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ECOSYSTEMS,
TRIBAL AND PUBLIC
AFFAIRS

July 29, 2015

Mark Brown, Project Manager
RMPs for Western Oregon
Bureau of Land Management
P.O. Box 2965
Portland, Oregon 97208

Dear Mr. Brown:

The U.S. Environmental Protection Agency has reviewed the Bureau of Land Management's Draft Resource Management Plan/Environmental Impact Statement (Draft RMP/EIS) for western Oregon (EPA Project Number: 12-0020-BLM). The plan will apply to forest lands in the Coos Bay, Eugene, Medford, Roseburg, and Salem Districts and the Klamath Falls Field Office in the Lakeview District. Our review was conducted in accordance with EPA responsibilities under the National Environmental Policy Act and Section 309 of the Clean Air Act.

The Draft RMP/EIS proposes to revise the 1995 RMPs for the six Districts listed above. The purpose of this RMP revision is to provide a sustained yield of timber, contribute to the conservation and recovery of threatened and endangered species, provide clean water in watersheds, restore fire-adapted ecosystems, provide recreation opportunities, and coordinate management of lands surrounding the Coquille Forest with the Coquille Tribe. The DEIS analyzes a No Action alternative of continued implementation of the 1995 RMPs, four action alternatives (A, B, C, and D), and two sub-alternatives (sub-B and sub-C). The DEIS identifies Alternative B as the preferred alternative.

The EPA has appreciated the opportunity to participate in the development of the Draft RMP/EIS as a cooperating agency. The BLM has made a concerted effort to engage all of the cooperating agencies in a meaningful and robust process. We also appreciate the way in which the planning team engaged with the cooperating agencies to structure the alternatives within the DEIS. As noted on page xxiii of the DEIS, the alternatives were developed to represent a range of overall management approaches, rather than exemplify gradations in design features. In doing so, we find the DEIS succeeds in exploring the full spectrum of alternatives, which would respond to the stated purpose and need and maximizes the potential decision space for the deciding official.

As a result of our review, we believe that it will be necessary to pull elements from many of the alternatives, including the No Action alternative, to arrive at a final RMP that will best meet the established purpose and need for action. Specifically, we find that the riparian strategy under Alternative B presents potential risks to aquatic resources that are incongruent with the BLM's purpose and need. In order to establish a robust aquatic strategy that will consistently deliver predictable social and environmental outcomes, we recommend that the Final RMP/EIS include a riparian strategy based on the management concepts within Alternatives A or D. We also recommend that the overarching aquatic

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strategy be expanded to capture key concepts from the No Action Alternative, including Key Watersheds and Watershed Analysis.

We would recommend retaining the Harvest Land Base strategy under Alternative B. We find that the Alternative B harvest strategy in concert with a robust aquatic strategy would allow for continuity of key landscape functions, including harvest, while providing clean water and contributing to the conservation and recovery of threatened and endangered species. However, because this approach represents a departure from current management, our review also highlights the need for a robust monitoring program capable of assessing project implementation and effectiveness. We recommend that the details of a monitoring program be directly addressed and incorporated into the final RMP/EIS.

Finally, we commend BLM for a robust analysis of the potential impacts of climate change under the analyzed alternatives. Again, we find that the Alternative B harvest strategy performs well relative to the other analyzed alternatives in terms of providing the latitude needed to increase landscape resiliency to the effects of climate change.

Our attached comments provide additional detail about our concerns and recommendations. In light of our concerns over the aquatic strategy under Alternative B, and the lack of detail in the Draft RMP/EIS with regard to Key Watersheds, Watershed Analysis, and Monitoring, we are rating the Draft RMP/EIS as EC-2 (Environmental Concerns – Insufficient Information). We sincerely appreciate the opportunity to provide comments and we welcome the opportunity to continue to engage with the BLM as you move forward. If you have any questions about our review, please contact me at (206) 553-1601, or by electronic mail at reichgott.christine@epa.gov, or you may contact Teresa Kubo of my staff at 503-326-2859 or by electronic mail at kubo.teresa@epa.gov.

Sincerely,

Christine B. Reichgott

Christine B. Reichgott, Manager
Environmental Review and Sediment Management Unit

Enclosure:
1. EPA Region 10 Comments on the Western Oregon Draft Resource Management Plan/ Environmental Impact Statement

EPA Region 10 Comments on the Western Oregon
Draft Resource Management Plan/Environmental Impact Statement

Aquatic Strategy

A robust aquatic strategy is critical to protecting, maintaining, and/or restoring water quality and the ecological health of watersheds and aquatic systems within the BLM planning area. We believe the DEIS as written contains the elements that should be included in an aquatic strategy. However, these elements are not all represented within the draft preferred Alternative B. The comments that follow identify those components that EPA believes are necessary to include in an aquatic strategy in order to fully satisfy BLM's purpose and need related to clean water and the conservation and recovery of listed fish. For communication purposes, we frame these comments using the structure of the Northwest Forest Plan (NWFP) Aquatic Conservation Strategy (Riparian Reserves; Key Watersheds; Watershed Analysis; Watershed Restoration). We are not, however, advocating for a wholesale continuation of the NWFP Aquatic Conservation Strategy or the associated terminology.

Riparian Reserves

The DEIS identifies Alternative B as the preferred Alternative. The riparian strategy associated with Alternative B calls for riparian reserves of one site potential tree height on fish bearing streams; 100 foot reserves on debris-flow prone, non-fish-bearing intermittent streams; and 50-foot reserves on other non-fish-bearing intermittent streams. Within those allocations, Alternative B would require 60-foot no-thin buffers on fish-bearing and perennial streams; and 50-foot no-thin buffers on non-fish-bearing intermittent streams. Our review of the DEIS finds that the riparian strategies under Alternative B (and Alternative C which employs the most management intensive approach of all the alternatives) would result in risks to aquatic resources that would be avoided under the riparian strategies included in Alternatives A and D.

In 2013, the Science Review Team (SRT), under the direction of the Interagency Coordinating Subgroup (ICS), reviewed available literature related to the use of no-cut buffers adjacent to thinning harvests such as those proposed under Alternatives B and C. This team found that this kind of a management approach has received relatively little treatment in literature.[1] Due in part to the uncertainty around effects associated with riparian thinning, the EPA sought to include an analytical methodology in the DEIS that would be capable of considering potential shade loss associated with different riparian thinning intensities, buffer widths, aspects, and initial canopy cover. To that end, EPA proposed a mechanistic modeling approach to BLM during the development of the Planning Criteria.[2] The BLM accepted the methodology, and we gratefully acknowledge the inclusion of both the method and the results in the DEIS.

As noted in the DEIS (page 295), the EPA methodology found potential shade loss under each of the alternatives analyzed, though more under Alternatives B and C than under Alternatives A, D and the No Action Alternative. Under Alternatives B and C, the EPA methodology found there would be up to 372 miles of fish-bearing and perennial streams that would be susceptible to shade reductions that could affect stream temperatures. This would represent approximately 5% of the total fish-bearing and perennial stream miles within the planning area. We appreciate most of the stream miles that would be

[1] Leinenbach, P., McFadden, G. and C. Torgersen. 2013. Effects of Riparian Management Strategies on Stream Temperature. Prepared for the Interagency Coordinating Subgroup. 22 pages.

[2] http://www.blm.gov/or/plans/rmpswesternoregon/files/rmp-criteria.pdf

susceptible to shade loss are within areas that currently have lower canopy cover, making them unlikely to be selected for management. This said, management that would impact shading resources could be pursued under Alternatives B and C. This fact introduces an element of risk to clean water and listed fish that we believe the BLM is striving to avoid in order to provide predictable outcomes. Under Alternatives A and D, there would be up to 33 miles (out of 6,970 miles) of fish-bearing and perennial streams that would be susceptible to shade loss. This represents less than 0.5% of the total fish-bearing and perennial streams in the planning area. As with Alternatives B and C, the streams, which would be susceptible to shade loss are those that currently have low canopy cover in the inner zone. Under the management direction for Alternatives A and D, it is very unlikely that the BLM would manage within the outer zones along those streams. Given the limited number of stream miles and the proposed management direction, we find Alternatives A and D to provide the greatest level of certainty (among all of the alternatives) with regard to stream shade outcomes.

Alternatives A and D also perform better over time with regard to the provision of woody debris in streams. As noted on page 225 of the DEIS, Alternatives A and D would result in a larger increase in the number of large trees near streams than Alternatives B and C. Similarly, as noted on page 227 of the DEIS, Alternatives B and C would result in a smaller increase in the average diameter of trees in stands within one site-potential tree height of streams when compared to Alternatives A and D. Finally, as noted on page 228 of the DEIS, Alternatives A and D would include within the Riparian Reserve the largest proportion of the landscape capable of delivering wood to the stream. Based on these factors, we believe Alternatives A and D provide a higher level of certainty with regard to wood delivery outcomes than do Alternatives B and C.

Recommendation:
We recommend that BLM utilize the riparian management strategy from Alternative A or D as the basis for the final riparian strategy in the FEIS/proposed RMP. These strategies would provide consistent, predictable outcomes related to temperature, large wood, and sediment and best meet the BLM's purpose and need related to the provision of clean water in watersheds and the conservation and recovery of fish listed as threatened or endangered under the ESA.

Key Watersheds
Key Watersheds are a primary component of the Aquatic Conservation Strategy under the No Action Alternative (the Northwest Forest Plan). By designating Key Watersheds, the NWFP intended to identify and prioritize the management of areas of refugia that are crucial to at-risk fish species and the provision of high quality water. The EPA strongly endorses the identification of Key Watersheds. Maintaining refugia is critical to maintaining and recovering habitat for listed fish, and the provision of clean water is essential not only for the conservation and recovery of fish, but to the health of over 1.8 million Oregonians who rely on BLM land for their drinking water.

While we support the Key Watershed concept, and recommend that it be carried forward in the proposed RMP, we also believe that the process for identifying and managing Key Watersheds can be refined and improved. Our analysis finds that the existing network of Key Watersheds on BLM land does not align well with those areas, which we now understand to be the most important for listed fish. Further, the existing network of Key Watersheds on BLM land does not align well with source water watersheds (those watersheds that provide drinking water). We also note that the management direction for Key Watersheds under the NWFP is effectively limited to prioritizing those areas for restoration and road decommissioning. While we support restoration and road decommissioning within Key Watersheds, we

do not find that this direction offers a high degree of certainty with regard to environmental outcomes, particularly given that restoration and road decommissioning are largely dependent upon the availability of funding and potentially complicated by factors related to right-of-way agreements with private landowners.

Recommendations:
We recommend that the BLM seek to better align Key Watersheds with those areas critical for the conservation and recovery of listed fish and high quality drinking water. We also recommend that the BLM provide specific, rather than aspirational management direction for those areas. To that end, we recommend that the BLM consider an approach based on the following overarching criteria:

High Intrinsic Potential Streams: Fish biologists and recovery planners have long recognized the importance of reach-scale stream attributes (channel gradient, stream discharge, and valley constraint). These attributes (which together represent the intrinsic potential of a stream) influence the availability of fine-scale habitat features (e.g., pools, spawning gravel, and large wood) needed by salmonids. At the time the NWFP was under development, we did not have the analytical capability to map intrinsic potential over large areas. Today, we have this capability thanks to the availability of high quality digital elevation and climate data. The resulting high-resolution maps of stream networks and reach-scale stream attributes allow us to identify and prioritize the protection and restoration of those areas that do, or have the potential to, contribute disproportionately to the conservation and recovery of listed fish.

We recommend that the FEIS identify those 6th field watersheds within the planning area that key out as containing high intrinsic potential (HIP) habitat for coho salmon or steelhead. We recommend that the FEIS identify HIP watersheds for both of these species because coho tend to prefer lower gradient, less confined streams, whereas steelhead tend to prefer higher gradient, more confined streams. As such, stream reaches with high intrinsic potential generally do not overlap for coho and steelhead. Intrinsic Potential (IP) should be calculated as $IP = (MD * CG * VC)^{1/3}$ where MD = Mean Annual Discharge; CG = Channel Gradient; and VC = Valley Constraint. Based on existing work with IP modeling, we recommend that High Intrinsic Potential (HIP) be defined as those streams with an IP of .75 or greater.[3]

Critical Habitat: As noted on page 217 of the DEIS, the National Marine Fisheries Service (NMFS) has designated critical habitat for eight anadromous salmonid species within the planning area. These are specific geographic areas that NMFS has identified pursuant to the Endangered Species Act (ESA) that contain features essential for the conservation of listed fish. Recognizing that there may be areas of critical habitat that are needed for population recovery, but which do not key out as HIP, we recommend that the FEIS also identify those 6th field watersheds that contain critical habitat.

Watersheds containing both HIP and Critical Habitat are of critical importance to fish recovery and have the underlying geomorphic structure to provide good habitat in the long term. We recommend that these watersheds receive specific management consideration as Key Watersheds (understanding that BLM may choose different nomenclature in order to differentiate these watersheds from Key Watersheds as designated under the NWFP). Specifically, we recommend that riparian areas within these watersheds be managed to minimize risk to shade, temperature and large wood inputs, and maximize certainty around

[3] Bidlack, A, Miewald, T., Benda, L., and G. H. Reeves. 2010. Preliminary Report on Intrinsic Potential Habitat Modeling for Chinook in the Klutina and Tonsina Watersheds, Alaska. 19 pages. Available at http://www.wildsalmoncenter.org/toolkit/pdfs/Copper%20River%20IP%20Paper%20042010.pdf

achievable outcomes. Based on our analysis, and the analysis in the DEIS, we find that this would best be accomplished by a strategy built around the concepts included in Alternatives A or D.

Watersheds containing *either* HIP streams *or* Critical Habitat should also receive specific management consideration. These have either been identified as critical to the conservation and recovery of listed fish, or they have the potential to contribute toward those goals. These watersheds should be designated as Tier II Key Watersheds (again, the naming convention is less important than the management direction associated with it). These areas should also be managed to minimize risk to shade, temperature and large wood inputs under a strategy built around Alternatives A or D. It may, however, be appropriate to consider some management in the outer zone (outside of 120 feet on perennial and fish-bearing streams or outside of 50 feet on intermittent non-fish-bearing streams) where stands lack diversity and structural complexity.

Drinking Water: Over 1.8 million Oregonians within the planning area get their drinking water from BLM lands. Under the approach outlined above, where watersheds containing HIP and critical habitat would be managed under an Alternative A or D-type approach, most of the watersheds providing source water would also receive a high level of protection. The alignment is not perfect, however. In those watersheds that contain *neither* HIP *nor* critical habitat, it is still critical that adequate protection be provided for source water. We recommend that any watersheds not designated as Tier I or Tier II key watersheds be managed to minimize risk to shade, sediment and large wood production on all perennial and fish-bearing intermittent streams (using an Alternative A or D approach similar to what would be pursued for Tier II key watersheds). Intermittent and non-fish bearing streams should be managed to ensure the protection and maintenance of water quality. Based on our review and the analysis within the DEIS, intermittent and non-fish bearing streams in "non-key" watersheds should at a minimum receive protection consistent with the riparian strategy presented in Alternative B.

Watershed Analysis

The EPA strongly endorses the use of watershed-scale information to establish the contextual basis for land use activities. Decision makers need watershed-scale information to be able to plan land use activities that are compatible with disturbance patterns; design roads that pose minimal risk; identify what and where restoration activities will be most effective; and establish specific parameters and activities that should be monitored.

As noted on page 23 of the DEIS, none of the action alternatives include the Northwest Forest Plan watershed analysis process. The DEIS goes on to note, however, that the BLM would generate the equivalent of watershed analysis under each of the action alternatives by "...providing watershed scale information, including identifying resource conditions, watershed processes, risks to resources, and restoration opportunities, as needed for NEPA analysis or ESA consultation for implementation actions taken in the future consistent with the plan."

The EPA appreciates the BLM's stated intention to conduct the equivalent of watershed analysis. Given the importance of this information to the overall implementation of the RMP, we recommend that the FEIS include additional detail about how watershed information will be utilized and incorporated in the implementation of the RMP.

Recommendations:
We recommend that the FEIS/Proposed RMP clarify how watershed analysis will be brought forward in RMP implementation. We note that the Record of Decision, for at least one recent RMP prepared by the BLM in Oregon, the West Eugene Wetlands RMP,[4] includes an appendix entitled "Guidance for Use of the Resource Management Plan." We believe such an appendix to the RMP for Western Oregon would be an appropriate place to provide detail about how watershed analysis will be incorporated in the implementation of the RMP. With regard to the direction to be included in that appendix, we recommend that the FEIS/RMP incorporate the following concepts:

- Watershed-scale information will be compiled with the purpose of developing and documenting a scientifically-based understanding of the ecological structures, functions, processes, and interactions occurring within a watershed.
- Watershed-scale information may include the identification of resource conditions; watershed processes; risks to resources; and restoration opportunities.
- Watershed-scale information will be relevant to analyzing the effects of implementation actions, determining monitoring and restoration needs for a watershed, and developing priorities for funding and implementing actions.
- BLM will use watershed-scale information, where appropriate, to facilitate NEPA and Endangered Species Act compliance for specific projects (e.g. biological assessments for consultation with the National Marine Fisheries Service and U.S. Fish and Wildlife Service under Section 7(a)(2) of the ESA), as well as the implementation of Total Maximum Daily Loads for those streams listed as water quality impaired under section 303(d) of the Clean Water Act.

Watershed Restoration
Watershed restoration is an integral part of any aquatic strategy aiming to recover fish habitat, and water quality. Page 23 of the DEIS states that "...all of the action alternatives include management direction for watershed restoration similar to the watershed restoration described in the Northwest Forest Plan and included in the No Action alternative."

EPA is very supportive of the direction related to watershed restoration in Appendix B (Management Objectives and Direction). In particular, we support the direction on page 907 (for all water features):

- Implement instream and riparian restoration activities, such as placement of boulders and large wood in streams, including tree lining from adjacent riparian areas for all streams. Place an emphasis on streams that have high intrinsic potential for fish, high priority fish populations (such as those defined in recovery plans), or high levels of chronic sediment inputs.
- Remove or modify constructed fish passage barriers to restore access to stream channels for all life stages of fish species.

We also appreciate the direction on pages 916 and 923 relative to roads. In general, we find the most important components of a watershed restoration program to be control and prevention of road-related runoff and sediment production, restoration of the condition of riparian vegetation, and restoration of in-stream habitat complexity.

[4] Eugene District BLM. 2015. Record of Decision and Resource Management Plan for the West Eugene Wetlands. Available at http://www.blm.gov/or/districts/eugene/plans/files/wew-rod.pdf

Recommendation
Given the importance of control and prevention of road-related runoff and sediment production, we recommend that best management practice "R 094" (in Appendix I) related to wet weather hauling be re-designated as management direction, and incorporated into Appendix B. It is EPA's position that limiting sediment production associated with hauling is an important component of a successful watershed restoration strategy. As such, it should carry the weight of management direction.

Harvest Land Base Strategy
Under the draft preferred Alternative B, the Harvest Land Base is comprised of an Uneven-Aged Timber Area (11% of the planning area), a Low Intensity Timber Area (3% of the planning area), and a Moderate Intensity Timber Area (8% of the planning area). The Uneven-Aged Timber Area in Alternative B is based on dry and very dry forest types identified by potential vegetation types. The portion of the Harvest Land Base outside of the Uneven-aged Timber Area is divided between the Low Intensity Timber Area in designated northern spotted owl critical habitat and the Moderate Intensity Timber Area outside of designated northern spotted owl critical habitat. Timber harvest in the Low Intensity Timber Area includes thinning and regeneration harvest with retention of 15 to 30 percent of the stand. In the Low Intensity Timber Area, the strategy would rely on natural tree regeneration after timber harvest. Timber harvest in the Moderate Intensity Timber Area includes thinning and regeneration harvest with retention of 5 to 15 percent of the stand. In the Moderate Intensity Timber Area, the BLM would use either natural tree regeneration or replanting after timber harvest, but would maintain early seral habitat conditions for several decades after harvest.

The EPA supports the Harvest Land Base Strategy under Alternative B. This strategy broadly aligns with what has come to be called "ecological forestry." EPA supports ecological forestry as it incorporates principles of natural forest development, including the role of natural disturbances, in the initiation, development, and maintenance of stands and landscape mosaics.[5,6,7] Ecological forestry concepts have also been endorsed by the U.S. Fish and Wildlife Service. The Revised Recovery Plan for the Northern Spotted Owl[8] and associated Critical Habitat Rule[9] employ the use of ecological forestry to achieve ecosystem goals within Critical Habitat.

Additionally, because Alternative B retains forest structure within each of the land use allocations in the harvest land base, we find the strategy complements the BLM's purpose and need related to clean water in watersheds. In a 2009 study in Western Washington, Pollock et al.[10] found a relatively strong relationship between maximum daily stream temperatures and the total amount of harvest in a basin. Their findings suggest that the impact of forest harvest activities on stream temperatures cannot be

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[5]Seymour, R. and M. Hunter. 1999. Principles of ecological forestry. P. 22-64 in *Managing biodiversity in forested ecosystems*. M. Hunter (ed.). Cambridge University Press, Cambridge, UK.

[6] Franklin, J.F., R.J. Mitchell, and B.J. Palik. 2007. *Natural disturbance and stand development principles for ecological forestry*. USDA For. Serv. Gen. Tech. Rep. NRS-19. 44p.

[7] Franklin, J. F. and K. N. Johnson. 2012. A Restoration framework for federal forests in the Pacific Northwest. *J. For.* 110(8): 429-439

[8] US Fish and Wildlife Service. 2011. *Revised recovery plan for the northern spotted owl (Strix occidentalis caurina)*. USDI Fish and Wildlife Service, Portland, OR. 258 p.

[9] US Fish and Wildlife Service. Dec. 4, 2012. Endangered and threatened wildlife and plants; revised critical habitat for the Northern Spotted Owl. Available online at https://www.federalregister.gov/articles/2012/12/04/2012-28714/endangered-andthreatened-wildlife-and-plants-designation-of-revised-critical-habitat-for-the-Northern-Spotted-Owl .

[10] Pollock, M., Beechie, T., Liermann, M. and R. Bigley. 2009. Stream Temperature Relationships to Forest Harvest in Western Washington. Journal of the American Water Resources Association. 45(1). 15 pp.

entirely mitigated through the use of riparian buffers. Given the intensive management that generally occurs on the intermingled private (checkerboard) lands, we support utilizing a management strategy on BLM land that provides for legacy structure and function post-harvest. By employing ecologically-based retention, Alternative B would help to ensure a continuation of broader landscape function, including the provision of clean water.

Finally, we recognize and appreciate the contention over the role of federal lands in providing for early seral habitat. It is firmly established in literature, however, that the early seral component is lacking on the landscape, and that this is to the detriment of biodiversity and overall ecosystem function.[11,12] Early successional or seral moist forest sites are highly diverse, trophic- and function-rich ecosystems that are utilized by a large number of species of conservation concern. Many of these species are either dependent on early seral habitat, use it for some aspect of their life history, or are able to utilize this habitat type opportunistically. Examples occur across almost all life forms and taxonomic groups, including trees, birds, mammals, herbs, and insects.[13] By proposing harvest prescriptions that retain biological legacies and use less intensive approaches to re-establishment of closed forest canopies, Alternative B represents an opportunity to both produce timber yields and reintroduce functional early seral habitat onto the landscape.

Recommendations:

- We recommend that BLM utilize the harvest land base strategy from Alternative B as the basis for the final harvest strategy in the FEIS/proposed RMP. The management concepts explored in Alternative B are consistent with the recovery plan for the northern spotted owl; allow for continuity of key landscape functions; and provide for the establishment of functional early seral habitat.
- Because the Alternative B approach would be a departure from past management on BLM land we recommend that the harvest land base strategy be carefully assessed and monitored. The monitoring strategy (see "monitoring" comments below) should lay the groundwork for how the harvest land base approach would be assessed in terms of implementation and effectiveness.

Monitoring

Page 39 of the DEIS states that under all action alternatives, the BLM would implement administrative actions at approximately the same levels as during the past decade. Those administrative actions would include "Project implementation and plan effectiveness monitoring" and "Wildlife, fisheries, or plant population monitoring." We appreciate this commitment. Monitoring is critical to effective plan implementation, and the cornerstone of adaptive management. It is also required under BLM regulations, which require that RMP revisions be based on monitoring and evaluation findings, new data, new or revised policy and changes in circumstances affecting the entire plan or major portions of the plan" (43 CFR 1610.5-6).

Given the important role of monitoring within the plan implementation process, we would like to see a more robust discussion of how monitoring will be carried forward under the new RMP. We appreciate

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[11] Swanson, M., J.F. Franklin, R.L. Beschta. 2011. The forgotten stage of forest succession: Early-successional ecosystems on forest sites. *Front. Ecol. Environ.* 9:117–125. (Swanson et al. 2011).

[12] Spies, T.A., K. Johnson, K. Burnett. 2007. Cumulative ecological and socioeconomic effects of forest policies in coastal Oregon. *Ecol. Appl.* 88(1):5-17

[13] Swanson, Mark E. 2102. Early Seral Forest in the Pacific Northwest: A Literature Review and Synthesis of Current Science. Available at: https://ncfp.files.wordpress.com/2012/06/swanson_20120111.pdf

that monitoring is a process, and that processes are difficult to analyze in the context of an environmental impact statement (that is, there are no inherent environmental impacts associated with establishing or continuing a monitoring program). It would be appropriate, however, to include the details of monitoring plan within an appendix to the FEIS/ROD.

Recommendation:
We recommend that a monitoring plan be included as an appendix to the FEIS/ROD. The monitoring plan should establish how watershed-scale information/watershed analysis will inform monitoring priorities; lay out monitoring questions that will be used to inform the adaptive management process; and discuss how localized monitoring information will be compiled and placed in a broader, regional context.

Climate Change
In our June, 2012 scoping comments and again in our November, 2013 comments on the planning criteria, the EPA made recommendations related to the analysis of climate change effects. We appreciate the responsiveness of the DEIS to those comments and recommendations. The draft RMP/EIS provides a robust analysis of climate change issues, including the impacts of BLM management on carbon storage; the impacts of BLM management on greenhouse gas emissions; the interaction between climate change and BLM management on outcomes for key natural resources and processes; and the potential effects of alternatives in adapting to climate change. We believe this analysis is fully consistent with the Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts issued by the Council on Environmental Quality in December of 2014.[14] Further, we believe this analysis, when final, can serve as a model for other planning efforts seeking to include a robust analysis of climate change effects.

While the analysis does not find strong differences among the alternatives with regard to carbon storage or greenhouse gas emissions, the analysis does demonstrate that active management could provide opportunities to implement climate change adaptive strategies. Based on the Climate Change analysis (pages 132-165 of the DEIS) and the Fire and Fuels analysis (pages 173-217 of the DEIS), we find that the Alternative B harvest strategy performs well relative to the other analyzed alternatives in terms of providing the latitude needed to increase landscape resiliency to the effects of climate change. As noted on page 198 of the DEIS, Alternative B would reduce the amount of acreage in low or moderate fire resistance to a greater extent than Alternatives A and C. Furthermore, Alternative B would maximize the number of acres in the Uneven-Aged Timber Area, and provide management direction to increase fine-scale within-stand heterogeneity. As noted on page 195 of the DEIS, the creation of small openings and heterogeneous stand composition would move vegetation patterns and fuel loadings and arrangements toward conditions comparable to low and mixed severity fire regimes.

Recommendation
In order to provide for landscape resilience, particularly in the dry forest in the interior/south portions of the planning area, we recommend that the Uneven-Aged Timber Area management direction under Alternative B be incorporated into the final RMP/EIS.

[14] https://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/ghg-guidance