unnecessary risk to the health of the watershed.

The EA needs to quantify the extent of the backlog of logging in the Clackamas River watershed, specifically in the Collawash, analyze the actual impacts of the road building, logging and hauling in the watershed, and meaningfully discuss the additional impact of the Jazz project on the environment.

Jazz Units of exceptional note

We include this section so that the Forest Service can modify the Jazz sale to remove these units and protect these special areas of concern, where thinning and road building will do much more ecological harm than good.

Unit 2: Has a wetland to the west of unit, and a stream to the east. The unit itself is on a small hillock right above these wet features, containing rhodies, chinkapin, and salal. This plant community at the top of the hillock signifies a dry area which means that water is moving quickly out of the area and into these wet meadows below. Logging will only expedite the moisture from the area, and add sediment to the meadow below. Too much sediment in a meadow could fill it in and alter the conditions.

Unit 4: To the north of the unit is a wet meadow filling in with cattails. Cattails are normally only present as early successional species. All around this are giant cedar stumps. Logging the riparian areas in the past hugely altered the landscape, and Jazz would continue that trend. There is also old growth that borders the southern portion of the unit and no roadway that leads into the unit.

Unit 18: Slide Creek, as it's name suggests, has a wide flood plain and there are plenty of instances of channel jumping. In some areas there are cattails and alders growing along the banks in an area that should be forested. The "existing alignment that goes into the unit from the south is non-existent, would require a log crossing

and would drive over the roots of a giant cedar. This unit is very wet, very open, and shows signs of plenty of natural recovery already.

Unit 44: Has rocky outcrops, wet areas with skunk cabbage, a creek along the N. boundary that is not marked on maps, more snags than most units in the sale (some even with a 5 feet dbh), a more mixed forest with Noble Fir, a decent amount of downed wood in various decay states, and a more open canopy which allows a diverse understory including calypso orchids.

Unit 56: On a 50 to 60% slope to the west. 6310 switchbacks through the unit, making two roads only 100 feet apart on this steep slope. On 6/ 18/2011, small rock slides were noted in FSR6310. It's likely that only the trees are holding this fragile hill together and loss of tree roots could lead to more landslides.

Unit 70: This unit is approximately 1/3 of a mile down a road that was nicely decommissioned just last year. This unit has old growth on both the east and west sides, borders the new wilderness expansion of Bull of the Woods, and cutthroat trout are present in Buckeye Creek which runs about an1/8 of a mile to the north of the unit. The unit itself has a nice rolling topography with microclimate pockets throughout and is naturally restoring.

Units 104 and 106: While these stands are even-aged, there is a diversity of hardwoods and shrubs in the understory such as rhodies, vine maples, and a rich herbaceous understory. Also some of these canopy trees are starting to hit the forest floor showing that the stand is taking care of itself.

Conclusion

As you are considering the optimal method of accomplishing the purpose and need "to increase health and growth of forest stands" please consider that active management is not always to only, or the best, way to improved forest health. In the comments above, Bark has provided ample suggestions to improve this project – based on our extensive survey of both the project area and the scientific literature pertaining to thinning and forest health. We anticipate a thorough review of these comments and expect the necessary changes made to both the forthcoming EA and the project itself.

In conclusion, I'll end with the Forest Service's own acknowledgement that "[w]ith no action, at 200 years of age these stands would function in a similar fashion to a treated stand but may have a larger amount of snags and down wood" (*PA at 104)* and recommend patience.

For the forest,

Brenna Bell, Esq., NEPA Coordinator

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