August 20, 2015

Jerome E. Perez
State Director
Washington/Oregon
Bureau of Land Management
P.O. Box 2965
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ATTN: Mark Brown
Submitted via Email: <blm_or_rmpwo_comments@blm.gov>

RE: Resource Management Plans for Western Oregon Draft Environmental Impact Statement

Dear Director Perez:

On behalf of our thousands of members and supporters throughout Oregon and the nation, our conservation organizations submit these comments concerning the Draft Environmental Impact Statement (DEIS) for the Resource Management Plans (RMP) for BLM forests and watersheds in Western Oregon.

Western Oregon's BLM lands support salmon, steelhead, and wildlife while delivering outstanding watershed and recreational values to the public. These forests are source-drinking watersheds for hundreds of thousands of Oregonians; they sequester large amounts of carbon; and they provide crucial ecological functions. The natural amenities found on these public lands are highly valued and sought after, from local residents to tourists from around the world.

We are pleased that the RMP recognizes that recreation is the means by which most Americans experience these lands, and that recreation provides the greatest economic benefits to local communities. Our members and supporters want the important natural amenities and environmental services to exist for future generations on BLM lands in western Oregon. However, we are concerned that the Draft RMP promotes plans that would resume clearcut logging, reduce streamside buffers, increase road construction, and reward damaging motorized off-road recreation on BLM forests.

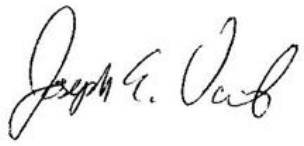
We are particularly concerned that BLM is proposing to disengage from the coordinated interagency federal land management plan embodied in the Northwest Forest Plan. Specifically, we are alarmed by the BLM's proposals to reduce riparian forest protections, eliminate the Aquatic Conservation Strategy, abandon protections for Key Watersheds, minimize green tree and down wood retention standards, abandon the Applegate Adaptive Management Area, and drop the Survey and Manage program for rare plants and animals. This profound shift away from a unified federal management strategy for lands within the range of the Northern spotted owl threatens to unravel the certainty and legal assurances relied upon by BLM and Forest Service

project planners across 25 million acres of federal land as well as assurances provided to adjacent private and state land managers throughout the Pacific Northwest.

As stated on page 21 of the DEIS, the purpose and need for the NWFP was guided by a presidential directive to the BLM and Forest Service to adopt a "comprehensive …common management approach to the [federal] lands administered throughout the entire region." The BLM has not provided a compelling reason for rejecting the comprehensive and unified approach to federal forest management that is abandoned in all of the action alternatives developed and considered in the DEIS.

We look forward to discussing these comments with your planning staff prior to the development of a Final Environmental Impact Statement and Record of Decision.

Sincerely,



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THE PURPOSE AND NEED

During the late 1980s and early 1990s, a series of lawsuits uncovered "*a remarkable series of violations of the environmental laws*," and "*a deliberate and systematic refusal … to comply with the laws protecting wildlife.*" [1] To end the gridlock, President Clinton directed the Forest Service and BLM to craft a comprehensive, long-term management strategy that is "*scientifically sound, ecologically credible, and legally responsible*." [2] The agencies assembled a team of leading scientists, called the Forest Ecosystem Management Assessment Team ("FEMAT"), to develop ecosystem management strategies that would meet this goal.[3] The final result was the Northwest Forest Plan, an ecosystem management plan that contained standards and guidelines for managing Forest Service and BLM public lands, created old-growth and riparian reserves, and provided for continued timber harvest. The Northwest Forest Plan has been upheld by the federal courts in challenges both from the timber industry and from conservation groups. The Ninth Circuit Court of Appeals also rejected the BLM's prior attempt to revise its RMPs to achieve the same objectives as earlier flawed attempts to revise the Northwest Forest Plan.[4] This DEIS marks the fourth major attack on the Northwest Forest Plan.

The range of reasonable alternatives to be considered in an environmental impact statement depends on the purpose of the project.[5] However, an agency's discretion to determine the purpose and need of a project is not unfettered. Courts require an agency's definition of purpose to be reasonable.[6]

Courts impose this standard to ensure that agencies do not avoid NEPA's requirements by defining a project's purpose so narrowly as to preclude consideration of reasonable alternatives.[7] Consideration of alternatives is "the heart of the environmental impact statement."[8]

For the Resource Management Plan for Western Oregon, BLM describes the purpose and need of the proposed action in the following way:

> *The BLM conducted plan evaluations in accordance with its planning regulations, which require that RMPs "shall be revised as necessary based on monitoring and evaluation*

[1] *Seattle Audubon Soc'y v. Evans*, 771 F. Supp. 1081, 1089-90 (W.D. Wash.), *aff'd*, 952 F.2d 297 (9th Cir. 1991).
[2] Northwest Forest Plan Record of Decision at 3.
[3] . *Seattle Audubon Soc'y v. Lyons*, 871 F. Supp. 1291, 1303 (W.D. Wash. 1994), *aff'd*, 80 F.3d 1401 (9th Cir. 1996); FEMAT Report at I-1, II-36 to-37, ch. V.
[4] *Pac. Rivers Council v. Shepard*, No. 03:11-CV-00442-HU, 2011 WL 7562961 (D. Or. Sept. 29, 2011), *report and recommendation adopted as modified*, No. 03:11-CV-442-HU, 2012 WL 950032 (D. Or. Mar. 20, 2012); *Pac. Rivers Council v. Shepard*, No. 12-35570 (9th Cir. March 1, 2013) (opinion and order dismissing appeal by timber Intervenors for lack of jurisdiction and upholding district court decision in its entirety).
[5] *Methow Valley Citizens Council v. Regional Forester*, 833 F.2d 810, 815-16 (9th Cir. 1987) (impact statements must consider all reasonable alternatives that accomplish project purpose, but need not consider alternatives not reasonably related to the purpose).
[6] *City of Carmel-by-the-Sea v. United States Dep't of Transp.*, 123 F.3d 1142, 1155 (9th Cir. 1997); *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 195-96 (D.C. Cir. 1991).

[7] *Simmons v. United States Army Corps of Eng'rs*, 120 F.3d 664, 666 (7th Cir. 1997); *City of New York v. United States Dep't of Transp.*, 715 F.2d 732, 743 (2d Cir. 1983); *Citizens Against Burlington*, 938 F.2d at 196.
[8] *Simmons v. United States Army Corps of Eng'rs*, 120 F.3d 664, 666 (7th Cir. 1997); *City of New York v. United States Dep't of Transp.*, 715 F.2d 732, 743 (2d Cir. 1983); *Citizens Against Burlington*, 938 F.2d at 196.

> *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). These evaluations concluded that "*[a] plan revision is needed to address the changed circumstances and new information that has led to a substantial, long-term departure from the timber management outcomes predicted under the 1995 RMPs*" [9] These evaluations also concluded that the management direction for most of the other resource management programs need to be modified or updated because of changed circumstances and new information. These evaluations concluded that changes are particularly indicated for the fisheries, aquatics, recreation, off-highway vehicle, and fire and fuels programs.*
>
> *Moreover, the BLM needs to revise existing plans to replace the 1995 RMPs' land use allocations and management direction because of new scientific information and policies related to the northern spotted owl. Since the 1995 RMPs were approved, there have been analyses on the effects of land management on northern spotted owl habitat, demographic studies, and analyses of the effects of barred owls on northern spotted owls. In addition, since that time, new policies for northern spotted owls have been put in place, including a revised recovery plan and a new designation of critical habitat.*[10]

The DEIS goes on to note that this purpose and need includes providing a sustained yield of timber, conservation and recovery of listed species, providing clean water, restoring fire-adapted ecosystems, providing for recreational opportunities, and coordinating management of lands surrounding the Coquille Forest.[11]

While these goals are laudable, the resulting alternatives do not comport with these objectives because each alternative includes components that would threaten wildlife, watershed, and recreational values in an attempt to increase timber production. BLM has steadfastly maintained that the Northwest Forest Plan has failed to produce "enough" timber from O&C lands, but in fact, timber production has produced a relatively constant – if lower than historic highs – harvest level. *See infra*. Moreover, all of the "new information" BLM references demonstrates that the Northwest Forest Plan is working to achieve the remaining stated "needs" for action. Monitoring of implementation of the NFP has demonstrated that more species are better protected under the NFP than without it; watersheds are in better condition than they were prior to the implementation of the NFP; water is cleaner and cooler with the ACS, riparian reserves, and a program of watershed restoration than without the NFP; more people recreate on BLM lands than use them for timber harvest; and recreationalists contribute more money to local economies than does timber harvest. While "restoring fire-adapted ecosystems" is part of the stated purpose and need, BLM acknowledges that it has little ability to do so on its lands due to the checkerboard pattern of federal and nonfederal ownership on the O&C lands.[12] BLM has also not demonstrated that the status quo has precluded coordination with the Coquille Tribe regarding management of their lands adjacent to federal lands.[13]

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[9] (USDI BLM 2012a, p. 12).
[10] DEIS at 5.

[11] DEIS at 6-10.
[12] DEIS at 181, 212.
[13] *See generally*, Regional Ecosystem Office, *20 Year Reports for the Northwest Forest Plan* (July 8, 2015),http://www.reo.gov/monitoring/reports/20yr-report/.

Given that available information indicates that the Northwest Forest Plan is working, the stated purpose and need for action are impermissibly flawed, leading to alternatives that are trying to solve imaginary problems with the status quo.

I. THE SUSTAINED YIELD PURPOSE AND NEED SHOULD BE SECONDARY, NOT PRIMARY.

BLM cites as its first purpose of the RMP revision to "Provide a sustained yield of timber." (DEIS at 6). The DEIS shows that regeneration is not needed to restore early seral-habitat, because early seral habitat is already over-abundant and likely to increase in the future as a result of climate change.

Regeneration harvest is not needed for "community stability" because the DEIS admits that the timber industry is inherently volatile and has been for decades. Increasing regeneration harvest will actually reduce not increase community stability. And, regeneration harvest is not needed for fire hazard reduction, because the DEIS shows that young forests resulting from such logging are more hazardous than mature forests.

What is the real purpose of sustained yield? The O&C Act says that sustained yield is sought *"for the purpose of providing a permanent source of timber supply, protecting watersheds, regulating stream flow, and contributing to the economic stability of local communities and industries, and providing recreational facilities"* [14]

BLM should structure the analysis so that these enumerated purposes are primary, and sustained yield is sought to the extent it fulfills these purposes. The analysis shows that pursuing a higher and more certain sustained yield will degrade watersheds and destabilize communities. This makes no sense. Is BLM seeking sustained yield for its own sake? Such a tautological approach is deeply flawed.

The DEIS at 6 concludes:

> *FLPMA specifically provides that if there is any conflict between its provisions and the O&C Act related to management of timber resources or the disposition of revenues from the O&C lands and resources, the O&C Act prevails (i.e., takes precedence) (43 U.S.C. 1701 note (b)). Thus, the multiple-use management direction of the FLPMA does not apply to the O&C lands that are suitable for timber production.*

BLM has jumped to a conclusion that there is a conflict between multiple use and lands suitable for timber production. BLM has not shown any such a conflict exists. In fact, the DEIS shows that forest conservation is highly compatible with the O&C Act purposes, including watershed protection and community stability.

BLM cannot rely on an interpretation of sustained yield that conflicts with its obligation to protect watersheds, regulate water flow, conserve endangered species, or maintain and restore water quality. BLM must use a rational definition of sustained yield that is qualified by conservation values. A consensus definition of the term is: "The sustainable yield of natural capital is the ecological yield that can be extracted without reducing the base of capital itself, i.e.

[14] 43 U.S.C. 1181a.

the surplus required to maintain nature's services at the same or increasing level over time. This yield usually varies over time with the needs of the ecosystem to maintain itself, e.g. a forest that has recently suffered a blight or flooding or fire will require more of its own ecological yield to sustain and re-establish a mature forest. While doing so, the sustainable yield may be much less."[15]

BLM should also interpret sustained yield in light of current scientific understandings of non-linearity of ecological process that sustain forests.

SUSTAINED YIELD FORESTRY IN BRITISH COLUMBIA by Lois Dellert is the definitive academic study of Sustained Yield in B.C. The report describes the evolution of Sustained Yield from 1900 to 1990 emphasizing the fear of scarcity and the hoped for improvement of timber production by scientific reordering of forests. From MacMillan through Sloan and Pearse to the present her central purpose is to examine the development of forest policy and,

> *...explore why it has been so difficult for forestry to achieve conservation in British Columbia.*
>
> *Forestry was motivated by scarcity and its goal was to support a forest-based economy by maximizing production and regulating the forest to provide a continuous supply of wood. Its policy of sustained yield was influenced by the scientific movement which believed the world operated according to universal rules and could be efficiently and rationally managed to capture its full potential and re-structured to achieve stability through order. The core ideas were efficiency and stability.*

The simple Newtonian universe of linear cause and effect and equilibrium dominant when Sustained Yield was developed no longer exists. Developments in non-equilibrium thermodynamics, in complexity and chaos theory, and in systems thinking about ecology and uncertainty have awoken science from Newton's sleep[16].

Recognizing that sustained yield must be achieved within some social and environmental constraints, the real goal is better conceived as sustainable forest management.

The Forest Service explored the definitions of sustainable forestry in a 2004 report called "National Report on Sustainable Forests—2003" (FS-766): The *Dictionary of Forestry* (Helms 1998) offers this description of forest sustainability:

> *....the capacity of forests, ranging from stands to ecoregions, to maintain their health, productivity, diversity, and overall integrity, in the long run, in the context of human activity and use.*

The *Dictionary of Forestry* also states that sustainable forest management is an evolving concept:

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[15] http://en.wikipedia.org/wiki/Sustainable_yield.

[16] http://www.pacificfringe.net/sustainedyield/ See also, Dellert, Lois. 1998. "Sustained Yield: Why Has It Failed to Achieve Sustainability?" in The Wealth of Forests: Markets, Regulation and Sustainable Forestry. Chris Tollefson, ed., UBC Press, Vancouver, B.C.

> *The stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality, and potential to fulfill, now and in the future, relevant ecological, economic, and social functions at local, national, and global levels, and that does not cause damage to other ecosystems–note criteria for sustainable forestry include (a) conservation of biological diversity, (b) maintenance of productive capacity of forest ecosystems, (c) maintenance of forest ecosystem health and vitality, (d) conservation and maintenance of soil and water resources, (e) maintenance of forest contribution to global carbon cycles, (f) maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of societies, and (g) legal, institutional, and economic framework for forest conservation and sustainable management.*

Other definitions particularly stress the importance of recognizing environmental limits. One example is the following statement[17] from the book *Defining Sustainable Forestry*:

> *Since sustainable forest management is only possible within the ultimate constraints and limits imposed by the ecosystem, sustainability should be viewed as the degree of overlap between ecological possibilities and socially desired benefits of forests.*
>
> *The concept of sustainable forest management is related to but different in significant ways from an earlier concept of sustained yield—the amount of wood that a forest can produce on a continual basis. The concept of sustained yield, dating back to the Middle Ages in Europe, was brought to the United States in the late 1800s by early forestry leaders such as Bernhard Fernow and Gifford Pinchot. It was expanded over time to include the perpetual production of other forest outputs in addition to timber supply, including water, recreation, fish and wildlife, and livestock forage—the expanded concept is often referred to as the "multiple-use sustained-yield" principle. This principle was enshrined in law in 1960 for national forests. The concept of sustainable forest management, however, includes managing the forest for more than outputs; it focuses on maintaining processes and seeking to sustain communities, economies, and all the elements of a forest (Floyd 2002).*

When one views the multiple objectives of the O&C Act as modified by the Federal Land Policy and Management Act, Endangered Species Act, and Clean Water Act, there is clearly no significant difference between sustained yield, multiple-use sustained-yield, and sustainable forest management.

II. BLM FAILED TO HARMONIZE ITS LEGAL MANDATES.

The DEIS states that FLPMA's multiple use mandate does not apply to lands suitable for timber production because there is a conflict between the mandates of FLMPA and the O&C Act. This is an unsupported assumption. Before finding a conflict, BLM must first try to harmonize the objectives of these Acts, which is what the Northwest Forest Plan did, and there is no reason to conclude that this was an error.

[17] Noss 1993.

In the 1944 Sustained Yield Act, Congress articulated a vision of sustained yield that encompassed, *"... maintenance of water supply, regulation of stream flow, prevention of soil erosion, amelioration of climate, and preservation of wildlife.*"[18] Congress clearly does not see a conflict between sustained yield timber production and water quality or wildlife habitat. The Gang of Four also cautioned that there is "no free lunch." To reconcile these, one must conclude that as long as the timber yield is low enough, other resources can also be sustained.

BLM has the cart before the horse. Any acre that is suitable for timber production is accorded a special status that causes BLM to reject other potential uses of those lands. The DEIS fails to recognize that timber production conflicts with other public benefits that flow from BLM lands.

Before designating lands suitable for timber production, BLM should first determine whether those lands are more suited for other public purposes including, but not limited to: water quality, hydrologic function, slope stability, soil conservation, species recovery, keeping species off of the ESA list, carbon storage/climate stability, recreation, community stability, and quality of life.

In responding to public comments on the Northwest Forest Plan EIS, the agencies concluded that the Northwest Forest Plan, including the reserve system was consistent with the O&C Act.

> ***Comment****: The SEIS fails to acknowledge the Oregon and California (O&C) Lands Act (43 USC Sec. 1181a) as a constraint on the management of O&C lands. Alternative 9 violates the dominant use of O&C lands, and fails to acknowledge that these lands are the subject of special legislation that dedicates them primarily to timber production rather than ecologic (including wildlife) uses. The Endangered Species Act does not require the enormous land set-asides for wildlife which are being proposed, and the magnitude of the exclusion of the timber use must be submitted for congressional review under Section 202(e) of FLPMA.*
>
> ***Response****: The management of the O&C lands is governed by a variety of statutes, including the O&C Lands Act, FLPMA, the Endangered Species Act, and the Clean Water Act. The O&C Lands Act requires the Secretary of the Interior to manage O&C lands for permanent forest production; however, such management must also be in accord with sustained-yield principles. Further, that Act requires that management of O&C lands protect watersheds, regulate streamflow, provide for recreational facilities, and contribute to the economic stability of local communities and industries. The Act does not require the Secretary to harvest all old-growth timber or all commercial timber as rapidly as possible or according to any particular schedule. The Secretary has discretion to determine how to manage the forest on a sustained-yield basis that provides for permanency of timber production over a long-term period. The Secretary must necessarily make judgments, informed by as much information as possible, about what kind of management will lead to permanent forest production that satisfies the principle of sustained yield.*
>
> O&C lands must also be managed in accordance with other environmental laws such as the Endangered Species Act and the Clean Water Act. Some provisions of these laws take predominance over the O&C Lands Act. For instance, the Endangered Species Act (ESA)

[18] 16 U.S.C. § 583.

> requires the Secretary to insure that management of O&C lands will not likely result in jeopardy to listed species or destruction or adverse modification of critical habitat. The ESA directs the Secretary and all federal agencies to utilize their authorities to carry out programs for the conservation and recovery of listed species. Although several owl recovery plans have been proposed, the Secretary has not yet adopted final recovery plans for either the northern spotted owl or the marbled murrelet. Alternative 9's Late-Successional and Riparian Reserve concepts are important building blocks in the development of recovery plans to achieve the conservation and recovery of those species.
>
> One of the purposes of the Endangered Species Act is the preservation of ecosystems upon which endangered and threatened species depend. Certainly, a forward-looking land management policy would require that federal lands be managed in a way to minimize the need to list species under the ESA. Additional species listings could have the effect of further limiting the O&C Lands Act's goals of achieving permanent forest production, which would contribute to the economic stability of local communities and industries. The O&C Lands Act ought not be interpreted in such a manner that limits the Secretary's ability to take steps now that would avoid future listings, and additional disruptions, in the future.
>
> Moreover, the concept of creating a set of reserves in which timber harvest is substantially circumscribed across a portion of the landscape, such as the proposed Late Successional Reserves, is consistent with the O&C Lands Act. The Secretary has discretion under the O&C Lands Act to determine the length of harvest rotations on O&C lands or whether any particular tract should be subject to harvest, as well as the intensity of harvest activities, which should occur. From a practical point of view, there is little or no on-the-ground difference between a management strategy that provides for a deferred harvest for 80 years on Old-Growth Emphasis Areas as proposed in BLM's Draft Resource Management Plans, and one that sets aside reserves in order to restore and maintain a healthy old-growth forest ecosystem, over the time of the deferred harvest. Regardless of approach, FLPMA requires the Secretary to monitor and revise Resource Management Plans in light of changed circumstances or new information generated through the adaptive management process.
>
> The lands included in the reserves under the preferred alternative greatly constrain, but do not exclude timber use. Silvicultural treatments, such as thinnings, consistent with the objectives for the reserves will be allowed. Since this use is not totally eliminated, this management decision will not be subject to the reporting requirement in Sec. 202(e) of FLPMA.[19]

The BLM must recognize the timber production is embedded within and dependent upon a complex ecological system. Timber production is based on the growth of trees, which is based on the existence of a complex soil food web, a wide variety of nitrogen fixing species, nutrient cycling, fungal abundance and diversity, etc. The USDA Committee of Scientists (COS) recognized that "*without ecologically sustainable systems, other uses of the land and its*

[19] 1994 NWFP SEIS pp F-114-115 (emphasis added).

resources could be impaired." [20] The BLM must strive to achieve ecologically sustainable forests, not just sustained production of timber based on simple agricultural models. "Ecological sustainability" means maintaining the composition, structure and processes of an ecological system within certain acceptable bounds typically described as the natural of historic range of variability. A modern and scientifically credible approach to sustained yield will require BLM to consider[21]:

- the dynamic nature of ecological systems,
- the role of natural functions and processes,
- uncertainty and variability of ecological systems,
- an integrated assessment of feedbacks and cumulative effects,
- how to preserve options, and
- the historic range of variability.

In the O&C Act, Congress did not require BLM to apply a one-dimensional view of sustained yield equating maximum tree growth rates with sustained yield. Congress explicitly required BLM to account for water resources, recreation, community stability, and later passed superseding legislation requiring conservation of water quality and imperiled fish and wildlife. The BLM must adopt a modern view of sustained yield.

Landscape ecology has lead to a new appreciation of the importance of disturbance agents such as fire and disease and insect outbreaks in maintaining forest health at the landscape level. Unfortunately, the sustained yield forestry approach still regards forests as timber supply areas where fire and pathogens destroy (waste) valuable timber.

Fire suppression in particular has had a very detrimental impact on habitat for biodiversity. Furthermore, the legacy of problems caused by fire suppression including the increased potential for devastating large scale forest fire will bedevil forest managers far into the future.

A particular revealing criticism of Sustained Yield management is that we are creating forests that need humans to take care of them. Fire and disease suppression as well as changed age class and species distribution has altered the dynamics of forest evolution that have been developing over millennia, creating conditions potentially overwhelming to established natural defense dynamics. Global warming and other anthropogenic changes will probably further exacerbate these problems.[22]

BLM must provide room for the entire suite of structures, functions, and processes that integrate to create and maintain healthy forest ecosystems. Disturbance agents such as fire, insects, and disease must be allowed to operate. The full suite of biodiversity must be preserved, including non-vertebrates that play such crucial roles in soil ecology and nutrient cycling.

Some observers warn, "*Distrust claims of sustainability. Because past resource exploitation has seldom been sustainable, any new plan that involves claims of sustainability should be suspect. One should inquire how the difficulties that have been encountered in past resource exploitation*

[20] COS p xvi.
[21] See Committee of Scientists pp 19-40. http://web.archive.org/web/20030212110159/www.fs.fed.us/news/science/
[22] http://www.pacificfringe.net/sustainedyield/index.htm

are to be overcome." [23] One of the main authors of the Northwest Forest Plan reinforced this same point.

Jack Ward Thomas, one of the main authors of the NWFP, also cautions against an outdated view of sustained yield timber production:

> *The vision that I was taught in school of the "regulated forest" and the resultant predictable outputs of commodities has turned out to have been a dream. And a dream that could only be realized in a time of seemingly boundless virgin forests. This vision held only so long as, no matter what the circumstances, there was more timber available over the next ridge. And, that timber was relatively cheap--easy to access and long--and environmental risks were either less appreciated or more palatable than at present. Further, it was assumed that good forestry was--as a matter of course--good wildlife management, good watershed and management, etc.*
>
> *By now it is becoming obvious that this dream was built on the pillars of the seemingly boundless virgin forest and an ethic of manifest destiny coupled with hubris of being able to predict the response of nature and humans. This was coupled with an inflated sense of understanding of forested ecosystems and of human control. Perhaps it is time to recognize that such stability is not attainable in any western region except for relatively short periods of years or decades.*
>
> *Why? Consider the variables that interact to affect long-term stability of the supply of timber. Each variable is subject, more or less independently, to considerable variation over the longer term. Taken together, in terms of their interactions, these variables are guaranteed to produce varying levels of uncertainty and makes attainment of stability unlikely.*
>
> *Oscillations in timber supply can be moderated by taking a conservative view of "annual sale quantity" projections as opposed to the tendency to make overly optimistic projections such as those that resulted in the first forest planning efforts of a decade or so ago.*
>
> *Insanity has been defined as doing the same things over and over and expecting a different result. Decidedly, optimistic outcomes were the trademark of the first generation of forest plans. With decided regularity, this optimism has not been justified and only reluctantly recognized and abandoned. This caused the agency(s) performance, in terms of commodity production, to consistently come in at below anticipated levels--i.e., the predictions were not valid and belated recognition of that fact, in turn, caused additional instability because of accumulated effects. More conservative approaches are more apt to produce predictable results. And, if results exceed those anticipated, it is easier to adjust commodity yields upward than to deal with the social and political consequences of short fall.*

[23] Donald Ludwig, Ray Hilborn, Carl Walters. 1993. Uncertainty, Resource Exploitation, and Conservation: Lessons from History. Science 260(2):17, April 2, 1993.
http://www.envsci.nau.edu/sisk/courses/env555/Readings/ludwig1.pdf

While the search for new understanding through science may produce short-term instability [sic] in commodities such as timber supply as managers react to new information, such efforts are essential to long-term stability if renewable natural resources are to be managed in a sustainable fashion. In the end, there can be no turning back from science--no matter now politically [sic] expedient that may seem in the short run.

In summary, the timber supply from federal lands is one drought, one insect and disease outbreak, one severe fire season, one election, one budget, one successful appeal, one loss in court, one listing of a threatened or endangered species, one new piece of pertinent scientific information, one change in technology, one shift in public opinion, one new law, one loss of a currently available technological tool, one change in market, one shift in interest rates, et al, away from "stability" at all times. And, these changes do not come one at a time, they come in bunches like banannas and the bunches are always changing. So, stability in timber supply from the public lands is simply a myth, a dream that was never founded in reality. It is time to stop pretending.[24]

BLM must respond to opposing viewpoints by taking a hard look at the core issue of sustained yield as the primary purpose of the RMP revision.

THE O&C ACT

I. MULTIPLE USE MANDATE OF THE O&C ACT

Given that the only apparent "problem" with the NFP is that it hasn't produced "enough" timber off O&C lands, it is clear that the real objective of the RMP revisions is to increase timber harvest. However, the O&C Act does not require maximum timber production from every acre all the time; the *Headwaters* case upon which BLM relies itself involved a land management plan with no-cut reserves; and the courts have already ruled that the Northwest Forest Plan does not violate the O&C Act. BLM is choosing to re-do its management plans, and that choice reflects only one true purpose – BLM's desire to increase logging on federal public lands in Oregon.[25]

The Oregon and California Lands Act ("O&C Act") governs railroad grant lands that revested in the federal government due to the railroad company's breach of its statutory duties. In the O&C Act, Congress sought to put an end to wasteful and destructive logging practices that clearcut large forest areas for short-term gains without safeguarding the forests and other resources. The

[24] Jack Ward Thomas, *The Instability of Stability*. Pacific Northwest Regional Economic Conference. Regions in Transition. Spokane. April 1997 http://www.pnrec.org/pnrec97/thomas2.htm

[25] It is not even clear that the O&C Act applies to BLM lands currently governed by the Northwest Forest Plan. The language of the Act states that it applies to "*such portions*...which have heretofore or may hereafter be classified as timberlands...." 43 U.S.C. § 1181a (italics added). Under this plain language, only portions of the O&C lands classified as timberlands are covered by the O&C Act. When BLM jointly promulgated the Northwest Forest Plan with the U.S. Forest Service, BLM changed the classification of the O&C lands previously defined as timberlands to the status of late-successional reserves and riparian reserves. BLM has the authority to reclassify its land under FLPMA § 202(d), where the lands are better suited to a different purpose.

Act instituted a conservation ethic, marking the first federal statute to impose sustain-yield constraints on timber cutting.

The O&C Act provides that O&C lands:

> *shall be managed . . . for permanent forest production, and the timber thereon shall be sold, cut and removed in conformity with the principal [sic] of sustained yield for the purpose of providing a permanent source of timber supply, protecting watersheds, regulating stream flow, and contributing to the economic stability of local communities and industries, and providing recreational facilities.*

Numerous statutes other than the O&C Act establish duties that BLM must meet in managing the O&C lands.[26] The timber industry has contended that BLM must manage the O&C lands under a timber-first mandate, drawing from the permanent forest production goal set out in the O&C Act. BLM has long recognized, however, that it must manage the O&C lands for multiple purposes both to comply with the O&C Act and its duties under other laws. Indeed, under the Northwest Forest Plan, BLM has been managing these lands to comply with all applicable laws, including the O&C Act.

II. SAFEGUARDS DRAWN FROM THE O&C ACT

Under the Act, O&C lands "shall be managed . . . for permanent forest production," but subject to other constraints.[27] First, permanent forest production is not synonymous with commercial logging. A 1979 Interior Solicitor memorandum clarified the forest production need not be for commercial use. That is but one of the uses. The forest production could be to protect watersheds, stream flows, or recreation.[28]

Second, the goal of the timber production is to promote economic stability of local communities. In the O&C Act, Congress sought to curtail the type of boom and bust logging frenzies that had generated economic instability. Congress decidedly did not support maximizing timber production for short-term economic gain. Instead, it sought to institute long-term sustainability. To achieve these goals, BLM must consider alternatives that promote community stability, even if they favor thinning over clearcutting and even if they shift some areas of the forest to other activities that would achieve that goal.

Indeed, the DEIS indicates that an alternative that increase timber harvest will be inconsistent with the O&C Act, which requires timber harvest "...contribut[e] to the economic stability of local communities and industries."[29] The DEIS states that "Because the timber industry has a long, national history of high volatility, alternatives with harvest volumes that exceed current levels are likely to introduce greater instability to local economies, based on past business

[26] These comments address only management of the O&C lands, but the RMP revisions pertain to all BLM lands, including vast tracts of public domain lands that are fully subject to all land management and environmental laws.
[27] 43 U.S.C. § 1181a.
[28] Interior Solicitor Mem. (Aug. 27, 1979).

[29] 43 U.S.C. 1181a.

cycles." [30] Introducing greater instability to local economies is an inappropriate outcome for BLM land management, and is inconsistent with the O&C Act.

Third, the Act does not seek to promote other resource extraction activities, such as grazing. Such activities should not occur where they conflict with any of the Act's other goals or BLM's duties under other laws.

Fourth, the O&C Act explicitly lays out other goals for management of the O&C lands. Specifically, the lands must be managed for the purpose of "protecting watersheds, regulating stream flow, . . . and providing recreational facilities."[31] The mandate to protect watersheds and stream flow supports establishing safeguards like those embodied in the Aquatic Conservation Strategy of the Northwest Forest Plan.

Similarly, BLM must manage the O&C lands to protect high-quality recreational opportunities. The Interior Solicitor has advised that this mandate "is broad enough to include such things as scenic highways or scenic rivers which are identified as such through the Bureau's planning process." [32] With respect to a wild and scenic river partially on O&C lands, the Interior Solicitor counseled that logging that would be noticeable from the river would be prohibited along scenic stretches of the river and that logging could occur in areas important for recreation only if it would not impair recreational or aesthetic qualities. [33]

SAFEGUARDS DRAWN FROM OTHER LAWS

BLM must comply with other laws unless they expressly carve out an exception for the O&C Act. The courts strive to reconcile overlapping statutory duties so that all applicable statutes retain their vitality. A statutory obligation is overridden only in the event of a direct conflict that makes it impossible to comply with competing mandates or explicit legislative language indicating an intent for one to be preeminent over another.

Initially, BLM and the courts focused on the role of the Federal Land Policy and Management Act ("FLPMA"), enacted decades after the O&C Act. In *Headwaters v. BLM*,[34] the Ninth Circuit held that BLM did not err in construing the O&C Act to make timber production a dominant or primary use of the lands. Headwaters had challenged a particular timber sale and argued that BLM erroneously emphasized timber production over conservation of wildlife habitat and old-growth forests. Before rejecting this construction of the O&C Act, the majority held that BLM appropriately tiered its environmental assessment for the timber sale to a programmatic environmental impact statement addressing wildlife and old-growth habitat, and it rejected Headwaters' challenge to BLM's multiple use determination, which emphasized timber production for the lands at issue. As later cases confirm, the result is often far different where BLM is subject to other statutory duties that lead it to protect O&C lands in order to protect wildlife or old-growth forests.

[30] DEIS at 568.
[31] 43 U.S.C. § 1181a.
[32] Interior Solicitor Mem. at 10. (May 14, 1981).
[33] Interior Solicitor Mem. at 1-2 (Oct. 4, 1978).
[34] 914 F.2d 1174, 1183-84 (9th Cir. 1990),

FLPMA has also been construed to impact BLM's wilderness review obligations for O&C lands. Under FLPMA, BLM has an obligation to conduct a wilderness study review of roadless areas that have 5000 acres or more and wilderness characteristics.[35] The review should have occurred within 15 years of FLPMA's passage, i.e., by the end of 1991. During a wilderness study review, BLM must manage the lands in a manner that does not impair their suitability for preservation as wilderness.[36] This has been construed to prohibit roadbuilding and logging in most instances.

FLPMA has a savings clause, which provides that the O&C Act prevails "*in the event of conflict with or inconsistency between [FLPMA and the O&C Act] insofar as they relate to management of timber resources, and disposition of revenues from lands and resources . . .*"[37] An Interior Department Solicitor's memorandum indicates that there is scant legislative history pertaining to the savings clause, but there was some indication that the Department sought to assuage concerns raised by the Oregon delegation that the funding formula and management of O&C lands would be affected by FLPMA.[38] The Solicitor's memorandum reconciles the O & C Act with FLPMA's wilderness study provision as follows: O&C lands that are suitable for timber production are ineligible for wilderness study, while O&C lands that are unsuitable for timber production can be considered for wilderness. In practice, however, O&C lands have been included in some wilderness study areas and designated wilderness areas, such as the Wild Rogue Wilderness and Table Rock Wilderness. Moreover, BLM could properly determine that designating O&C lands that are suitable for timber production as wilderness would be the most effective way to meet its legal obligations to protect species and ecological functions.[39]

After *Headwaters*, the courts have retreated from a timber-centric vision for O&C lands. Instead, the operating principle has become one of dual responsibilities. BLM must meet all of its statutory obligations, many of which call for environmental safeguards even where such safeguards result in less intensive or pervasive logging.

In *Portland Audubon Society v. Lujan* [40], the Ninth Circuit found no unavoidable conflict between an injunction stopping old-growth logging pending compliance with the National Environmental Policy Act, and the O&C Act, even though the Act's timber targets (stated as a minimums) could not be met under the injunction. BLM and the O&C counties had argued that "the district court erred in issuing an injunction which prevents the BLM from selling a minimum of 500 million board feet of timber per year as directed by the" O&C Act.[41] The court rejected this argument, stating:

> *We find that the plain language of the Act supports the district court's conclusion that the Act has not deprived the BLM of all discretion with regard to either the volume requirements of the Act or the management of the lands entrusted to its care. Because there does not appear to be a clear and unavoidable conflict between statutory directives,*

[35] 43 U.S.C. § 1782(a).
[36] *Id*. § 1782(c).
[37] 43 U.S.C. § 1701 note.
[38] Interior Solicitor Mem. at 9 (Sept. 5, 1978).
[39] Since the O&C Act supersedes FLPMA only where the two conflict, BLM still has an obligation to designate Areas of Critical Environmental Concern particularly where special management is needed to protect ecological values that are consistent with the O&C Act's goals. *See* 43 U.C.S. § 1702.
[40] 998 F.2d 705 (9th Cir. 1993).
[41] *Id*. at 709.

we cannot allow the Secretary to 'utilize an excessively narrow construction of its existing statutory authorizations to avoid compliance [with NEPA].'" [42]

Under this ruling, BLM must comply with NEPA, the ESA, and other environmental laws in its management of O&C lands.

More recent court rulings have held that in fact, the BLM must comply with many other laws, in addition to the O&C Act, which may have the effect of reducing the amount of timber that can be produced on O&C lands.[43] Similarly, the *Swanson* court also held that timber industry Plaintiffs did not have standing to bring a claim against BLM for failing to offer 500 MMbf of timber per year.[44] Consequently, it is plain that BLM has the legal authority to reduce timber harvests where necessary to comply with the provisions of other laws, as well as the multiple use mandate of the O&C Act.

I. THE NORTHWEST FOREST PLAN COMPLIES WITH THE O&C ACT AND ENVIRONMENTAL LAWS

In the Northwest Forest Plan, the agencies understood that other environmental laws take precedence over the O&C Act in the absence of a conflict between laws, and that prudent management to avoid future conflicts with such other laws is within the BLM's discretion, as it could promote economic stability in the long-run. For example, "*That Act does not limit the Secretary's ability to take steps now that would avoid future listings and additional disruptions*."[45] The Secretaries made the finding that the adopted plan "will provide the highest sustainable timber levels from Forest Service and BLM lands of all action alternatives that are likely to satisfy the requirements of existing statutes and policies." [46]

In *Seattle Audubon Society v. Lyons*,[47] Judge Dwyer rejected the contention that the Northwest Forest Plan violated the O&C Act, stating that BLM must fulfill its conservation duties under other environmental statutes in managing the O&C lands. He also rejected the contention that the agency need not comply with the NEPA or the ESA because it has no power under its enabling statute to modify its management activities based on the other environmental statutes. BLM "*for many years has exercised broad authority to manage the O&CLA lands: the BLM is steward of these lands, not merely regulator. Management under the O&CLA must look not only to annual timber production but also to protecting watersheds, contributing to economic stability, and providing recreational facilities.*"[48]

Judge Dwyer noted that the court in *Headwaters* approved a BLM management plan that allocated over 50% of the area at issue to non-timber uses and that the decision dealt with the O&C Act alone, not BLM's duty to comply with other statutes. He also pointed to *Portland Audubon* as confirming that BLM must fulfill conservation duties imposed by other statutes. As in *Portland Audubon*, NEPA compelled BLM to consider the environmental impacts of its

[42] *Id*. at 709.
[43] *Swanson Grp. Mfg. LLC v. Jewell*, No. 13-5268, 2015 WL 3634645 (D.C. Cir. June 12, 2015).
[44] *Id.*
[45] NWFP ROD at 50.
[46] NWFP ROD 61.
[47] 871 F. Supp. 1291 (W.D. Wash. 1994) (appeal history omitted),
[48] *Id*. at 1314.

actions.[49] Moreover, Section 7(a)(1) of the Endangered Species Act requires BLM to utilize its authorities and carry out programs to conserve threatened and endangered species.[50] BLM appropriately construed this mandate to take action to minimize the need to list species in the future.[51] Moreover, Judge Dwyer concluded that the agencies could not, given the current conditions of the forests, meet their obligations under NEPA and § 7(a)(1) of the ESA "*without* planning on an ecosystem basis*."*[52]

While NEPA and the ESA are two statutes that impose mandates on BLM's management of O&C lands, the Interior Solicitor has recognized that numerous statutes similarly constrain BLM's management of O&C lands. The Wild and Scenic Rivers Act is one such statute, and in fact several designated wild and scenic rivers include O&C lands. BLM must also manage the lands to safeguard species listed under state endangered species acts, to provide sufficient habitat to conserve and rehabilitate fish, wildlife, and game populations, to meet water quality standards established under the Clean Water Act, and to impose measures to protect wetlands, including by prohibiting logging in wetlands areas, where necessary. *See* Interior Solicitor Mem. (May 14, 1981).

In short, there is no need to emphasize timber production over other statutory mandates because BLM has been acting in concert with those mandates under the Northwest Forest Plan for 20 years. BLM should be up-front about its one true purpose in proposing this action – increasing the cut from BLM lands in Oregon.

II. THE DEIS FAILS TO DISCLOSE THE EFFECTS TO THE NORTHWEST FOREST PLAN AS A WHOLE.

The 1994 Northwest Forest Plan amended the planning documents of 19 national forests and seven BLM districts, and it set standards and guidelines for these lands. The timber industry challenged the agencies' authority to adopt an ecosystem plan that covered lands administered by both the Forest Service and BLM. As stated above, the district court noted that both agencies' planning statutes required an integrated, scientific approach; both agencies had to comply with NEPA's mandate to consider ecosystem effects; and both agencies had to comply with the Endangered Species Act, among other laws such as NEPA. The court held that "[g]iven the current condition of the forests, there is no way the agencies could comply with the environmental laws *without* planning on an ecosystem basis."[53]

The effectiveness and legality of the Northwest Forest Plan depends on its application to both Forest Service and BLM lands; the Northwest Forest Plan is a "coordinated management direction for the lands administered by the Forest Service and BLM within the range of the spotted owl [that will also] protect and enhance late successional and old-growth forest ecosystems."[54] Two key assumptions behind the biological analysis of the Northwest Forest Plan were that (1) "[r]iparian and Late-Successional Reserves (LSRs) will retain reserve status and

[49] 871 F. Supp. at 1311.
[50] *Id*. at 1311, 1314.
[51] *Id*. at 1314.
[52] *Id*. at 1311 (emphasis in original).
[53] *Seattle Audubon Soc'y v. Lyons*, 871 F. Supp. 1291, 1311 (W.D. Wash. 1994).
[54] FWS Northwest Forest Plan Biological Opinion at 2 (Feb. 10, 1994).

will not be available for timber production other than as provided in Alternative 9" and (2) "[a]lternative 9 applies to Forest Service and BLM lands; all future actions on these lands would be consistent with Alternative 9, as adopted in the Record-of-Decision (ROD)."[55] BLM's alternatives in this DEIS, however, violate both of these assumptions.

A similar conclusion was reached with respect to aquatic protection. "The effectiveness of the [Aquatic Conservation Strategy] is still subject to debate among scientists. If the plan as implemented is to remain lawful, the monitoring, watershed analysis, and mitigating steps called for by the ROD will have to be faithfully carried out, and adjustments made if necessary."[56]

Under NEPA, federal agencies are required to examine in an EIS the cumulative impacts of proposed actions – that is, those impacts that result from the incremental impact of the action when added to the past, present, and reasonably foreseeable future actions.[57] By considering action alternatives that would change BLM's land management, the agency is essentially considering pulling out of the multi-agency Northwest Forest Plan. BLM cannot do this without causing the entire Northwest Forest Plan to crumble; that is, although the action agency here is BLM, its decisions will by necessity change the validity of the Forest Service's actions and land management assumptions. The DEIS fails to address or analyze the environmental and cumulative impacts of these alternatives on the continuing validity of the Northwest Forest Plan as a whole.

Similarly, pursuant to the consultation provisions of the Endangered Species Act, BLM, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service must address the full effects of this action, which includes the dismantling of the regional Northwest Forest Plan.[58]

Because the unraveling of the Northwest Forest Plan and its protections is a foreseeable future action and effect of the proposed actions, the environmental and cumulative impacts of losing or changing the Northwest Forest Plan should have been analyzed by BLM in the DEIS. As they were not, the DEIS violates the National Environmental Policy Act. By attempting to back out of the Northwest Forest Plan, BLM is violating its affirmative conservation duties under ESA § 7(a)(1). Finally, consultation under ESA § 7(a)(2) must look at the entire agency action, which is the dismantling of the Northwest Forest Plan.

III. BLM CANNOT MAKE RADICAL DEPARTURES FROM THE NWFP WITHOUT EXPLANATION

[55] *Id.* at 4.
[56] *Seattle Audubon Soc'y v. Lyons*, 871 F. Supp. at 1322.
[57] 40 C.F.R. § 1508.7.
[58] *See Connor v. Burford*, 848 F.2d 1441, 1453 (9th Cir. 1998) (agency must "analyze the effect of the of the *entire* agency action" and render a "comprehensive biological opinion") (emphasis in original); *Greenpeace v. National Marine Fisheries Serv*., 80 F. Supp. 2d 1137, 1147-50 (W.D. Wash. 2000) (finding biological opinion invalid for failing to assess full scope of individual and cumulative fishing allowed under fishery management plan); *see also PCFFA v. NMFS*, No. 04-1299-RSM, Report and Recommendation, slip op. at 22 (W.D. Wash. 2006) (later site-specific consultations that do not address entire Northwest Forest Plan cannot adequately address cumulative effects).

Recent *en banc* case law from the 9th Circuit affirms the principle that BLM cannot radially depart from the NWFP without adequate explanation. *Organized Village of Kake v. USDA*. (9th Circ, July 29, 2015) http://cdn.ca9.uscourts.gov/datastore/opinions/2015/07/29/11-35517.pdf

BLM proposes some significant changes from the Northwest Forest Plan, including

- eliminating the Northwest Forest Plan's survey and manage program,
- dramatic narrowing of the purpose of and the width of riparian reserves,
- increasing active management in the reserves, and
- reducing the retention requirements in the timber management areas.

The NWFP was adopted with the most compelling scientific rationale of any RMP anywhere.

The purposes of the survey and manage program were justified based on "additional species analysis" contained in the 1994 FSEIS for the Northwest Forest Plan and further explained in Appendix J2 of that document. Based on the encouragement of Judge Dwyer, the NWFP adopted an ecosystem management approach that attempted to protect species before they become threatened or endangered. BLM is now trying to narrow the purpose and need for this RMP revision by asserting that it does not have a wildlife conservation mandate. This is incorrect. Wildlife conservation is mandated by the ESA, FLMPMA, as well as the mandates of the O&C Act (e.g., "permanent forest production" and "recreation facilities"). BLM has tried three times (unsuccessfully) to eliminate the survey and manage program (2004 EIS/ROD, 2007 EIS/ROD and 2008 WOPR). Twice the courts have rejected the agencies' efforts because the survey and manage program was considered integral to the overall conservation scheme of the Northwest Forest Plan.

The broad purposes of the riparian reserves were explained in the 1994 FSEIS. These purposes include both terrestrial and aquatic conservation objectives, providing extra assurance that at-risk fish would be conserved, mitigating for cumulative impacts, maintaining microclimate and wood input for amphibians and other wildlife that live near but not in streams. The agencies wrote an EIS to amend the ACS in 2008 but withdrew it in the face of litigation. Now BLM proposes an even more radical revision of the riparian reserves and its objectives and standards & guidelines. BLM DEIS does not address all the reasons that riparian reserves were established.[59]

BLM proposes to allow significant logging in reserves with an assumption that logging is compatible with late successional habitat and other objectives. This assumption was rejected in the Northwest Forest Plan and BLM has not explained how they arrived at a contradictory conclusion.[60]

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[59] See Heiken, D. 2013. Riparian Reserves Provide Both Aquatic & Terrestrial Benefits - A Critical Review of Reeves, Pickard & Johnson (2013). https://dl.dropboxusercontent.com/u/47741/Heiken%202013.%20Review%20of%20Reeves%20et%20al%20Riparian%20Proposal.pdf

[60] See Heiken, Doug. 2009. The Case for Protecting Both Old Growth and Mature Forests, Version 1.8. Oregon Wild. http://dl.dropbox.com/u/47741/Mature%20Forests%2C%20Heiken%2C%20v%201.8.pdf (See especially the following sections that explain why the authors of the NWFP adopted a mostly hand-offs approach in reserves, except for dense young stands:

- Logging mature forests will impair development of important features of old-growth forests, especially snags and dead wood. p 29

Heiken (2009) explained:

> The Northwest Forest Plan prohibits logging of stands 80 years or older in the Late Successional Reserves for several reasons: (a) such stands are beginning to acquire late successional characteristics and provide valuable habitat for spotted owls and other wildlife; (b) there is a lack of evidence to support the hypothesis that logging in stands >80 years old is beneficial to habitat development; and (c) logging will likely do more harm than good.
>
> This reasoning is articulated in several scientific reports, including the 1990 Interagency Scientific Committee (ISC) Report, the 1993 SAT Report, and various reports to Congress where the scientists were being asked to explain to a skeptical committee in Congress why logging old forests could not be compatible with conserving late-successional forest ecosystems. The ISC report said "no consensus exists about whether any silvicultural systems would produce the desired results. The ability to harvest timber in currently suitable owl habitat and have that habitat remain suitable has not been clearly demonstrated."[61]
>
> The SAT noted that "considerable additional research is likely required" before we will know whether silviculture can be compatible with spotted owls, and while the spotted owl is relatively well studied, the risks and uncertainty are even more pronounced for the hundreds of other species associated with old-growth.[62] It should also be recognized that President Clinton's Mission Statement directed the FEMAT team to ensure that "tests of silviculture should be judged in an ecosystem context and not solely on the basis of single species or several species response."[63]
>
> The 1993 Report of the Scientific Analysis Team (SAT) specifically highlighted the risks associated with logging in suitable owl habitat, saying "intentions to selectively cut forest stands to create conditions favorable for spotted owls, represents increased risks to the viability of the spotted owl."[64] The Scientific Analysis Team said there are several factors that support this conclusion and affirm the Interagency Scientific Committee's decision to exclude logging in old growth reserves and rely on natural processes to maintain and restore habitat:

- In all forest types, recognize that logging has trade-offs. p 34
- In moist provinces, mature forests just need time, not logging. p 35
- In dry provinces, fire hazard is over-stated. Logging mature trees will just make things worse. p 39")

[61] Thomas, J.W., E.D. Forsman, J.B. Lint, E.C. Meslow, B.R. Noon, and J. Verner. 1990. A Conservation Strategy for the Northern Spotted Owl. A report by the Interagency Scientific Committee to address the conservation of the northern spotted owl. USDA, Forest Service, and U. S. Department of the Interior, Fish and Wildlife Service, Bureau of Land Management, and National Park Service. Portland, OR (*herein* ISC Report), 1990, p 104.

[62] Thomas, JW, Raphael, MG, Anthony, RG, Forsman ED, Gunderson, AG, Holthausen, RS, Marcot, BG, Reeves, GH, Sedell, JR, and DM Solis. 1993. Viability Assessments and Management Considerations for Species Associated with Late-Successional Old-Growth Forests of the Pacific Northwest. The Report of the Scientific Analysis Team (*herein* SAT Report), 1993, p 147.

[63] FEMAT Report, p iii.

[64] SAT Report p 145.

a. "Lacking experience with selective cutting designed to create spotted owl habitat, such practices must be considered as untested hypotheses requiring testing to determine their likelihood of success. ... Given the uncertainty of achieving such expectations, it is likely that some silvicultural treatments, which have been characterized as largely experimental, may well have an opposite effect from that expected. Consequently, such treatments may hinder the development of suitable habitat or they may only partially succeed, resulting in development of marginal habitat that may not fully provide for the needs of spotted owls. Results which fall short of the expected conditions could occur because of delay or failure to regenerate stands that have been cut, increased levels of windthrow of remaining trees, mechanical damage during logging to trees remaining in the logging unit, the spread of root rot and other diseases. Increased risk of wildfires associated with logging operations that increase fuels and usually employ broadcast burning to reduce the fuels also increase the risk of not attaining expected results. Such events may spread to areas adjacent to stands that are logged, thereby affecting even more acreage than those acres directly treated." [SAT p 147-148] The SAT indicates that these comments apply equally to density management and patch cutting, both of which are being promoted as tools to enhance owl habitat. The SAT also cited concerns about the effect of logging on snags and down woody debris which are essential features of owl habitat.

b. "Planning produces a description of desired future conditions [and] culminates in a final plan for a project which, for timber sales, involves legal contracts obligating the purchaser and the seller to specific provisions. … Our experience is that commonly not all provisions of the plan are thoroughly incorporated into such contracts, nor are all contract provisions thoroughly administered to ensure compliance." [SAT p 148-149].

c. "There are also probabilities associated with how well monitoring will identify 'trigger points' that indicate a management plan may need modification. The more complex the plan (i.e., the more variables there are to monitor) the less likely the monitoring plan will successfully detect problems. Manipulation of forest stands to accelerate development of spotted owl habitat on a landscape scale, as prescribed in the Bureau of Land Management Preferred Alternative, is an extremely complex issue involving a myriad of variables over a very long timeframe. Development of a monitoring plan intensive enough to isolate the causes of observed variations for wide-scale implementation of the Bureau of Land Management Preferred Alternative seems unlikely to us. … [I]nadequate monitoring will increase, perhaps dramatically, the risk of failure of a plan that relies heavily on adaptive management." [SAT p 149].

d. "A basic requirement for a viable adaptive management strategy is the existence of resources necessary to make the required adjustments. Adaptive management can only be expected to reduce risk if options to adjust management to fit new circumstances are not eliminated. Adaptive management, therefore, can be considered a means to reduce risk associated with a Resource Management Plan commensurate with the options for adjustment which remain during the time the plan is in effect." [SAT p 149-150] In other words, silvicultural manipulation of mature forests has long-term consequences and is likely to foreclose some future options in

those stands, thus reducing the utility of adaptive management. A prime example is the fact that logging "captures mortality," yet mortality is an essential feature of old-growth habitat used by both spotted owls and their prey.

e. SAT then noted the cumulative effects of all these uncertainties: "The combined risks associated with treatment of spotted owl habitat or stands expected to develop into suitable habitat for spotted owls, as discussed above, will likely result in situations where either habitat development is inhibited or only marginal habitat for spotted owls is developed. The exact frequency of these partial successes or failures is unknown. Given the likely cumulative relationship among the risks for each factor, it appears to us that the overall risk of not meeting habitat objectives is high. … Members of the Interagency Scientific Committee indicated that, because a plan (the Interagency Scientific Committee's Strategy) was put forth which proposes to reduce the population of a threatened species by as much as 50 percent, providing the survivors with only marginal habitat would be extremely risky and certainly in their minds not 'scientifically credible' [65]

f. The SAT concluded, "The transition period (1-50 years) between implementation of the Interagency Scientific Committee's Strategy and achievement of an equilibrium of habitat and spotted owls is a critical consideration. … Given the existing risks that face owl populations and the sensitivity of the transition period, the short-term effect of these actions on habitat loss may be much more significant than the long-term predicted habitat gains. We further conclude that, although research and monitoring studies are presently being initiated, no significant new data exist which suggest that the degree of certainty that is expressed in the Bureau of Land Management Draft Resource Management Plans for developing owl habitat silvicultural treatments is justified. Therefore, it is our opinion that the course prescribed in the Interagency Scientific Committee's Strategy, pertaining to timber harvest in Habitat Conservation Areas, remains the most likely course to result in superior habitat conditions within reserves (i.e., Old-Growth Emphasis Areas). The approach prescribed by the Interagency Scientific Committee's Strategy preserves options for adjustments in the course of management under a philosophy of adaptive management." [66]

The authors of the Northwest Forest Plan took all this into account and determined that 80 years is a useful place to draw the line between younger forests that are likely to benefit from careful thinning and older forests that are likely to experience net negative consequences.[67] There is no new science to change that conclusion. In fact, new information developed since 1994 shows that dead wood is probably more

[65] USDA 1991:45., SAT p 151. file://localhost/mailbox/::C%257C:Documents%20and%20Settings:netcorps:Application%20Data:Thunderbird:Profiles:0a0zzrc0.default:Mail:pop.efn.org:Inbox.sbd:DC%3Fnumber=100232524 - _ftn3

[66] SAT p 151-152.

[67] See 1993 SAT Report pp 146-152. AND February 1991 Questions and Answers on A Conservation Strategy for the Northern Spotted Owl (prepared in response to written questions from the Senate Energy and Natural Resources Committee to the Interagency Scientific Committee on the May 1990 ISC Report. AND Jerry Franklin, David Perry, Reed Noss, David Montgomery, Christopher Frissell. Simplified Forest Management To Achieve Watershed And Forest Health: A Critique. National Wildlife Federation. http://www.coastrange.org/documents/forestreport.pdf

valuable than previously thought. It is important for a wide variety of ecological functions, not least of which is providing complex habitat to support owl prey species. Thinning stands over 80 years will remove many large trees and prevent them from ever becoming snags and dead wood. The long-term loss of recruitment of dead wood habitat in older stands is a very strong argument against logging in stands over 80 years old.[68]

Structure-based management (SBM) is often suggested as a way to produce logs and habitat from the same forests, but this is not a well-supported approach to managing older forests. There are well-founded critiques which point out that structure-based management is untested, uncertain, high risk, and unlikely to result in desired outcomes. Consider the well-developed critique of structure based management set forth by the Scientific Panel on Ecosystem Based Forest Management:

> The concept that all forests must be silviculturally manipulated (logged) and eventually replaced in order to provide desired goods and services, including the continued health of forest landscapes, is an old and honored tradition. … The proposition that forest values are protected with more, rather than less logging, and that forest reserves are not only unnecessary, but undesirable, has great appeal to many with a vested interest in maximizing timber harvest. … Our interpretation of the scientific literature, combined with our professional experience, leads us to some very different conclusions about appropriate approaches. Scientifically based strategies for the conservation of forest ecosystems, with a sound theoretical basis in conservation biology—including biodiversity and critical ecological services—have inevitably incorporated reserves along with ecologically sensitive management of unreserved areas (e.g., FEMAT 1993). … In our view, the assumptions underpinning simplified structure-based management (SSBM) are not supported by the published scientific literature on structural development of natural forests, disturbance ecology, landscape ecology and conservation biology, or by the relationships between ecosystem structures and processes. … We do not believe, however, that scientific literature or forestry experience supports the notions that intensively managed forests can duplicate the role of natural forests, or that sufficient knowledge and ability exist to create even an approximation of a natural old-growth forest stand.[69]
>
> …

[in dry forests]
Hanson et al (*in press*) reviewed 2 decades of fire records in conifer forests in dry provinces of the Northwest Forest Plan and found that the proportion of area burned and the severity of

[68] USDA Forest Service. 2007. Curran Junetta Thin Environmental Assessment. Cottage Grove Ranger District, Umpqua National Forest. June 2007. http://www.fs.fed.us/r6/umpqua/projects/projectdocs/curran-junetta-thin/index.shtml This EA revealed that heavy thinning in young stands would delay attainment of objectives for recruitment of dead wood for 6 decades or more.

[69] Jerry Franklin, David Perry, Reed Noss, David Montgomery, Christopher Frissell. Simplified Forest Management To Achieve Watershed And Forest Health: A Critique. National Wildlife Federation. http://www.coastrange.org/documents/forestreport.pdf

fire has not changed significantly.[70] These findings, along with the evidence that logging has unavoidable adverse impacts, indicates that caution is warranted. We should not encourage excessive and unwarranted logging in mature forests. PNW Research Station recently reported that profit-driven fuel reduction logging can conflict with both habitat objectives and fire risk reduction objectives.[71]

If there is a new push for timber volume from mature forests and trees, it will cause fire hazard to increase. Commercial logging can increase fire hazard by making forest stands hotter and windier, and fuels dryer. "Thinning opens stands to greater solar radiation and wind movement, resulting in warmer temperatures and drier fuels throughout the fire season. [T]his openness can encourage a surface fire to spread. …"[72] Opening the canopy also stimulates the growth of new surface and ladder fuels, and logging moves fine fuels from the canopy to the ground where they are more available for combustion.

BLM's Western Oregon Plan Revision EIS confirms that fire hazard will increase in areas managed for timber production, and that retaining more canopy cover would help reduce fire hazard. "The more canopy that would remain, the less effect wind would have on drying fuels and surface fires. This reduction in mid-flame wind speed would reduce flame length, which can lead to a reduction in tree mortality. … A lower probability of mortality equates to greater fire resiliency."[73]

The current DEIS does not provide adequate discussion or explanation for the radical departures from these important Northwest Forest Plan requirements.

RANGE OF ALTERNATIVES

In preparing an EIS, NEPA requires the agency to "study, develop and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources."[74] The regulations implementing NEPA explain that alternatives to the agency's proposed action are "the heart of the environmental impact statement."[75] The "touchstone" of the alternatives analysis is "whether [the] selection and discussion of alternatives fosters informed decision-making and informed

[70] Hanson, C.T., Odion, D.C., DellaSala, D.A., and W.L. Baker. *in press.* Overestimation of fire risk in Northern Spotted Owl Recovery Plan. Conservation Biology.

[71] PNW Research Station. 2006. Seeing The Bigger Picture: Landscape Silviculture May Offer Compatible Solutions To Conflicting Objectives. Science Findings. July 2006. Http://Www.Fs.Fed.Us/Pnw/Sciencef/Scifi85.Pdf

[72] USDA Forest Service; Influence of Forest Structure on Wildfire Behavior and the Severity of Its Effects, November 2003. http://www.fs.fed.us/projects/hfi/2003/november/documents/forest-structure-wildfire.pdf

[73] BLM. 2008. Western Oregon Plan Revision FEIS, pp 810-811.

[74] 42 U.S.C. § 102(2)(E).
[75] 40 C.F.R. § 1502.14; *see also* 42 U.S.C. § 4332(2)(E); 40 C.F.R. 1507.2(d), 1508.9(b).

public participation."[76] "The existence of a viable but unexamined alternative renders an environmental impact statement inadequate." [77]

The BLM failed to consider a reasonable range of alternatives in the DEIS. First, BLM explains that it did not consider an alternative that would examine the status quo, which is implementation of the Northwest Forest Plan *as amended and currently implemented*.[78] BLM's rationale for not analyzing effects of the NFP as implemented is that:

> *It is not possible to analyze continuation of the current practices within the decision area as the No Action alternative for two reasons. First, implementation of the timber management program has departed substantially from the outcomes predicted in the 1995 RMPs, and the manner and intensity of this departure has varied substantially over time and among districts (USDI BLM 2012, pp. 6-12). There is no apparent basis on which the BLM might select and project into the future continuation of the practices from a specific year (or set of years) since 1995. Second, continuing to harvest timber at the declared annual productive capacity level for multiple decades into the future would not be possible using the current practices (USDI BLM 2012, pp. 6-12). The No Action alternative provides a benchmark to compare outputs and effects, even though this alternative does not meet the purpose and need of the project. Because of the inherent unsustainability of current practices, the BLM cannot project their implementation into the future; thus, continuation of the current practices would not serve the essential function of the No Action alternative of providing a baseline for comparison of outputs and effects.*[79]

This rationale is arbitrary and capricious. While it may be true that the BLM's timber program has departed from timber harvest *estimates* in existing RMPs or even the NFP, this does not mean that BLM cannot model or predict how existing RMPs will affect the environment. BLM could simply forecast timber outputs based on continued application of the RMPs as amended by court order or other change; and BLM provides no evidence that this approach is inappropriate. Indeed, in order for the agency to conclude that the existing RMPs are not "sustainable over time," it must have completed some sort of calculations; but this evidence is not in the DEIS or appendices.

Similarly, BLM claims that "continuing to harvest timber at the declared annual productive capacity level for multiple decades into the future would not be possible using the current practices," and cites its 2012 *Resource Management Plan Evaluation Report: Western Oregon* for support. However, that report simply lists reasons why BLM has not met the timber targets in existing RMPs, not that it is impossible to continue to implement existing RMPs as amended by the NFP and to project those environmental consequences into the future.[80]

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[76] *Westlands Water Dist. v. U.S. Dep't of Interior*, 376 F.3d 853, 872 (9th Cir. 2004) (*quoting California v. Block*, 690 F.2d 753, 767 (9th Cir. 1982)).
[77] *Morongo Band of Mission Indians v. FAA*, 161 F.3d 569, 575 (9th Cir. 1998); *Alaska Wilderness Recreation & Tourism v. Morrison*, 67 F.3d 723, 729 (9th Cir. 1995).
[78] DEIS at 77-79.
[79] DEIS at 77.
[80] 5 U.S.C. § 706(2)(A).

I. ARTICULATION OF ENVIRONMENTAL CONSEQUENCES FROM ALTERNATIVES

The DEIS is clear that the BLM does not intend to select one of the alternatives analyzed in the DEIS, but instead will select aspects of the various alternatives for implementation. DEIS at 76. For that reason, each alternative contains different mixes of uses that seek to offset any environmental "benefit" (i.e., protection) with a commensurate amount of environmental "harm" (i.e., extraction). While this is an attempt to develop alternatives that are "balanced," in practice it means that the public cannot assess the individual components of each alternative. Instead, the public is left with the impression that more timber harvest means less environmental protection, which, while likely true, does not allow for the public to have a true understanding of the actual differences among the alternatives, or what combination of particular aspects of particular alternatives have what particular environmental effects. For example, an alternative that allocates more land to the timber harvest base, but also decreases riparian buffers and increases ACEC designations over the status quo may have the "same" effects on fisheries as an alternative that reduces lands in the harvest base but also increases riparian buffers and does not designate any additional ACECs. This alternatives approach does not allow the public to clearly understand the differences among alternatives and to make a reasoned choice among them.[81]

II. INCREASED DISCRETION HAS ADVERSE ENVIRONMENTAL CONSEQUENCES.

BLM's internal agency reward system leads to unintended consequences. Unreasonably high timber targets combined with highly discretionary standards and guidelines will lead to abuse of discretion and failure to attain environmental objectives.

The EIS needs to take a hard look at the adverse effects from increased discretion, especially increased flexibility for logging in reserves. Rules for riparian reserves and LSRs provide too much discretion, allowing BLM to log inside the riparian areas for reasons other than restoring aquatic resources. Logging often causes a mix of positive and negative effects. In an effort to meet timber targets, BLM will focus on the benefits and ignore the adverse trade-offs, and therefore likely lead to logging in reserves with net negative effects on ecological objectives for the reserves.[82]

The action alternatives leave very little of the BLM landscape off-limits to logging. Subtracting structurally complex LSR, inner riparian zones, and congressionally reserves lands, leaves 63% of BLM lands open to logging under the preferred alternative.

[81] *California v. Block*, 690 F.2d at 767.

[82] See Heiken, Doug. 2009. The Case for Protecting Both Old Growth and Mature Forests, Version 1.8. Oregon Wild. http://dl.dropbox.com/u/47741/Mature%20Forests%2C%20Heiken%2C%20v%201.8.pdf

2015 BLM RMP Analysis of what's open to logging

Open to logging	Acres	Not open to logging	Acres	
LSR	636,635	LSR that is structurally complex*	463,910	
outer riparian zone**	167,729	inner riparian zone	232,083	
HLB Low	77,384	cong reserved	40,537	
HLB mod	224,582	district reserves - not including road footprint*	187,926	
HLB uneven	274,199			
East Side Mgt Lands	151,885			
District Reserve Road Footprint**	33,701			
Totals	1,566,115		924,456	2,490,571
Percentages	**63**		**37**	

3. The DEIS Fails To Distinguish Differences Among Alternatives.

The DEIS seems to focus too much on the similarity among alternatives instead of highlighting differences. The purpose to NEPA is to help the decision-maker choose among alternatives, so the analysis must be redone to better highlight differences that are relevant to the decision-maker's choice among alternatives.

For instance, the DEIS at 225 says "All of the alternatives would increase the potential large wood and small functional wood contribution to streams from the current conditions. There is no meaningful difference discernible at this scale of analysis among the alternatives in their effect on potential wood contribution." This fails to recognize that there are significant differences in wood recruitment among the alternatives. In particular, those that allow commercial logging within the riparian reserves will capture mortality and reduce recruitment of functional wood to both the stream and the adjacent stream-side habitat. Another example is on page 233 of the DEIS which says "there would be no identifiable difference among the alternatives in the effects on fish from peak flow increases …" This does not mean that differences will not occur but rather, BLM reached this conclusion because the analysis was done at a scale that was not designed to identify differences.

As another example, DEIS at 315 states "Although the absolute values for increased potential fine sediment delivery through 2023 vary by alternative, these differences do not represent a substantial difference in the effects of the alternatives, because the increases in sediment delivery and the differences among the alternatives in future increases in sediment delivery are so small in comparison to the existing sediment delivery." This is misleading. Instead of highlighting the small additional level of sediment produced at a regional scale compared to the sediment from existing roads, BLM should disclose that some of the new sediment would be produced in areas that are not currently exposed to high levels of sediment form existing roads. There are local effects that will be significant and differ significantly among alternatives that allow more or less logging and road building near streams.

DEIS at 430 says "there is no basis for predicting a difference in effects between the No Action alternative and Alternatives A, B, and C" with respect to conservation of rare plants and fungi. This is high misleading, especially given the fact that the no action alternative requires pre-disturbance surveys and protection buffers for rare and uncommon species, while the action alternatives do not require surveys and will result in the loss of countless populations of rare and uncommon wildlife. The action alternatives won't even protect existing known sites of rare and

uncommon species on O&C lands "when protection measures … conflict with sustained-yield timber production…" There are many bases for BLM to distinguish alternatives but BLM offers a misleading analysis that highlights similarities. This is arbitrary and capricious.

BLM is basically asking the wrong questions and failing to highlight the choice faced by decision-makers. The EIS needs to clearly show that more logging allowed near streams, more regeneration logging with less retention, more logging of older forests, and more logging without survey for rare and uncommon species, will result in greater the adverse effects to fish, water, wildlife, carbon, and recreation. It is important for the decision-maker to understand this and to be able to see and understand these differences among alternatives.

One example where BLM does find a substantial difference is on DEIS at 255 which says "There is a substantial difference in the structural complexity of most future forests when comparing the even-aged management (which includes clear-cutting) practices in the HITA in Alternatives A and C to the two-aged practices (which include variable retention-regeneration harvest) in the No Action alternative, and the LITA and MITA in Alternatives B and Sub-alternative B, and the MITA in Alternative D." This is an important disclosure that should lead the decision-maker to choose an alternative that retains more structure in regeneration harvest areas. It also shows why BLM finds a difference – because it looked at stand-scale effects, instead of regional effects. BLM needs to do more of this and ask further questions such as. What are the local stand-scale and reach-scale effects of more logging near streams or near populations of rare and uncommon wildlife.

Once these local effects are more clearly understood and disclosed, BLM can then add up those effects to provide a clearer picture of cumulative impacts.

AQUATIC CONSERVATION STRATEGY

The Northwest Forest Plan included the Aquatic Conservation Strategy ("ACS") developed by FEMAT. The ACS has four basic components: (1) a system of key watersheds or refugia comprising watersheds with the best aquatic habitat or the greatest potential for recovering at-risk fish stocks; (2) riparian reserves along streams where certain activities are constrained; (3) watershed analysis to be used to tailor activities to specific watersheds needs; and (4) a comprehensive, long-term watershed restoration program.[83]

The ACS imposed constraints on habitat-degrading activities in two ways. First, binding standards and guidelines restrict certain activities within riparian reserves and key watersheds.[84] Second, FEMAT recognized the need to constrain: (1) activities outside riparian reserves in, e.g., unstable areas; and (2) the cumulative impacts of activities throughout a watershed.[85] Instead of imposing explicit constraints on such activities, the ACS has nine objectives that require aquatic habitat to be maintained and restored to properly functioning conditions.[86] The Northwest Forest Plan Record of Decision gave the ACS objectives binding force as standards and guidelines and

[83] Northwest Forest Plan Record of Decision at B-12; FEMAT at V-32.
[84] See Northwest Forest Plan Record of Decision at C-7, C-30 to C- 38.
[85] FEMAT at V-29.
[86] Northwest Forest Plan Record of Decision at B-11; FEMAT at V-30 to-31.

explicitly required that federal lands shall be managed to attain the ACS objectives. "Both FEMAT and the [Northwest Forest Plan] contemplate that projects must be consistent with ACS objectives."[87]

When Judge Dwyer upheld the validity of the Northwest Forest Plan, he cautioned with respect to the ACS that, "[I]f the plan as implemented is to remain lawful, the monitoring, watershed analysis, and mitigating steps called for in the ROD will have to be faithfully carried out, and adjustments made if necessary." *Seattle Audubon Soc'y*, 871 F. Supp. at 1322. More recently, courts have found that FEMAT embodies the best available scientific information pertaining to the impacts of forestry activities on salmon and their habitat.[88]

The BLM offers no compelling rationale for why all of the proposed action alternatives eliminate the Aquatic Conservation Strategy Objectives and the Key Watershed designations of the NWFP. As confirmed in the 20-year NWFP Monitoring Report, the Aquatic Conservation Strategy Objectives and the Key Watershed designations have proven effective at improving water quality. The BLM's refusal to develop or consider an action alternative that retains these bedrock conservation elements of the NWFP is arbitrary and capricious.

As acknowledged by the BLM on pages 9-10 of the DEIS, FLPMA (43 USC 1701[a][8]) directs the agency to protect water resources and the O&C Act (43 USC 1181a) requires the BLM to manage forests for the purpose of protecting watersheds. At no point in the DEIS does the BLM identify how abandoning the ACS of the NWFP will achieve those objectives or contribute to attaining the purpose and need of the plan revisions process.

I. RIPARIAN RESERVES ARE AN INTEGRAL PART OF THE ACS.

The FEMAT scientists first convened in April 1993 and assessed the likelihood of having the continued persistence of the species, well-distributed throughout its historical range on federal lands over the next 100 years.[89] They were instructed to assume that the Aquatic Conservation Strategy would be fully implemented. For the salmon species considered, the likelihood of their continued survival on these lands over the next 100 years was only 65%.[90] Only when the riparian reserves and other mitigation measures were added into the protections of the ACS did the Northwest Forest Plan result in an 80 percent or greater likelihood of continued existence of salmon and steelhead.[91]

Recognizing that the ACS represented the best available science on the intersection between forest management and salmonid protection, NMFS has relied on ACS consistency in order to

[87] PCFFA v. NMFS, No. 04-1299RSM, Order on Report and Recommendation, slip op. at 4 (W.D. Wash. March 30, 2007).
[88] *PCFFA v. NMFS*, 71 F. Supp.2d 1063, 1069 (W.D. Wash. 1999); see also *PCFFA v. NMFS*, No. 04-1299RSM, Order on Report and Recommendation, slip op. at 6 (W.D. Wash. March 30, 2007) ("The FEMAT scientists are respected scientists and their views relevant.").
[89] FEMAT at IV-40.
[90] FEMAT Table V-11, at V-69.
[91] FSEIS at 3&4-196; App. J2- 47-48.

judge jeopardy. "[B]ecause NMFS is allowed to equate ACS consistency with a no jeopardy finding, NMFS chooses to inquire into ACS consistency."[92]

Riparian forests are distinctly different from upland forests because they are located adjacent to stream channels where dynamic processes of stream flow and sediment transport interact with vegetation. Riparian forests have a dual role of providing water quality and habitat for freshwater species as well as late-successional habitat for a variety of birds, mammals and other species. Plants along streams and aquatic animals have distinct management needs quite different from upland areas. A large body of scientific literature describes interactions between riparian forests and stream channels as well as larger scale watershed processes.

II. THE BLM SHOULD WORK TOWARD SALMON RECOVERY

The recovery of threatened salmonids (e.g. the Southern Oregon Northern California Coast (SONCC) coho salmon Evolutionary Significant Unit and the Oregon Coast coho salmon ESU) must be a high priority for the RMP planning process. Development of the 1995 Medford District RMP and other RMPs anticipated federal ESA fish listings by adopting the Aquatic Conservation Strategy (ACS) of the Northwest Forest Plan into RMPs. Subsequently, the SONNC coho salmon ESU was federally listed as threatened in 1997 and the listing reaffirmed in 2006. The NOAA Fisheries has determined that the Northwest Forest Plan ACS is adequate for protection and recovery of listed fish ESUs, including the SONCC. We recommend that the ACS be used in all alternatives. Incorporation of the ACS would assure approval by NOAA fisheries and avoid questions of legality as occurred in the WOPR. We are concerned that the RMP process is emphasizing forestry classifications (e.g. moist/dry) that are designed to be compatible with spotted owl recovery while largely ignoring the need for protection of riparian forests to recover coho salmon.

Habitat monitoring has found that streams have generally improved with the ACS (Lanigan et al. 2011). Unfortunately, SONCC coho salmon populations have recently declined despite modest improvements in habitat. The SONCC coho recovery plan states that the SONCC coho salmon ESU is at high risk of extinction and is not viable." The parallel to spotted owl declines is striking but not surprising since both species are strongly dependent on watersheds with mature and old growth forest cover.

Riparian Forests are best managed with treatments that enhance structure through decadence creation, underplanting and prescribed fire (see Franklin et al. 2009:32). We believe these silivicultural treatments are appropriate in riparian forests because they do not remove structure (i.e. coarse wood) needed for the dual purpose of providing habitat for animals and integrity for stream channels. Commercial thinning in riparian forests is often not appropriate because it removes the very component (coarse wood) needed to achieve desired conditions and creates numerous adverse impacts antithetical to stream integrity.

[92] PCFFA v. NMFS, 265 F.3d 1028, 1034-35 (9th Cir. 2001) (further noting that presumably other methods of reaching a jeopardy determination are available, but discussing none).

III. PROTECT KEY WATERSHEDS

The RMP fails to identify a hierarchical system of 5th, 6th, and 7th field coho "key" spawning and coho "key" rearing watersheds with requirements to substantially reduce road density and grazing in 6th and 7th field watersheds. Summer steelhead would also be high priority for key watershed designations. Key watersheds were identified in the Northwest Forest Plan prior to the listing of coho salmon. Federal listings of coho salmon, SONCC coho recovery plan, and recent research findings[93] indicate a need to build on key watershed component of the ACS to direct effective recovery actions at appropriate watershed scales. Although not federally listed, summer steelhead in the Rogue Basin are at a high risk for loss of viability over the next decades. Generally coho and summer steelhead spawn in the same tributaries, thus these watersheds or sub-watersheds would be high priority for key watershed designation (e.g. Cheney Creek, Foots Creek, Evans Creek etc.).

IV. BASIS FOR KEY WATERSHED RMP STANDARDS AND GUIDELINES

Refugia are a cornerstone of most species conservation strategies. Williams et al. (2011b) identified four critical elements for watershed scale conservation: (1) maintain processes that create habitat complexity, diversity and connectivity;(2) nurture all of the life history stages of the fishes being protected; (3) include a large enough watershed to provide long-term persistence of native fish populations and (4) provide management that is sustainable over time. A system of Coho Key Watersheds that serve as refugia is crucial for maintaining and recovering habitat for threatened coho salmon within core areas identified in SONCC recovery plan. Coho Key Watersheds would include areas of high quality habitat as well as areas of degraded habitat. Coho Key Watersheds with high quality conditions would serve as anchors for the potential recovery of depressed populations segments within core population areas. Those areas of lower quality habitat with a high potential or capacity for restoration and will become future sources of high quality habitat with the implementation of a comprehensive restoration program.

As stated in our scoping comments, we recommend that 5th field watersheds with relatively high amounts of high intrinsic potential coho habitat and relatively high spawner counts be identified in RMPs as Key Coho Watersheds. For example, in the Illinois Basin, Sucker Creek, Deer Creek, upper East Fork Illinois River, Elk Creek and possibly Althouse Creek would be identified as Coho Key Watersheds to support core area designation in the SONCC Coho Recovery Plan (p. 30-6). Within Coho Key Watersheds we recommend that sufficient 6th or 7th field sub-watersheds be identified as Coho Key Spawning Watersheds. Likely candidates as Key Coho Spawning Watershed would be smaller watersheds of "key" streams (e.g., Bear Creek and Grayback tribs to Sucker Creek). Mainstem areas of 5th field watersheds are often too unstable for successful spawning by coho because of instability of gravel beds during winter peak flows.[94] Thus, it is common to find high concentrations of coho spawning in only a few tributaries of 5th field watersheds or in spring fed side channels buffered from bedload movement (e.g., Sucker Creek). A portion of juvenile coho migrate to mainstem 5th field stream areas suitable for rearing

[93] Firman et al. 2011
[94] Nawa and Frissell 1997.

or seek out other tributary reaches. The relatively small 6th and 7th field sub- watersheds would be high priority areas for intensive road decommissioning and grazing reduction.

A review by Carnefix and Frissell (2009) found that it is more effective to reduce road densities to very low densities in selected high priority watersheds than to reduce high road densities to only moderate levels. A road density effect on adult coho salmon was corroborated by Firman et al. (2011) who found that "[p]redictor variables indicative of land management, cattle density, and road density were negatively associated with peak spawner densities in many of our models."

The coho populations studied were spawning in 7th field watersheds. This is important because reducing road densities is extremely costly. Reducing roads to very low densities in 6th and 7th field Coho Key Spawning Watersheds would be far more practical and effective than attempting to reduce road densities in Coho Recovery Plan "population" areas that are many times larger. The recommended restoration strategy is to concentrate road density reductions in small watersheds where they will be most effective to benefit known coho spawning populations.

V. RECOMMENDED STANDARDS AND GUIDELINES FOR KEY WATERSHEDS

- Coho Key Watersheds are highest priority for watershed restoration;
- No new roads would be built in Coho Key Watersheds;
- Road Densities in Coho Key Spawning Watersheds would be reduced to 0-0.5/mi^2 during first ten years of plan;
- Grazing would be reduced or eliminated in Coho Key Spawning Watershed; and
- Watershed analysis is required prior to major ground disturbing management activities such as timber harvest in Coho Key Watersheds.

VI. THE BLM SHOULD MAINTAIN RIPARIAN RESERVES

> *The No Action alternative has wider Riparian Reserve widths on fish-bearing streams than all action alternatives." –DEIS at 228.*
>
> *[T]he Riparian Reserves in the No Action alternative were designed to meet an array of objectives, including broad ecological objectives and riparian and terrestrial species habitat. In contrast, the Riparian Reserves in the action alternatives are designed to meet narrower objectives: conservation and recovery or listed fish and protection of clean water, consistent with the purpose and need for action. -DEIS at 80.*

The BLM offers no compelling rationale or reason for its refusal to develop and consider action alternatives that meet the "broad ecological objectives" for Riparian Reserve management that underlie the NWFP. Indeed, federal courts have ruled that the NWFP conservation plan (including the terrestrial habitat connectivity function of Riparian Reserves) is the absolute minimum allowed by federal law. The DEIS contains no proposal to replace the habitat connectivity function provided by NWFP Riparian Reserves and contains no analysis or disclosure of the impacts of reduced riparian widths on terrestrial wildlife connectivity. Thus the

BLM is stepping away from minimum level science based broad ecological objectives that provide a comprehensive management approach to federal lands throughout the entire region, which is what the purpose and need of this DEIS calls for.

As illustrated in Table 3-89 of the DEIS, several BLM action alternatives would allow logging impacting 275-372 miles of fish-bearing and perennial streams "susceptible to shade reductions that could affect stream temperatures." Raising stream temperatures directly inhibits BLM watershed management goals and may result in violations of the Clean Water Act associated with TMDL listed-waterbodies.

Page 317 of the DEIS indicates that increase in riparian reserve logging proposed in every BLM action alternative would necessitate additional road construction within the "sediment delivery distance" (200 feet) near streams.

> *Within the sediment delivery distance (200' feet), newly constructed roads would primarily be constructed to provide access for forest thinning [logging] within the riparian reserve. In the action alternatives, this thinning [logging] would be limited to the outer zone of the riparian reserve." DEIS at 317.*

The BLM fails to quantify the amount of road to be constructed in Riparian Reserves or the amount of sediment that will be added to streams. The BLM neglects to disclose which streams in the planning area are currently TMDL listed for sediment and how the agency intends to meet its Clean Water Act obligations.

Please note that pages 332-335 of the DEIS indicate that the shade reductions and soil disturbance associated with Riparian Reserve logging will make "riparian habitats more susceptible to the introduction and spread of invasive plants" undermining BLM policy objectives for the management of invasive species and riparian habitats.

VII. BLM SHOULD RETAIN NWFP RIPARIAN RESERVES AND STANDARDS & GUIDELINES

We have two primary concerns with alternatives that modify streams buffers. First, the spatial extent of the buffers is reduced without any compelling justification. Second, the standards & guidelines governing activities in the buffers are weakened which will allow many activities to degrade the conditions that need careful conservation. We find no compelling rationale for either of these changes.

BLM claims that the riparian requirements under the no action alternative have conflicting objectives and that the action alternatives will increase certainty. This is inaccurate and misleading. The Northwest Forest Plan clearly prohibits timber harvest in riparian reserves. While it is true that the agencies have exploited some loopholes in that prohibition, that problem could be easily fixed with direction from BLM's state office. Contrary to BLM's assertions, the action alternatives actually increase uncertainty because most of the alternatives allow regeneration harvest in areas that are currently reserves, and they allow commercial logging in the outer portion of narrower stream buffers to achieve questionable purposes that will likely lead to conflict and controversy.

The DEIS fails to consider an adequate range of alternatives for riparian reserves. BLM should consider adopting wider stream buffers to meet several important policy objectives, including, but not limited to:

- Maintain and improve water quality;
- Maintain natural rates of wood recruitment both instream and adjacent areas that support terrestrial wildlife that live near streams;
- Provide high value habitat for spotted owls, marbled murrelets, and Pacific fishers that spend disproportionate time in lower slopes near streams;
- Increase old forest habitat to provide connectivity and support wildlife dispersal across the managed landscape;
- Provide habitat (including moderated microclimate and natural rates of wood recruitment) for numerous species that are not threatened & endangered;
- Provide greater assurance that salmon populations and water quality will be conserved;
- Provide carbon storage in highly productive streamside forests;
- Provide a buffer for increased climate extremes expected under climate change;
- Mitigate for amplified hydrologic cycle caused by climate change;
- Reduce landslide risk by encompassing a greater amount of potentially unstable lands;
- Protect of recreation and scenic values in areas where those values are high;
- Allow near stream forests to serve their natural functions including capture/store/release water, energy, sediment, carbon, nutrients, as well as provide unimpeded movement of wood, gravel, and organisms.

BLM should consider an alternative that retains the existing NWFP buffer widths with clarified standards & guidelines that limit active management to situations that provide clear net benefit to aquatic AND terrestrial wildlife, and do not retard attainment of ACS objectives.

BLM needs to compile and synthesize all the adverse impacts that are caused by reducing streamside buffers and increasing logging near streams, such as those listed above. Where effects are disclosed, the DEIS spreads these effect disclosures across numerous different sections of the DEIS, so the public and the decision-maker cannot see clearly all the public benefits that result from the simple requirement to maintain or increase stream buffers.

The DEIS does not address the original reasons for adopting wider buffers, nor provide a compelling alternative rationale for the proposed radical reduction of stream buffers. The Northwest Forest Plan adopted wider riparian reserves to meet a specific set of objectives that encompassed both aquatic and terrestrial wildlife and to mitigate cumulative effects. When an agency proposes to change course after making an important policy decision, the courts have consistently held that NEPA analysis must clearly explain the rationale for the change. This requires addressing the reasons for the original decision. The DEIS appears to lack any clear disclosure of the multi-faceted purposes of the riparian reserves and the diverse aquatic and terrestrial values that were intended to benefit from the adoption of wider stream buffers. The EIS needs to present the decision-maker with a clear picture of all the adverse impacts that will be caused by the choice whether to maintain or reduce stream buffers and whether to maintain or weaken rules protecting those buffers.

The Northwest Forest Plan explicitly adopted wider stream buffers for a variety of reasons that remain compelling to this day. BLM must not reverse the policy decision to protect wide stream

buffers absent a clear disclosure of a competing rationale and disclosure of the adverse effects of reduced protection for streamside forests. Oregon Wild has carefully reviewed and documented the original reasons for adopting wide stream buffers and Oregon Wild convincingly refutes all the rationales for reduced stream protection offered to-date. BLM must carefully review and respond to this analysis.[95] BLM is proposing to dramatically change the purposes of the riparian reserves in the Northwest Forest Plan from terrestrial AND aquatic purposes, to exclusively aquatic purposes. In making this change, BLM must carefully evaluate the original broad purposes of the riparian reserves, and provide a clear and compelling rationale for narrowing those purposes.

Most of the purposes of the wide riparian reserves adopted in the NWFP cannot be met by protecting forests elsewhere on the landscape. Simply put, meeting Recovery Action 32 is not a substitute for wide riparian buffers. Many of the purposes of the reserves are directly or indirectly connected to the unique slope positions and proximity to streams. For example, any amphibians are associated with streams but use habitat much farther than ½ to 1 site-potential tree distance from the stream. Narrow riparian buffers will have direct adverse effects on these amphibian species.

VIII. OTHER SPECIES RELY ON RIPARIAN AREAS

One of the key purposes of wide riparian buffers was to provide for dispersal of terrestrial organisms. This rationale has only increased in importance in the years since the Northwest Forest Plan was adopted.[96]

Spotted owls disproportionately use lower slopes near streams. Evidence indicates that spotted owls and barred owls are more likely to tolerate each other's presence in mixed hardwood-conifer forests near streams. These conditions often extent more than ½ to 1 site-potential tree distance from streams. Marbled murrelets disproportionately rely on nesting habitat near streams. Reducing stream buffers to ½ to 1 site-potential tree will shrink potential marbled murrelet nesting opportunities and expose marbled murrelet nest patches to next predation. Even wildlife that live within ½ to 1 site-potential tree still rely on protection of forests beyond that narrow buffer. Reducing stream buffers will expose their habitat to edge effects such as increase wind, increased temperature, reduced humidity, and reduced input of down wood which is in short supply as a result of past practices and which so many wildlife species rely on. This is why the authors of the NWFP saw a need for a buffer-on-the-buffer.

The DEIS does not disclose all of these significant adverse effects from reduced stream buffers. The DEIS analysis of riparian reserves does not address all the values provide by riparian reserves. The analysis focused exclusively on listed fish and water quality, but riparian reserves also provide value to non-aquatic species such as spotted owls and marbled murrelets and Pacific fisher, which spend disproportionate time on lower slopes near streams. Wide riparian buffers

[95] See Heiken, D. 2013. Riparian Reserves Provide Both Aquatic & Terrestrial Benefits - A Critical Review of Reeves, Pickard & Johnson (2013). https://dl.dropboxusercontent.com/u/47741/Heiken%202013.%20Review%20of%20Reeves%20et%20al%20Riparian%20Proposal.pdf.

[96] See Alexander K. Fremier. Leona K. Svancara, Michael Kiparsky, Dale D. Goble, Stephan Gmur, Barbara Cosens, Jocelyn Aycrigg, Frank W. Davis, Robin Kundis Craig, J. Michael Scott (2015) A riparian conservation network for ecological resilience. Biological Conservation 191 (2015) 29–37.

also meet the purpose and need to reduce fire hazard by maintaining more mature forest and less regeneration harvest that leads to hazardous fuel conditions. Wide riparian buffers also contribute to community stability by protecting important public values near streams and by constraining timber harvest that makes communities boom and bust. The DEIS analysis of the alternatives therefore fails to recognize all the important effects of the wide buffers in the no action alternative.

The DEIS fails to address the unique values of lands near streams. BLM treats all lands outside of their new narrow buffers as if they were interchangeable in providing habitat functions for spotted owls, marbled murrelets, and other wildlife. BLM is assuming that protecting old forest far from streams is equivalent to protecting habitat near streams. This is wrong. The no action alternative protects wider riparian buffers. These forests may appear to resemble upland habitat, but their proximity to streams makes them function differently, and the EIS needs to recognize this.

Reeves et al. admit that riparian reserves were established to provide "dispersal corridors for a variety of terrestrial organisms" and "[t]he boundaries of the Riparian Reserve were extended to a full site-potential tree height on all non-fish bearing streams … to provide additional support for non-fish organisms that use the area near streams as habitat or migratory corridors"[97] but their analysis never fully acknowledges the scope of the terrestrial wildlife objectives expected from riparian reserves, nor does their analysis show whether terrestrial objectives will be met if riparian reserves are systematically reduced as they propose.

Application of riparian reserves Scenario 1 throughout the range of the northern spotted owl was one of the key mitigations adopted to assure long-term viability of, not just fish, but a wide range of aquatic and terrestrial species. The EIS supporting the NWFP states: *[General Mitigation Measures] Application of Riparian Reserve Scenario 1 in the intermittent streams would benefit a wide variety of terrestrial and aquatic species by providing additional habitat. These species include the northern spotted owl, coho salmon, amphibians, small mammals, and some vascular plants. Connectivity of the ecosystem would also be improved.*[98]

The NWFP Record of Decision adopted Riparian Reserve Scenario 1 with the explicit intention to benefit: spotted owls, marbled murrelets, marten, red tree vole,[99] vascular plants, bryophytes, amphibians[100] (especially tailed frog, Van Dyke's salamander, clouded salamander, Del Norte salamander, black salamander, Cope's giant salamander, Cascade torrent salamander, southern torrent salamander[101]), bats,[102] birds, mammals, mosses, arthropods,[103] goshawk, fisher, bufflehead, harlequin duck,[104] 19 mollusks,[105] 12 species of lichen, 23 species of fungi,[106] and

[97] Reeves et al. pp 8 and 9.

[98] 1994 FSEIS p 3&4 – 49.

[99] 1994 FSEIS, Appendix B-11, p B-143 -145.

[100] 1994 ROD p B-13.

[101] 1994 FSEIS p 3&4 – 176; 1994 FSEIS, Appendix J2, p 45.

[102] 1994 FSEIS pp 3&4 – 186-187.

[103] 1994 FSEIS, pp 3&4 – 61, 81.

[104] 1993 SAT Report, Ch 5, pp 296-298, 304, 308—309, 310.

130 species that were subject to "additional species analysis" because of viability concerns and received mitigation in the form of wider riparian buffers).[107] Two of these benefited species - the spotted owl and marbled murrelet - were already listed as "threatened" under the ESA when the NWFP was approved. Since the NWFP was adopted, three additional benefited species are warranted (or likely warranted) for ESA listing (the Pacific fisher, the Humboldt marten, and the North Coast DPS of the red tree vole).

In upholding the Northwest Forest Plan Judge Dwyer said "*The federal defendants were bound by law, and by the obvious fact of species interdependence, to consider the survival prospects of species other than vertebrates."*[108] There is no new information available suggesting that the current buffers are not needed. In fact, there is some evidence suggesting that buffers should be extended to accommodate dispersal of wide-ranging amphibians over ridgetops.[109]

Reeves et al. devote a section of their paper (at pages 46-48) to address the terrestrial wildlife impacts of their proposal, giving five justifications for adopting smaller riparian reserves and why it will have "minimal" effects on terrestrial wildlife. All of their justifications are flawed.

Those flaws are described in detail in the following documents: Heiken, D. 2013. Riparian Reserves Provide Both Aquatic & Terrestrial Benefits - A Critical Review of Reeves, Pickard & Johnson (2013).[110] The DEIS does not address the voluminous evidence that riparian reserves like those in the no action alternative are irreplaceably important for spotted owls, marbled murrelets, and a variety of amphibians, as reported in Heiken (2013).

IX. RIPARIAN RESERVES CONTRIBUTE TO SPOTTED OWL CONSERVATION

The NWFP represents the "federal contribution to recovery" of the threatened northern spotted owl.[111] The NWFP relies on riparian reserves to provide benefits to spotted owls, including dispersal, connectivity, and demographic support. Reeves et al. dismiss the need to maintain riparian buffers for spotted owls because FWS' final critical habitat rule did not specifically incorporate riparian reserves. A more thorough review of the evidence shows that riparian

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[105] 1994 ROD p 38.

[106] 1994 FSEIS, Appendix J2, pp 20 – 23.

[107] 1994 FSEIS, Appendix J2; 1994 FSEIS, Appendix B11, pp B-143 – B-145. Martin Raphael. 2012. The Function of Riparian Reserves for Terrestrial Species – What Was the Intent? http://ecoshare.info/wp-content/uploads/2013/01/Raphael-buffers.pptx

[108] *Seattle Audubon Society v Lyons*, 871 F. Supp. 1291 (W.D. Wash. 1994).

[109] Science Findings, Issue 120 (February 2010) Linked in: Connecting riparian areas to support forest biodiversity, based on science by Kelly Burnett and Deanna Olson. http://www.fs.fed.us/pnw/sciencef/scifi120.pdf; and Olson, D.H., Anderson, P.D., Frissell, C.A., Welsh, H.H., Jr., and D.F. Bradford. 2007. Biodiversity management approaches for stream–riparian areas: Perspectives for Pacific Northwest headwater forests, microclimates, and amphibians. Forest Ecology and Management 246 (2007) 81–107.

[110] https://dl.dropboxusercontent.com/u/47741/Heiken%202013.%20Review%20of%20Reeves%20et%20al%20Riparian%20Proposal.pdf

[111] 1994 ROD p 15.

reserves are critically important for spotted owls, and increasingly so in light of new threats like the barred owl and climate change.

The 1994 Record of Decision for the NWFP explained the role of riparian reserves in conservation of spotted owls:

> ***Mitigation Measures Adopted*** *... The standards and guidelines of the selected alternative mitigate the impacts to plant and animal species and their interrelated ecosystems. The standards and guidelines for the land allocations of this decision will improve current conditions and alter certain past practices detrimental to late-successional species by protecting large blocks of remaining late-successional and old-growth forests, and by providing for the regrowth and replacement of previously harvested late-successional forest stands. ...*
>
> *... riparian reserves in particular mitigate timber harvest effects by providing for well distributed patches of late-successional forest that serve for dispersal of mobile species such as the northern spotted owl, and serve as refugia for species that disperse only short distances.*
>
> *... Another possible mitigation is that the rate of timber harvest in the matrix could be controlled (such as with the 50-11-40 rule) to provide additional dispersal habitat for spotted owls. This measure was not adopted, in part, due to the acreage of late-successional and other reserves well-distributed in the matrix ... this will protect larger amounts of nesting, roosting, and foraging owl habitat, which will be higher quality than what the 50-11-40 rule would have done (see Appendix G, part 3 of the Final SEIS).*[112]

A careful review of the available evidence shows that riparian reserves provide disproportionate value to spotted owls and they represent an integral part of the spotted owl conservation strategy adopted in 1994. New evidence reinforces the importance of riparian reserves.

Contrary to Reeves et al.'s assertions, the critical habitat rule and the recovery plan explicitly recognize the role of riparian reserves in owl conservation. FWS's 2012 proposed rule for revised critical habitat said "Riparian Reserves, Adaptive Management Areas and Administratively Withdrawn Areas can provide both demographic support and connectivity/dispersal between the larger blocks, but are not necessarily designed for that purpose."[113] And FWS's 2011 Revised Recovery Plan states:

> Riparian Reserves, Adaptive Management Areas and Administratively Withdrawn Areas can provide both demographic support and connectivity/dispersal between the larger blocks, but are not necessarily designed for that purpose. … Apparently in response to barred owls, some marked spotted owl site centers have moved higher up slopes (Gremel 2005). According to one study, "the trade-off for living in high elevation forests could be reduced survival or fecundity in years with severe winters (Hamer et al. 2007:764).[114]

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[112] 1994 NWFP ROD p 29-31.

[113] USFWS 2012. Proposed rule- Revised Critical Habitat for the Northern Spotted Owl. Federal Register Jun 1, 2012. http://www.gpo.gov/fdsys/pkg/FR-2012-06-01/html/2012-13305.htm

[114] USFWS 2011. Final Revised Recovery Plan for the Northern Spotted Owl. pp A-14, B-11.

Spotted owls spend disproportionate time in riparian areas and on the lower third of slopes. Robert Anthony recently provided input to an interagency process regarding thinning in riparian reserves and noted that spotted owls are associated with riparian areas, and that logging has negative effects on spotted owls and their prey:

> *Northern spotted owls are also associated with riparian areas, which is relevant to thinning of young forests in these areas (McDonald et al. 2006, Glenn et al. 2004). The association with riparian areas has been determined with the use of radiotelemetry studies of their movements and habitat use, which have shown that owls use riparian areas more than their proportional availability across the landscape. There have been at least three hypotheses proposed for the disproportionate use of riparian areas: (1) riparian areas provide more favorable thermoregulatory conditions (Barrows 1981); (2) prey species are more abundant in riparian areas (Carey et al. 1992 1999); and (3) fire severity has been lower in riparian areas resulting in the retention of structural complexity (Reeves et al. 2006). There is some support for all three of these hypotheses so they all likely have some influence over the use of riparian areas by northern spotted owls.*
>
> *... [M]any of the forest management practices (i.e., clearcuts, shelterwood cuts, heavy commercial thinning) used in the Pacific Northwest have had negative effects on spotted owls*[115]
>
> *... [I]t is safe to say that commercial thinning within the range of the northern spotted owl will have a negative effect on abundance of northern flying squirrels. Northern flying squirrels are the owl's primary prey by number and biomass throughout most of their range; consequently, there is little doubt that commercial thinning will have a negative effect on abundance of flying squirrels as prey for spotted owls. In addition, commercial thinning has negative effects on the abundance of red-backed voles (Suzuki and Hayes 2003, Manning unpublished data), which is also an important prey species for the owl.*[116]

The contractor's report supporting FWS' 2004 status review of the spotted owls found "owl locations were positively associated with proximity to riparian habitat..."[117] The SEI Report also said, "In the Klamath Province, more nests than random sites were on the lower third of slopes … "[118] Blakesly et al. (1992) found similar results in California: "Spotted owls also selected the lower third of slopes, used the middle third of slopes in proportion to their availability, and used the upper third of slopes less than expected …"[119]

Riparian stands may be particularly important to spotted owls in areas where old forests are uncommon, such as the BLM checkerboard of western Oregon. Glenn et al. (2004) said:

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[115] Forsman et al. 1984, Zabel et al. 1995, Buchanan et al. 1995, Hicks et al. 1999, Meimann et al. 2003.

[116] Anthony, R.G. 2013. Effects of Riparian Thinning on Marbled Murrelets and Northern Spotted Owls. Part III of the Science Review Team for the identification and interpretation of the best available scientific information to determine effects of riparian forest management. 28 January 2013.

[117] SEI Scientific Evaluation Of The Status Of The Northern Spotted Owl, Chapter 5: Habitat Associations, p 5-6. http://www.sei.org/owl/finalreport/Chapter5HabitatAssociations.pdf *citing* Irwin et al. (in press).

[118] SEI p 5-19, *citing* Hershey et al. (1998).

[119] Blakesly, Franklin & Gutierrez 1992. Spotted Owl Roost And Nest Site Selection In Northwestern California. J. Wildl. Manage. 56(2):388-392. http://www.fs.fed.us/psw/publications/blakesley/blakesley1.PDF

> *[N]est sites for owls at NCR [Northern Coast Range] and ESF [Elliot State Forest] generally were located within mature/old conifer forest or along conifer–broadleaf edges associated with riparian areas. … In areas of western Oregon where spotted owls occupy sites with little or no old conifer forest, we recommend that managers retain existing old and mature conifer forest, broadleaf forest, broadleaf forest edges, and forested riparian areas as owl habitat.*[120]

The NWFP expected riparian reserves to serve two main purposes for spotted owls – First, owls use high quality habitat in riparian reserves for movement of adults within and between territories, and for dispersal of juveniles between reserves. Second, riparian reserves provide "demographic support" for owls in the matrix, that is, the additional suitable owl habitat occurring in riparian reserves supports a larger owl population that is less vulnerable to extinction.

The riparian reserves were adopted in part as a replacement for the spotted owl dispersal standard known as the "50-11-40 rule" that pre-dated the NWFP. Riparian reserves were expected to maintain and develop late-successional habitat, and provide superior dispersal habitat (i.e., better than 11" dbh and 40% canopy closure).[121] Higher quality dispersal habitat means that owls can not only move safely through the landscape with protective cover from predators, but they can also find roosting sites that are protected from weather extremes, hunting perches, a prey base offering foraging opportunities, as well as nesting/breeding sites.

An addendum to the Biological Assessment for the NWFP states:

> *Owl dispersal requirements are believed to be met in Alternative 9 due to the cumulative benefits from a variety of land allocations and standards and guidelines which are not specifically earmarked as owl dispersal standards. The following are two [sic] the benefits which are expected to be the most important to assuring owl dispersal … .*
>
> *Riparian Reserve Scenario 1 results in an increase in the total acreage and the amount of owl habitat and murrelet habitat which would be retained along intermittent streams. This will have a greater effect in the provinces which have higher stream densities, as illustrated in the calculations below and the Aquatic Conservation Strategy discussion in Chapter 3&4. The larger acreage of protected habitat will increase the amount of dispersal and nesting habitat which will be retained throughout the owl and murrelet range.*
>
> *Riparian Reserve Scenario 1 will apply to Alternative 9 throughout the range of the northern spotted owl. This modification increases the acreage of Riparian Reserve along intermittent streams from one-half to the full height of a site potential tree. … The decision to implement Riparian Reserve Scenario 1 results in 3,233,100 acres of Riparian Reserves, which is an additional 638,000 acres (25 percent increase) over the Draft SEIS Alternative 9. … These Riparian Reserves will improve travel and dispersal corridors for*

[120] Glenn, Hansen, & Anthony 2004. Spotted Owl Home-Range And Habitat Use In Young Forests Of Western Oregon. Journal Of Wildlife Management 68(1):33–50. http://www.eddylsrproject.com/deis/B1/703-47%20Glenn%202004.pdf

[121] 1994 ROD p 29-31.

many terrestrial animals and plants, and serve as connectivity corridors between the Late-Successional Reserves. …

The standards and guidelines state that Riparian Reserve widths may be modified after completion of watershed analysis. That analysis will take into account northern spotted owl dispersal needs as well as other species that were intended to be benefited by this mitigation measure. There are two specific values in the application of Riparian Reserve Scenario 1 for spotted owl dispersal. First is the fact that the acreage reserved will be fairly evenly arranged across the landscape. This is important because of the documentation of juvenile spotted owl dispersal occurring in random directions. An even distribution of dispersal habitat is important, and this was one factor which lead to the development of the 50-11-40 rule. The second important feature is that the acreage reserved will have the potential both in the short term and in the long term to provide higher quality habitat than "11-40" conditions. The Riparian Reserves will have more complex forest structure and more dead and down, which will provide better roosting and foraging conditions than a strictly 11 inch dbh and 40 percent canopy closure stand would provide. This will increase its effectiveness in providing for owl survival during dispersal.[122]

David Wiens conducted intensive research on spotted owls in the Oregon Coast Range west of Eugene and found that:

Spotted owls and barred owls in my study selected foraging sites that were closer to streams than random locations, and the relative probability of selection decreased linearly with increasing distance to a stream for both species … . In my study area, small low-order streams were common in lower elevation riparian-hardwood zones and steep, narrow ravines in patches of mature and old conifer trees. Strong selection for habitats near riparian zones has at least 3 explanations. First, cool microclimates associated with stream drainages may be favorable for thermoregulatory purposes during hot, dry summers (Forsman 1976, Barrows 1981). Second, and perhaps more importantly, productive vegetation conditions near streams are likely to support a rich diversity of prey used by both owl species, including woodrats (Carey et al. 1999, Anthony et al. 2003), flying squirrels (Meyer et al. 2005, Wilson 2008), deer mice, and shrews (Verts and Carroway 1998). … A third reason that riparian areas were selected may be due to their complex canopy structures that resulted from past fires that burned less intensively along stream corridors than in upslope areas (Reeves et al. 1989, Kauffman et al. 2001). Such structures may provide good perching opportunities for hunting terrestrial or arboreal prey. … [123]

The 1993 SAT Report, which provided the genesis of the ACS, also offered evidence that riparian areas serve as source areas for small mammals which may serve as a prey base for spotted owls and other predators, stating:

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[122] 1994 FSEIS, Appendix G – Part 3 – Addendum to Biological Assessment. pp G-23 – G-24.

[123] Wiens, J. David. 2012. Competitive Interactions and Resource Partitioning Between Northern Spotted Owls and Barred Owls in Western Oregon. PhD dissertation. OSU. http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/28475/WiensJohnD2012.pdf

Many mammal populations are also dependent on riparian areas. Doyle (1986 and 1990) found that riparian areas in old-growth forests in the Cascades of Oregon were source areas for upland small mammal populations. Abundance of small mammals in coastal forests of Oregon were greatest within 300 feet of the stream, even though individuals were found up to 600 feet away (Gomez 1992). Chapter 5 of this document and USDI (1992) identify several mammal species that use or are dependent on riparian zones. Riparian corridors may also be important as dispersal, travel, and migratory routes for mammals (Gregory et al. 1991).[124]

X. RIPARIAN RESERVES HELP REDUCE COMPETITION BETWEEN SPOTTED OWLS AND BARRED OWLS.

Barred owls, native to eastern North American, have moved west and invaded the entire range of the northern spotted owl. When the NWFP was adopted in 1994, the barred owl was barely mentioned in the analysis. It was assumed that all suitable spotted owl habitat would be available to spotted owls and contribute to their conservation and recovery. Now barred owls occupy and defend tens of thousands (if not hundreds of thousands) of acres of suitable owl habitat that was assumed to be available for the recovery of the spotted owl. Barred owls and spotted owls use similar habitat, and there is significant dietary overlap between the two owls, though barred owls appear to be more generalists in both habitat and food sources.

The barred owl population appears to be growing, and there is no evidence that its population growth is slowing. To mitigate for this, suitable owl habitat needs to be conserved now more than ever. Protecting existing habitat in riparian reserves (and growing more habitat inside and outside reserves) helps increase the chances that spotted owls and barred owl can co-exist. Reducing stream buffers and increasing logging will just increase adverse competitive pressures and magnify the existential perils faced by the spotted owl.

There are two approaches being considered to address the new and significant threat posed by the barred owl: (1) grow more habitat, and (2) kill barred owls. These are not mutually exclusive. The first approach is to protect and grow more suitable owl habitat based on a well-known axiom of the "species-area relationship" from island biogeography which holds that as habitat area increases, the number of cohabiting species also increases.[125] Simply put, spotted owls are more likely to *co-exist* with barred owls if there is more suitable habitat, while local or regional *extirpation* is more likely if there is less suitable habitat available. The existing riparian reserves help protect and restore more suitable habitat and increase the chances of co-existence. Reeves et al. proposal for more logging in riparian reserves will mean reduced area of suitable habitat and greater likelihood of competitive exclusion.

Corroborating these ecological principles, Dr. David Wiens recent telemetry work shows that barred owls have a survival advantage relative to spotted owls in fragmented landscapes.

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[124] 1993 SAT Report, Chapter 5, pp 461-462.

[125] Oscar E. Gaggiotti and Ilkka Hanski. 2004. Chapter 14 - Mechanisms of Population Extinction. *In* Ecology, Genetics, and Evolution of Metapopulations. Elsevier. 2004. http://web.archive.org/web/20070612211945/http://www.eeb.cornell.edu/sdv2/Readings/Gaggiotti&Hanski.pdf. See also Martina Carrete, José A. Sánchez-Zapata, José F. Calvo and Russell Lande. Demography and habitat availability in territorial occupancy of two competing species. OIKOS 108: 125-136, 2005 http://www.ebd.csic.es/carnivoros/personal/carrete/martina/recursos/13.%20carrete%20et%20al%20%282005%29%20oikos%20108-125.pdf.

However, that survival advantage diminishes in landscapes with a higher proportion of older forest (as show in the figure below).[126]

This provides strong support for the continued conservation of mature & old-growth forest inside and outside riparian reserves because spotted owls are able to compete nearly equally with barred owls in landscapes with a high proportion of old forest. According to Wiens:

> *Survival of both species was positively associated with an increasing proportion of old (>120 yrs old) conifer forest within the home range, which suggested that availability of old forest was a potential limiting factor in the competitive relationship between the 2 species. When viewed collectively, my results support the hypothesis that interference competition with a high density of barred owls for territorial space can act to constrain the availability of critical resources required for successful recruitment and reproduction of spotted owls.*[127]

To address the need for additional suitable habitat and to reduce the adverse competitive interactions between spotted owls and barred owls, the FWS adopted Recovery Action 32 that recommends conservation of a *subset* of high quality suitable owl habitat in all federal land allocations. This is a step toward mitigating the effects of the barred owl, but we are not ware of any analysis showing that protecting just a subset of the highest quality habitat is adequate mitigation for all the suitable habitat occupied and defended by barred owls. An impressive groups of spotted owl experts are already calling for conservation of a more inclusive subset of high quality owl habitat.[128]

Even if the highest quality owl habitat in the matrix is likely to be protected under Recovery Actions 10 and 32, riparian reserves still serve an important role in owl conservation. Reeves et al.'s suggestion otherwise is unsupported for several reasons. First, FWS made the recommendation for conservation of high quality habitat knowing that riparian reserves were important for spotted owls and riparian reserves were already protected. Spotted owl conservation likely requires conservation of *both* high quality owl habitat and riparian reserves, not one or the other. Second, riparian reserves are disproportionately important to owl conservation in general, and barred owl mitigation in particular, as described below. Protection

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[126] Wiens, J. David. 2012. Competitive Interactions and Resource Partitioning Between Northern Spotted Owls and Barred Owls in Western Oregon. PhD dissertation. OSU. http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/28475/WiensJohnD2012.pdf. Wiens, D. 2012. Presentation to The Wildlife Society. http://tws.sclivelearningcenter.com/index.aspx?PID=6893&SID=163551 (at 1:12).

[127] Id.

[128] Eric D. Forsman, Robert G. Anthony, Katie M. Dugger, Elizabeth M. Glenn, Alan B. Franklin, Gary C. White, Carl J. Schwarz, Kenneth P. Burnham, David R. Anderson, James D. Nichols, James E. Hines, Joseph B. Lint, Raymond J. Davis, Steven H. Ackers, Lawrence S. Andrews, Brian L. Biswell, Peter C. Carlson, Lowell V. Diller, Scott A. Gremel, Dale R. Herter, J. Mark Higley, Robert B. Horn, Janice A. Reid, Jeremy Rockweit, Jim Schaberl, Thomas J. Snetsinger, and Stan G. Sovern. "Population Demography of Northern Spotted Owls." DRAFT COPY 17 December 2010. This draft manuscript is in press at the University of California Press with a projected publication date of July 2011. It will be No. 40 in Studies In Avian Biology, which is published by the Cooper Ornithological Society. http://www.reo.gov/monitoring/reports/nso/FORSMANetal_draft_17_Dec_2010.pdf

of high quality owl habitat outside of riparian reserves is not a replacement for conservation of riparian reserves.

David Wiens' recent PhD dissertation based on field research in the Oregon Coast Range provides strong evidence that riparian reserves are disproportionately valuable for reducing competition between spotted owls and barred owls.

> *Spotted owls' habitat selection shows a preference for riparian hardwoods (more than 4x greater than the non-forest reference), only slightly less than the owls' preference for old conifer forest (>5x). Furthermore, there is evidence that riparian forests may provide hope as an area where resource partitioning and niche segregation exists between the two owl species. That is, the diverse mix of food sources and habitat structures in riparian reserves appears to meet important needs of both species with less direct competition for resources. Finally, Wiens' telemetry work provides evidence that when spotted owls venture close to barred owls, their selection for riparian forests intensifies.*
>
> *Under the base [resource selection function] RSF for spotted owls, old conifer was >5 times as likely to be selected for foraging as the nonforest reference category (selection ratio [exp( )] = 5.3, 95% CI = 4.4–6.4), followed by riparian hardwood (4.3, 95% CI = 3.5–5.4), mature conifer (3.4, 95% CI = 2.8–4.1), and young conifer forest (1.9, 95% CI = 1.6–2.4). ... As proximity to a barred owl's core-use area increased, a spotted owl's affinity for old, mature, and young conifer forest types was gradually replaced by selection for riparian hardwood forest (Fig. 3.7). ... [S]potted owls spent a disproportionate amount of time foraging in steep ravines within patches of old conifer forest. Spotted owls in my study also showed strong selection for riparian-hardwood forest along low-order streams. ... My results also parallel those of Glenn et al. (2004), who reported that resource selection by spotted owls in younger forests of western Oregon was associated with hardwood (broadleaf) trees and riparian areas. ... Spotted owls and barred owls in my study selected foraging sites that were closer to streams than random locations, and the relative probability of selection decreased linearly with increasing distance to a stream for both species. ... The best model of resource selection indicated that spotted owls responded to an increased likelihood of encountering core-use areas of barred owls by decreasing the time spent in mature and old forest and intensifying use of riparian-hardwood forests. Additionally, I found that when spotted owls did enter a core-use area of barred owls they were located more frequently within riparian-hardwood forest than other forest types. ... Data on habitat selection and dietary composition suggested that riparian hardwood forests may be an important aspect of resource partitioning between the Species ... My results emphasize the value of older conifer forests, large hardwood trees, and moist bottomland riparian areas to resource partitioning between spotted owls and barred owls in the central Oregon Coast Ranges. ... My finding that older riparian-hardwood forests played an important role in niche segregation between the 2 species emphasizes the need to consider these forest*

conditions within a management context, as these forests are likely to promote a wide diversity of prey for both species …"[129]

XI. RIPARIAN RESERVES ARE IMPORTANT FOR MARBLED MURRELETS

Marbled murrelets are a threatened seabird that nest on large mossy limbs of mature and old-growth trees located within about 50 miles of the coast. Like spotted owls, marbled murrelets also depend disproportionately on lower slopes and riparian forests. FWS' 1997 Recovery Plan for the Marbled murrelet says "With respect to slope, eighty percent of nests in the Pacific Northwest were located on the lower one-third or middle one-third of the slope."[130] Hamer and Nelson (1995) show that the mean distance to streams from marbled murrelet nests in the Pacific Northwest is 159 meters.[131]

In California, Baker et al. (2006) found that marbled murrelet nest sites "were located closer to streams, had a greater basal area of trees >120 cm dbh, and were located lower on slopes than random sites based on analysis of variance models." Baker (2006) states:

> *We found that nest sites were much closer to streams than would be expected based on randomly available sites within old-growth forests. Nest sites may have been located near streams because these sites afforded murrelets better access from at-sea flyways. Studies have found proximity to streams or other openings to be important for murrelet nesting in other regions as well (Hamer and Nelson 1995, Meyer et al. 2004, Zharikov et al. 2006).*[132]

In British Columbia Burger & Chatwin (2002) found that "[f]orests bordering major stream channels provided high quality nest habitat for murrelets, with large trees, high epiphyte cover and many potential nest platforms. Detections of murrelets were also highest along stream beds …."[133]

Increased clearcutting within riparian reserves is in direct conflict with FWS' 1997 Recovery Plan for the Marbled Murrelet which recommends that mature forests within "secured areas" (such as riparian reserves) be protected so they can serve as future nesting habitat for the marbled

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[129] Wiens, J. David. 2012. Competitive Interactions and Resource Partitioning Between Northern Spotted Owls and Barred Owls in Western Oregon. PhD dissertation. OSU. http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/28475/WiensJohnD2012.pdf

[130] USFWS 1997. Marbled Murrelet Recovery Plan, p 32. http://ecos.fws.gov/docs/recovery_plans/1997/970924.pdf

[131] Thomas E. Hamer & S. Kim Nelson. 1995. Chapter 6: Characteristics of Marbled Murrelet Nest Trees and Nesting Stands. USDA Forest Service Gen. Tech. Rep. PSW-152. 1995. http://www.fs.fed.us/psw/publications/documents/gtr-152/chap6.pdf.

[132] Baker, L.M., Peery, M.Z., Burkett, E.E., Singer, S.W., Suddjian, D.L., And S.R. Beissinger. 2006. Nesting Habitat Characteristics of the Marbled Murrelet in Central California Redwood Forests. The Journal of Wildlife Management (70(4) 939-946. https://www.cnr.berkeley.edu/beislab/BeissingerLab/Steve'%20Publications/Baker_et_al_2006.pdf

[133] Burger, A.E., and T.A. Chatwin. 2002. Multi-scale studies of populations, distribution and habitat associations of Marbled Murrelets in Clayoquot Sound, British Columbia. Ministry of Water, Land and Air Protection Victoria, BC. March 2002. http://env.gov.bc.ca/wld/documents/techpub/mamuwebs.pdf

murrelet.[134] This recovery plan recommendation is not about *existing* high quality habitat, but about mature forests that can serve as future recruitment habitat. These 80-120 year-old maturing forests are precisely those targeted for logging in many recent policy proposals, such as the BLM Secretarial Pilots,[135] and the federal legislation proposed by Representatives DeFazio, Walden, and Schrader.[136]

XII. MAINTAIN BUFFER PROTECTIONS FOR WILDLIFE THAT LIVE NEAR STREAMS

Reeves et al. claim that new information shows that narrow buffers will adequately protect the microclimate needed to meet ACS objectives, stating:

A number of research efforts have examined the effects of forest management on microclimate in riparian areas since the ACS and the associated ecological function curves were originally formulated. … it has been suggested that a one tree-height buffer on fish streams should reduce potential impacts of harvesting in areas on the edge of the buffer on riparian microclimate and water temperature (Brosofske et al. 1997, Moore et al. 2005) (Figure 9b).

… With buffers of 49 ft or greater width, daily maximum air temperature above stream center was less than 1°C greater, and daily minimum relative humidity was less than 5 percent lower than for unthinned stands.[137]

Reeves et al. err by focusing on conditions at the *center of the stream* instead of conditions *throughout the buffers*. This is one of the most significant errors in Reeves et al.'s analysis. Riparian reserves are intended to protect numerous species that do not live *in* the stream, rather, they live in the stream-side forest extending hundreds of feet from the stream, but they still require a relatively cool-moist microclimate, complex forest structure, and abundant wood, and these species will be adversely affected by logging adjacent to narrower riparian reserves. This is part of the reason the NWFP adopted a *buffer-on-the-buffer*, that is, an outer buffer of shade and cover to maintain suitable microclimate conditions for wildlife that live in the inner buffer.

The EIS supporting the NWFP states:

> *Riparian areas are widely considered to be important wildlife habitat. Cool air temperatures due to the presence of cool and turbulent surface waters, typically dense vegetative canopy cover, and their location in the lowest portions of watersheds combine to maintain a distinct microclimate along stream channels and in the adjacent riparian*

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[134] USFWS 1997. Recovery Plan for the Marbled Murrelet. http://ecos.fws.gov/docs/recovery_plans/1997/970924.pdf

[135] Oregon Wild 2011. Scoping Comments on the Wagon Road and Roseburg BLM Secretarial Pilots. http://www.oregonwild.org/oregon_forests/forest-management/in-your-forests/files-for-eyes-on-the-agencies/Wagon_Road_and_Roseburg_Pilots_scoping_6-29-2011_BLM.pdf

[136] Oregon Wild 212. Problems and Pitfalls Associated with the Proposed "O&C Trust, Conservation, and Jobs Act" Version 1.3, June 5, 2012. http://www.oregonwild.org/oregon_forests/old_growth_protection/westside-forests/western-oregon-s-patchwork-public-lands/O-C_Trust_Act_White_Paper_FINAL_6-5-2012_w_DeFazio_response.pdf

[137] Reeves et al. pp 25, 26.

area. Maintaining the integrity of the vegetation in these areas is particularly important for riparian-dependent species of amphibians, arthropods, mammals, birds, and bats. Many species of amphibians, birds, and mammals use late-successional and old-growth riparian areas, including associated streams, ponds and wetlands, for reproducing, foraging, roosting, and as travel corridors (Table 3&4-11). The many wildlife species, along with lichens, mosses, vascular plants and mollusks, listed in Table 3&4-11 depend on diverse and complex riparian and aquatic habitats.

The principal factor influencing the outcomes for amphibians related to the width of Riparian Reserves.[138]

The NWFP anticipated regeneration harvest (modified clearcutting) on lands in the matrix outside of riparian reserves. The ongoing threat of regeneration logging is highlighted by recent efforts to increase regeneration harvest. The NWFP recognized that forest openings adjacent to a riparian buffer would create "edge effects" that change the microclimate in the buffer and reduce the recruitment of wood to the buffer. The NWFP addressed this problem by adopting a *buffer-on-the-buffer* so that at least the inner portion of the riparian reserves would have near-natural microclimate and wood recruitment processes.

Reducing the width of riparian reserves and increasing logging adjacent to the narrower buffer will expose sensitive wildlife such as amphibians, lichen, mollusks, red tree vole, and spotted owls, to unfavorable microclimate conditions and reduced levels of dead wood recruitment. This undermines the viability of numerous species that were specifically intended to benefit from the absence of edge effects in the inner buffer.

Reeves et al. recognize a "primary purpose for the extension of the boundary of the Riparian Reserve from one site-potential tree height to two on fish-bearing streams was to protect and enhance the microclimate of the riparian ecosystem within the first tree height …"[139] but they dismiss concerns about microclimate throughout the inner buffer by shifting the focus to microclimate conditions at the *stream center,* or at most 20 meters from the stream. This ignores the fact that many riparian species that were intended to benefit from the riparian reserves use habitat much further from the stream. The outer buffers were established in part to protect microclimate within an inner buffer extending up to 1 site-potential tree height from the stream, which notably protects only a portion of the habitat used by riparian associated species.

Reeves et al. rely on Olson et al. (2007)[140] to support the idea that narrower buffers may be adequate, stating:

Olson et al. (2007) reviewed studies of the effects of timber harvest activities, inside and outside of riparian buffers, on microclimatic conditions and amphibians. They concluded that relatively narrow buffers (compared to those of the Northwest Forest Plan) can be effective in maintaining microclimates 33-66 ft (10-20 m) from the stream center. Potential concerns about microclimate that could arise from reducing the size of riparian

[138] 1994 FSEIS pp 3&4 - 61, 3&4 - 81.

[139] Reeves et al. p 24.

[140] Olson, D.H., Anderson, P.D., Frissell, C.A., Welsh, H.H., Jr., and D.F. Bradford. 2007. Biodiversity management approaches for stream–riparian areas: Perspectives for Pacific Northwest headwater forests, microclimates, and amphibians. Forest Ecology and Management 246 (2007) 81–107.

buffers can be reduced further by minimizing clearcutting along the outer boundary (Moore et al. 2005, Anderson et al. 2007, Kluber et al. 2008). As mentioned previously, clearcutting is not part of the silvicultural strategy under ecological forestry—strategically placing aggregated retention patches during harvest should help ameliorate concerns here.[141]

Reeves et al. make several errors here:

- First, Olson et al. (2007) actually refer to buffers that maintain conditions "at stream center" and the microclimate that "*may* extend 10-20 meters." Reeves tries to make an uncertain statement seem more certain.
- Second, Reeves et al. ignore a very important caveat in Olson et al. (2007) which actually expresses a specific concern about the microclimate effects upslope beyond 10-20 meters from the stream center. Olson et al. state: "However, we have few data for predicting the countervailing spatial extent of upslope harvest influences on microclimates within buffers."[142]

- Third, riparian reserves are intended to protect many species that rely on moderated microclimate conditions extending more than 10-20 meters from the stream. The reduced riparian buffers advanced by Reeves et al. might maintain the microclimate at the *stream center,* or at most 20 meters from the stream, but the NWFP sought to protect the microclimate out to a distance equal to the height of a *site-potential tree*, often 60 meters.[143]
- Fourth, the variable retention harvest (VRH) advocated by Reeves et al. and Franklin & Johnson (2012)[144] is in fact a form of clearcutting (with small reserves). At the site scale, VRH likely creates "edge effects" that are indistinguishable from clearcutting.

A key issue is whether narrow buffers are adequate to protect wildlife, such as amphibians, that may be associated with streams, but also venture away from the water. The NWFP adopted wider buffers in part because many amphibians live up to 900 feet from water. The 1993 SAT

Report explained:

The abundance of amphibians in Pacific Northwest forest and riparian zones is influenced by habitat conditions in riparian areas (Bury et al. 1991, Gomez 1992). Amphibians populations are generally found less than 900 feet from water sources (Nussbaum et al. 1983). Gomez (1992) found that rough-skinned newts, tailed frogs, and western redbacked salamanders were the most abundant species of herptafauna in upland and riparian areas along the Oregon Coast Range. These organisms were found up to 600 feet from streams but were most abundant within 300 feet. Many species have

[141] Reeves et al. p 27.

[142] Olson et al. (2007) at p 98.

[143] 1993 SAT Report, Chapter 5, pp 461-462. See also Olson, D.H., Anderson, P.D., Frissell, C.A., Welsh, H.H., Jr., and D.F. Bradford. 2007. Biodiversity management approaches for stream–riparian areas: Perspectives for Pacific Northwest headwater forests, microclimates, and amphibians. Forest Ecology and Management 246 (2007) 81–107.

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

Table 3
Maximum distances away streams into upland forests at which Pacific Northwest amphibians have been found

Species	Distance (m)	Comments	Reference
RHKE/RHVA, ANFE, PLDU, PLVE, ENES, TAGR [ASTR, DITE]	30–40 m [20–30 m]	Time-constrained searches in quadrats 0–10, 10–20, 20–30, and 30–40 m from streams; 5–100+ year old conifer stands, 0 to 40+ m buffers, 1st–3rd order streams, Oregon; DITE, RHKE/RHVA, PLDU and ASTR found primarily at 0–10 m from stream, PLVE found primarily at 0–20 m from stream	Vesely (1996)
AMGR, TAGR, ENES, PLVE	55	Pitfall traps and cover boards spanning 5, 30 and 55 m from stream; 70-year-old conifer stands; British Columbia; more AMGR were captured at 30 m from stream than 5 and 55 m from stream; AMGR and TAGR moved more along streams than up or down slopes	Maxcy and Richardson (2000)
ASTR	65	Pitfall traps at 5, 25, 45, 65 m from stream; <5 and 80+ year old conifer stands; non-fish-bearing streams <3 m wide; British Columbia; no difference in capture frequency across distance from stream	Matsuda and Richardson (2005)
DITE	66, 22, 19	Radiotracking; forested, clearcut with buffer (20–30 m), and clearcut conifer stands; small strems 1–6 m wide; British Columbia; maximum distance from stream was 66 m in intact forested habitat, 22 m in clearcut, 19 m in buffered clearcut	Johnston and Frid (2002)
ASTR	100	Pitfall traps 5, 25, 50 and100 m from stream; 5- and 250-year-old conifer stands; headwater streams 1–3 m wide and fishless; British Columbia; mean distances from stream reported (adults: 28 m; juveniles: 17 m; males 23 m; females 17 m); frogs captured farther from streams in old growth than in clearcuts	Wahbe et al. (2004)
DITE, TAGR, PLVE, ENES, AMGR, ASTR, RAAU	~135	Pitfall traps, 10 × 10 grid across 135 m × 135 m; 40–50-year-old red alder stands; 2nd order streams, Oregon	McComb et al. (1993a)
ASTR, DITE, BAWR, PLDU, PLVE, RAAU, RHsp, TAGR	200	Pitfall traps at stream and 200 m upslope, 2 trans-riparian pitfall arrays with traps every 25 m; 5–200+ year old conifer stands, deciduous stands; 3rd–4th order streams, Oregon	Gomez and Anthony (1996)
DITE, TAGR, PLDU, PLVE, ENES, ANFE, ASTR, RAAU	400	Pitfall traps <10 and 400 m from streams, 2 trans-riparian arrays with traps every 50 m; 12–140 year conifer stands; 2nd–3rd order streams, Oregon	McComb et al. (1993b)

Species acronyms follow Table 2.

> *specific tolerance thresholds (e.g., temperature and moisture) microhabitat requirements (e.g., headwater seeps or talus slopes). Many also require downed wood, but may differ in types of wood (e.g., snag, bark on a log, or bark on the ground) or particular decay class of wood (refer to Chapter 5 more specific requirements of specific species). Alteration of microhabitat climate may influence the suitability of riparian conditions for riparian-dependent organisms.*[145]

Narrow buffers that maintain microclimate at the stream center are unlikely to protect temperature-sensitive species that live hundreds of feet from streams.

Reeves et al. offer an incomplete and misleading account of amphibian habitat use, saying "*Recent research by D. Olson of the USFS Pacific Northwest Research Station, found that most amphibians moved along the stream within 45 ft (13.6 m) of the channel."*[146] In reality there is abundant evidence from Olson and others showing that amphibian use habitat much farther than 45 feet from streams.

The results presented in Olson et al. (2007) do not justify any systematic reduction of stream buffers on federal lands. In fact, their findings strongly reaffirm the importance of the existing buffers, or even an expansion of buffers to promote connectivity between watersheds.

Recent recognition that **stream-breeding amphibians can disperse hundreds of meters into uplands** implies that connectivity among neighboring drainages may be important to their population structures and dynamics.

> *Microclimate studies substantiate a ''stream effect'' of cool moist conditions permeating upslope into warmer, drier forests. … Riparian areas may function as habitat for resident*

[145] 1993 SAT Report, Chapter 5, p 461.

[146] Reeves et al. p 28.

> *species and as corridors for transient species … [Amphibians] may be abundant upslope, and loss or degradation of upland forest habitat could disrupt population dynamics or affect persistence. … Questions persist about whether narrow buffers provide sufficient moderation of microclimate, habitat diversity, and transfers of energy and matter to support non-fish aquatic and riparian biota, particularly sensitive frogs and salamanders, whose abundance is often greatest upstream of fish-bearing waters and whose adult stages sometimes forage hundreds of meters upland from the immediate stream margin. … Many studies reveal pronounced decreases in the ability of amphibians to disperse as human alteration of landscapes increases, and survival of juveniles in such fragmented landscapes is often substantially reduced (see Cushman, 2006)*. These findings imply dramatic effects on immigration because dispersal in amphibians is thought to be primarily effected by juveniles rather than adults (e.g., Funk et al., 2005; Cushman, 2006). … [*L]ess intensive thinning harvests that retain a substantial proportion of the pre-harvest stand density and canopy cover have less impact on stream and riparian microclimates than do more intensive regeneration harvests. … Relatively narrow buffers … can be effective in maintaining stream center microclimate conditions and therefore the steep near-stream microclimate gradients that may extend 10–20 m from streams in intact stands (Anderson et al., 2007; see above microclimate discussion). However, we have few data for predicting the countervailing spatial extent of upslope harvest influences on microclimates within buffers. In general, our understanding of trans-buffer microclimate gradients must be improved by sampling at a higher spatial resolution with spacing among sensors sufficient to quantify non-linear trends across ecotones associated with both stream-buffer and buffer-upslope edges.*[147]

Evidence continues to show adverse effects on microclimate from logging near streams.

Reeves et al. recognize that "large wood is an important element of stream and river ecosystems"[148], however, Reeves et al. mislead when they assert that "[a]llowing ecological forestry in the outer half of the riparian buffers along non-fish-bearing streams is also unlikely to affect wood recruitment."[149] Reeves et al. fail to recognize that recruitment of wood is not just important for streams but also for terrestrial/upland ecosystems that were also intended to benefit from riparian reserves. Reeves et al.'s focus on clearcutting adjacent to narrow buffers and tree tipping into streams fails to recognize likely adverse affects on wood recruitment to terrestrial portions of the riparian reserves.

Many riparian species rely on unimpeded successional processes that accumulate abundant dead wood *near* streams, but not necessarily *in* streams. Logging within and adjacent to riparian reserves will capture mortality, truncate wood recruitment processes, and deprive wildlife of the abundant dead wood they need. Likewise, reducing stream buffers and allowing clearcut edges directly abutting inner riparian buffers will eliminate one source of down wood that would

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[147] Olson, D.H., Anderson, P.D., Frissell, C.A., Welsh, H.H., Jr., and D.F. Bradford. 2007. Biodiversity management approaches for stream–riparian areas: Perspectives for Pacific Northwest headwater forests, microclimates, and amphibians. Forest Ecology and Management 246 (2007) 81–107 (emphasis added).

[148] Reeves et al. p 14.

[149] Reeves et al. p 28.

otherwise fall into the buffer. Protecting an outer *buffer-on-the-buffer* helps maintain natural levels of wood recruitment at least within the inner buffer, though the outer buffer itself would still suffer from depleted dead wood levels due to edge effects.

The NWFP explicitly recognized the problem of reduced wood recruitment in narrow riparian buffers adjacent to logged sites. The 1993 FEMAT Report, an appendix to the EIS supporting the NWFP explained:

> *Large wood on the ground is an important habitat component in riparian areas. Maintaining the integrity of the vegetation is particularly important for riparian-dependent organisms including amphibians, arthropods, mammals, birds, and bats (see appendix V-E for greater detail).*
>
> XIII. RIPARIAN PROCESSES AS A FUNCTION OF DISTANCE FROM STREAM CHANNELS - LARGE WOOD DELIVERY TO RIPARIAN areas

Large downed logs are recruited into riparian areas from the riparian forests and from upslope forests. Similar to large wood delivery from riparian areas into streams, the effectiveness of upland forests to deliver large wood to the riparian area is naturally expected to decline at distances greater than approximately one tree height from the stand edge (Thomas et al.., 1993). Timber harvest adjacent to the riparian area creates an edge that eliminates one source of large wood. Thus, long-term levels of large wood may diminish in the riparian zone.[150]

Additionally, any proposal to protect buffers narrower than one site-potential tree will trigger concerns about wood recruitment to streams, and (depending on slope and aspect) could also degrade the riparian microclimate. Wood is recruited from the full site-potential tree buffer, plus unstable areas. Logging in those areas will capture mortality and reduce in-stream wood recruitment. Also, riparian reserves serve to mitigate for logging outside the buffers. Retaining untreated "skips" (such as riparian reserves) helps mitigate for the loss of snags and dead wood in logged uplands.[151]

OREGON DRINKING WATER PROTECTION PROGRAMS

The Oregon Department of Environmental Quality has spatially mapped drinking water surface source areas for Oregon.[152] We are specifically requesting that BLM analyze a higher protection standard for BLM lands within these drinking water source areas. For example, we recommend that Cave Junction and the Kerby Water District receive a higher degree of watershed protections and higher priority for restoration. A Cave Junction "Drinking Water Special Management Unit" would include the entire East Fork Illinois River watershed upstream of the highway 199 bridge where the City of Cave Junction water intake is located. The federal government invested more than $10 million to construct the City of Cave Junction water and sewage treatment systems in

[150] 1993 FEMAT Report, pp V-25 - V-26.

[151] Heiken, D. 2013. Riparian Reserves Provide Both Aquatic & Terrestrial Benefits - A Critical Review of Reeves, Pickard & Johnson (2013). https://dl.dropboxusercontent.com/u/47741/Heiken%202013.%20Review%20of%20Reeves%20et%20al%20Riparian%20Proposal.pdf

[152] http://www.deq.state.or.us/wq/dwp/swcountymap.html

the 1990s. That investment and the City water rights should be a high priority for protection. In addition the City of Cave Junction has complied with the US Environmental Protection Agency source water protection planning requirements. The City of Cave Junction holds two water rights to divert water from the East Fork Illinois River and serve domestic water to many businesses and 2,350 citizens who live in Cave Junction and Kerby. The Oregon DEQ has mapped the drinking water source area for Kerby and Cave Junction. BLM needs to make spatially explicit analysis of this and all Oregon DEQ drinking water source area maps.

Improved drinking water protection would entail the retention of NW Forest Plan Riparian Reserves with added emphasis on actions to filter out excessive nutrients caused by logging (e.g. phosphorus, nitrogen), filter out roadside use of herbicides, reducing pollutants from road runoff by decommissioning roads or disconnecting roads from stream channels., eliminating rampant off- road- vehicle use that often travel in and across stream channels, eliminating herbicides for roadside weed control, eliminating grazing and horse trails, reducing public road access to stream channels where motorized user dump trash and toxic materials (e.g. Logan Cut), halting mineral withdrawal to prevent the creation of additional toxic mine waste (e.g. Queen of Bronze mine in Takilma Area) and increasing law enforcement to prevent illegal marijuana gardens that use toxic materials (rodenticides) and excessive fertilizers.

We will not be satisfied with the all too often repeated rhetoric that "logging will meet all drinking water requirements." Management of BLM lands and streams must be designed to buffer the effect of ongoing private land pollution and not contribute towards cumulative non-point water pollution effects.

RECOVERY ACTIONS FOR SALMON AND OTHER FISHES

The Southern Oregon Northern California Coastal Coho Cecovery Plan provides recovery actions relevant for analysis in this DEIS. Modeling analysis must delineate critical coho habitat and the network of stream channels upstream of critical habitat that would affect critical habitat.

Circumstances have changed since the ACS was adopted in 1995 BLM RMPS. Coho salmon have been listed and critical habitat identified on BLM lands. The NMFS has deemed the existing ACS (no action alt.) as adequate to maintain and recover listed coho salmon. A recovery plan is final for Southern Oregon Northern California Coastal coho salmon, and a final plan is expected soon.

A huge body of monitoring and research demonstrate that the current ACS has been effective at protecting and improving both water quality and habitat for coho salmon. Any analysis for reduced riparian reserves need to factor in climate change that is likely to be first evident with exacerbated hot dry summers in the Medford District.[153] We provide the following recovery actions and analysis for coho salmon and other fishes that could become biologically threatened and need to be listed and protected.

[153] See Climate Change Report for Rogue Basin http://www.geosinstitute.org/climatewiseservices/completed-climatewise-projects.html

- The National Marine Fisheries Service has identified critical habitat for Oregon Coastal Coho salmon and Southern Oregon Northern California Coastal coho salmon. Spatially explicit identification of these critical habitats need to be integrated into analysis with a higher Riparian Reserve protection standard than non-critical habitat or unoccupied critical habitat. Analysis would need a watershed approach since all stream channels upstream of occupied critical habitat would also need a higher protection standard (e.g. Riparian Reserve land allocations, protections from logging, habitat enhancement, passage improvement, and sediment reductions from non-point sources such as roads, gullies, landslides, OHV use).
- Timber yield projections (p. 58) must be reduced due to landslide prone lands that are unsuitable for harvest due to sediment pollution risk to coho salmon or are uneconomical due to access costs and risks. This is especially relevant for the Medford District because of low productivity on steep lands and need for relatively high road miles to access the low volumes of timber (See Table 28 p. 127). The Medford District needs over a mile of new road for every 1.5 million board ft thinned.
- We recommend that one or more alternatives analyze retaining the existing ACS with more flexibility when implementing project level "buffers" within Riparian Reserve that contain occupied critical habitat of listed species such as coho salmon.
- Analysis of at least one action alternative must include the identification of "inner gorges" and "landslide prone areas" for inclusion within protective riparian reserves based on site-specific project analysis.
- Where feasible, large trees >20' dbh in the outer fish riparian reserve (150-300ft) would be cut or tipped and cabled yarded into the stream with logging equipment. The Medford District has been successful with this technique on Cheney Creek, a high quality coho stream in the Applegate River basin. Obviously, if these large trees in the existing fish riparian reserves (15-300ft) are logged (Alts A, B, C, D) they will never be available for enhancing fish habitat.
- Fire killed trees within Riparian Reserves would not be removed from the riparian reserve. Fire killed trees would be retained to provide shade and dead wood. Burned hazard trees in the riparian reserve would felled into the stream. These management techniques were successfully implemented with the Biscuit Fire decisions.
- Occupied critical stream habitat shall be withdrawn from mineral entry to expedite installation of wood/boulders, ensure retention of large wood placement and ensure protection of spawning gravel and riparian forests.
- Coho salmon migration barriers within project areas or along haul routes shall be removed through collaboration with other agencies, watershed councils, and private land owners.
- A list of coho barriers shall be developed with ODFW and the top barriers shall be removed each year beginning with the year after the ROD. The BLM shall enter into cooperative agreements (i.e. funding, technical expertise) to improve passage on private lands that affect BLM lands upstream.
- Pacific lamprey are declining on the west coast and have been petitioned for federal listing. The principal issue for them is passage of adults to spawning areas. Spatially explicit analysis is needed to identify priorities for retrofitting culverts to provide Pacific lamprey passage on larger streams.

- Sediment from roads within a project area shall be reduced through disconnecting the road runoff from the stream network, decommissioning roads, and preventing off road vehicle use.
- Illegal water withdrawals on coho or summer steelhead streams shall be investigated and returned to instream flow.
- Watersheds with coho spawning shall be reviewed for logging deferral due to cumulative impacts. For example, portions of the Evans Creek watershed on the Medford District were deferred from logging in the 1995 Medford RMP. Conditions remain severely degraded in portions of this watershed (West Fork Evans Creek) and the logging deferral needs to be reinstated.
- Identify a network of 5th or 6th field watersheds as key coho salmon/summer steelhead watersheds for priority restoration.
- Identify a network of 6th and 7th field coho salmon/summer steelhead spawning key watersheds for intensive sediment reduction. Roads would be storm proofed or decommissioned. Roads would be disconnected from the stream network. Grazing would be eliminated. Firman et al. 2012 found that coho salmon spawner abundance was correlated with lower road densities and lower grazing.
- Beaver dams create the highest quality coho salmon habitat. Existing and former beaver dams need to be identified and management directed to enhancing conditions for beaver and protecting beaver from persecution (Pollock et al. 2003).

1. The DEIS Does Not Provide Relevant Choices For The Decision Maker To Ameliorate Sediment Delivery To Critical Coho Habitat.

It is vital that the BLM prevent sediment delivery to coho critical habitat and identify one or more mandatory techniques that would substantially reduce chronic and episodic sediment delivery to streams. We recommend:

- Retain 2 tree height riparian reserves for occupied critical coho habitat. This would greatly reduce sediment from landslides and timber harvest, reduce road building adjacent coho critical habitat, and prioritize road removal/sediment abatement.
- Identify roads within 6th or 7th field coho spawning watersheds for sediment reduction by disconnecting the road from the stream network or decommissioning/obliterating roads.
- Prohibit OHV use in 5th field coho watersheds. Designate them as "closed" and prioritize law enforcement, physical barriers, signs, monitoring and outreach in these watersheds.
- Eliminate grazing along occupied coho critical habitat.
- Identify headwalls and unchanelled valleys as potential sediment delivery sources (i.e. landslide prone areas). Retain mature or older forests on these sites and prohibit road building across potentially unstable areas.
- Reduce or identify a relatively low ASQ for dry forests because due to low productivity it takes twice the number of road miles to obtain the same volume of timber as other districts.

2. Nutrient Loading

The BLM failed to address nutrient loading of streams due to logging. Modeling analysis with reduced (60 ft.) no cut buffers must disclose increased risk of nutrient loading of nitrogen and

phosphorus into streams that are released with logging activities. Many streams in the planning area exceed Oregon DEQ standards for nutrients.

Generally forest buffers of 100 ft or more are needed to retain mobilized nutrients. Adequate no cut buffers are particularly important in headwater streams because of their extensive linear network. There is no science to support narrower buffers in headwater channels subject to nutrient loading. Many streams in the planning area exceed DEQ standards for phosphorus (e.g. Sucker Creek on the Medford District). The issue is how best to keep nutrients retained in soils and not leached out to streams.

3. Medford District Riparian Reserves

Analysis is needed to address the special needs of streams and cold water fish in the Medford BLM District where the dry forest classification dominates. The Riparian Reserve analysis needs to reflect conditions (i.e., context as per NEPA) that warrant a high standard of protection to achieve desired outcomes.

- The Rogue Basin experiences naturally very high stream temperatures, low stream flows exacerbated by droughts, and frequent fires. These hostile factors for fish and water quality are best ameliorated in the long term with the existing Riparian Reserve widths.
- Climate change modeling indicates more heat and drought related stresses on Rogue River cold water salmonids, requiring the maximum protection (i.e. NW Forest plan ACS).
- The federally listed Southern Oregon/ Northern California Coastal Coho salmon Evolutionary Significant Unit in the Medford District is listed separately from the Oregon Coastal Coho ESU. This is important because the SONCC ESU Coho in the Medford District are at a much greater risk of extinction than the Oregon Coastal Coho ESU. Coho populations are much below desired levels and have been decreasing, resulting in the need for retaining a high standard for protection and restoration for at least the next ten years.
- Small cold water refuges created by groundwater make the 2 tree default riparian reserve advisable for occupied coho salmon and summer steelhead habitat.
- Retaining the existing Riparian Reserve standards for the Medford District would greatly simplify timber sale implementation across all forest designations. The Medford District has done a good job of implementing Riparian Reserve thinning and this would continue across all designations as determined by local conditions.
- The Medford District rarely needs to consult with National Marine Fisheries Service because the existing Riparian Reserve widths are known to be adequate to protect federally listed SONCC Coho salmon. Retaining the existing Riparian Reserve standards in the Medford District would ensure speedy timber sale implementation because no consultation with NMFS would be needed.

For the reasons stated above, we think it best for the "dry forest" Medford District to continue managing Riparian Reserves as they have in the past, which includes the judicious commercial thinning of second growth within the reserves based on extremely variable site specific

conditions that defy modeling. Bringing existing Riparian Reserve management forward into the DEIS as a preferred option would ensure a smooth and less controversial transition for changes with upland (dry) forest management (i.e. improved "certainty").

BUREAU SENSITIVE SPECIES AND SURVEY AND MANAGE

The BLM analysis relies upon the development of hypothetical future structurally complex older forests to offset the very real and **immediate** impacts associated with abandoning the Aquatic Conservation Strategy and the Survey and Manage program of the NWFP.

As indicated on page 683 of the DEIS, currently 28% of BLM forests are young stands that lack the wildlife habitat and hydrological values associated with older structurally complex stands. "Young forest habitat is the most prevalent type of habitat" actually present on BLM lands today. Page 684 of the DEIS goes on to acknowledge that when the private lands portion of the O&C checkerboard is considered, 45% of Western Oregon forests consist of young stands. Hence "the prevalence of young and stand establishment stands is greater in the decision area than average historical conditions."

Every BLM action alternative calls for an increase in clearcutting and plantation establishment in a landscape in which young stands already dominate the "timbershed."

Page 225 of the DEIS indicates that alternatives B and C would reduce the amount of structurally complex forests within one site potential tree of streams. *See also* Figure 3-52 and page 233.

Page 680 of the DEIS indicates that the BLM intends to rely upon projected increases in hypothetical habitat for Bureau Sensitive Species (BSS) and (former) Survey and Manage species rather than protecting the actual known sites where these species occur. Trading occupied actual habitat for hypothetical future habitat is arbitrary and capricious.

I. BLM HAS NOT PROVIDED A RATIONALE FOR ABANDONING SURVEY AND MANAGE MITIGATION.

The Northwest Forest Plan adopted survey and manage as mitigation for past and ongoing loss of habitat that are associated with old forests and adversely affected by logging and fragmentation. BLM appears to have adopted a very narrow purpose and need focused on recovery of ESA-listed species, to the exclusion of the NWFP goal of keeping wildlife off of the list. BLM must address the original purposes of the Northwest Forest Plan and must provide a compelling rationale for changing the core purposes of land management. BLM cannot avoid their duty to protect wildlife and avoid analyzing the effects of failing to protect wildlife.

BLM should not abandon core elements of the Northwest Forest Plan, including the survey and manage program, which courts have repeatedly said is important to meeting the goals of the Plan. One of the purposes of the Northwest Forest Plan was to restore a functional interconnected old growth ecosystem. Another purpose was to not only recover species currently listed under the Endangered Species Act, but also prevent new species from being listed. This involved an ecosystem approach to forest management.

Past management of BLM lands has caused severe fragmentation of habitat and substantial emissions of greenhouse gases. Fragmentation of habitat results in increased extinction risk for wildlife populations and these effects tend to be time-lagged. Global warming will compound these effects. It takes a long time to recover from this "extinction debt." BLM lands remain highly fragmented, and the atmosphere remains polluted with excessive greenhouse gases, so BLM has a duty to focus on species that may become endangered during the lag period, rather than just focus on the species that are currently listed under the Endangered Species Act. *See* Jens Kolk, Tobias Naaf. Herb layer extinction debt in highly fragmented temperate forests - Completely paid after 160 years?[154]

In the 1994 Northwest Forest Plan, protecting species diversity was considered an integral part of maintaining functional old growth forest ecosystems. To meet the underlying need for "*a healthy forest ecosystem with habitat that will support populations of native species (particularly those associated with late-successional and old-growth forests),*" the 1994 EIS considered various combinations of reserves and standards and guidelines that mitigate the effects of continued logging and other management activities.[155] In the framework of the 1994 FSEIS, the twin goals of viable populations and functional ecosystems are mutually reinforcing. "In many respects the test of providing a functional, interacting late-successional and old-growth forest ecosystem subsumes the test of viability for the system's component species and groups of organisms."[156] This is merely an expression of the well-recognized interdependence of species.

The structure and function of the historic landscape condition in this region was created by relatively high-productivity forests visited by infrequent large stand-replacing fires which created a landscape dominated by large blocks of old forest. This is the condition that more than 1,000 species evolved with, but this condition was highly fragmented and functionally destroyed by decades of industrial clearcutting. The NWFP sought to recreate something much closer to the conditions that species evolved with.

The authors of the Northwest Forest Plan recognized that establishing large reserves on a highly fragmented landscape is not enough to meet the goal of preventing new species listings. Until the historic pattern of large blocks of old forest can be restored, the survey and manage program is needed to avoid loss of rare and uncommon species during logging.

For decades prior to 1992, logging proceeded on federal forests in the Pacific Northwest without adequate consideration of the needs of species that are dependent upon late-successional and old-growth forest (LSOG). Logging plans were typically designed to disperse cutting units across the landscape in order to avoid acute effects in any one area, but the resulting habitat fragmentation caused widespread harm to virtually the entire forest ecosystem. In the 1993 FEMAT report and the 1994 FSEIS for federal forests within the range of the spotted owl, federal forest managers for the first time attempted to craft a plan that would maintain and restore a functional interconnected late-successional old-growth forest ecosystem that would provide for the needs of

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[154] *Biological Conservation* 182 (2015) 164-172 http://www.sciencedirect.com/science/article/pii/S0006320714004777; and Mark Urban. Accelerating extinction risk from climate change. SCIENCE 1 MAY 2015. https://www.sciencemag.org/content/348/6234/571.full.pdf

[155] 1994 FSEIS vol I p 1-4.
[156] FEMAT, p. II-36.

the spotted owl, marbled murrelet, Pacific salmon, and hundreds of other species associated with LSOG and aquatic ecosystems.

BLM's assertion that "*the distribution of structural stages in the decision area in 50 years would be within the range of the average historic conditions*" (DEIS p 680) is highly questionable. BLM needs to better explain why this conclusion differs from the NWFP. BLM also needs to consider the landscape perspective. Late successional forests are in such short supply on non-federal lands that BLM may need to provide greater than historic average levels of old forest on BLM lands in order to compensate for degraded conditions across the federal/non-federal landscape so that wildlife associated with old forests remain viable.

Conservation of BLM lands represents a rare opportunity to restore low elevation forests. Restoration of a functional interconnected old forest ecosystem, as intended by the NWFP, requires that forests are allowed to express their full range of development and such forests are represented across a wide range of different biophysical settings, such as high elevation and low elevation, valley bottoms and ridge-tops, northern latitudes and southern, moist western aspects and dryer eastern aspects. The NWFP recognized this by including a wide range of biophysical settings in a network of reserves. "*Lower elevation forests have been subject to more intensive forest management than higher elevation forests because a large portion of lands at low elevations are privately owned. Small fragments of old growth are the only remaining representatives of low elevation forests in some areas.*" [157] BLM lands in western Oregon represent a large amount of low elevation forests that have relatively high productivity and high biodiversity. More BLM lands should be allocated to reserves to conserve their high ecological values.

In 1993-94, the authors of the FEMAT and the NWFP FSEIS considered a range of alternatives and concluded that none of the alternatives would ensure attainment of a functional interconnected late-successional old-growth ecosystem within 100 years, because the reserves were so damaged by past management that they likely needed 200 or more years to regrow and recover.

> *During the next 100 years, none of the alternatives provides for a higher than 60 percent likelihood of reaching an outcome in which the quality and quantity of the overall late-successional ecosystem (as defined by the three attributes: abundance and ecological diversity, processes and function, and connectivity) would be at least as high as the hypothesized long-term average condition."*[158]
>
> *In general, high rates of logging, forest plantations, fire suppression, ownership patterns, and human population and environmental influences have altered the regional ecosystem on federal lands to the extent that none of the alternatives can provide for a return to conditions that closely match those of previous centuries. ... [N]one of the alternatives achieved a likelihood of 80 percent or greater for Outcome 1 for any of the individual attributes (see the FEMAT Report, Chapter IV, Terrestrial Forest Ecosystem Assessment). ... The results indicate that none of the alternatives had a 60 percent or greater likelihood of producing a late-successional and old-growth ecosystem with*

[157] 1994 NWFP SEIS, p 3&4-31.
[158] 1994 FSEIS p 3&4 – 43

attributes that approximate at least long-term average conditions (Outcome 1) over a timeframe of 100 years. This occurs primarily because 100 years is not long enough for cutover landscapes to return to late-successional conditions that approximate prelogging conditions. Many late-successional attributes require 200 to 500 years to develop."[159]

The ecosystem assessment shows that the likelihood of attaining a functional and interconnected late-successional and old-growth forest ecosystem in the next 100 years is reduced because some characteristics of terrestrial ecosystems will not be obtained for at least 200 years. Similarly, the Assessment Team expected that degraded aquatic ecosystems will not be fully functional in 100 years. [160]

In recognition of the current deficit of functional late successional forest and the continued risks faced by many late-successional species, the agencies added several mitigation measures, including survey and manage, to the preferred alternative in the Final EIS. The Survey and Manage program requires that the agencies search for and protect certain rare and uncommon species, resulting in the creation of many relatively small, but biologically valuable, protection buffers.

The 1994 FSEIS relied primarily on a network of large reserves to maintain a functional interconnected late-successional old-growth ecosystem.[161] "The reserve system is designed to be comprehensive, adequate, representative, and replicated." [162] However, there are two problems with reliance on reserves. First, there are "significant unanswered questions about the degree to which a reserve system designed spatially to accommodate vertebrate dispersal meets the needs of small organisms," [163]

The second problem with excessive reliance on the reserves is that "old growth forests tend to be distributed in a highly fragmented mosaic." [164] Before the reserves were established in 1994, they were significantly impacted by past logging and road building so the reserves are not currently capable of ensuring the persistence of all late-successional old-growth species.

As much as 40 percent of the Late Successional Reserves currently in young plantations were established for timber production. Typically, the plantations are densely stocked with young Douglas-fir trees, and are unlikely to follow natural stand development pathways toward late successional conditions. Consequently, late-successional forest development in these plantations may be retarded or may not occur at all. In addition, young plantations often increase the occurrence of human caused wildfires, as well as increase the rate of spread and extent of fire and other disturbances across landscapes. The presence of young plantations in Late-Successional Reserves, thus, may increase the risk of loss of intermingled late-successional forests."[165]

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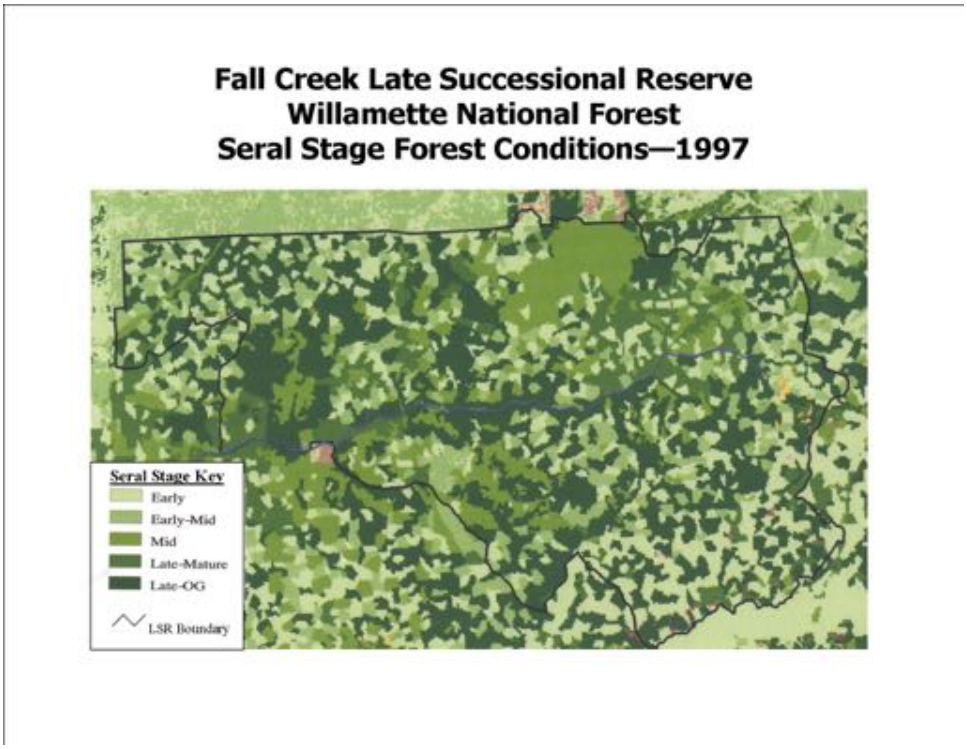
[159] 1994 FSEIS p 3&4 – 45
[160] 1994 FSEIS p 3&4 – 66
[161] 1994 ROD p 45. 1994 FSEIS vol I p 2-23. 2004 FSEIS vol I p 129
[162] 2004 FSEIS vol I p 129
[163] Perry et al. Sept 4, 2001 letter to the RIEC. See also 2004 FSEIS vol I pp 108-109.
[164] 1994 FSEIS vol I p 3&4-29.
[165] 1994 FSEIS vol I p 3&4-49. 2000 FSEIS vol I p 17.

So, the reserve system may not only be conceptually flawed for rare species with limited dispersal capabilities, but it is also non-functional for species that can disperse.

The current DEIS analysis is mostly limited to an projection of the abundance of various forest structural stages, while failing to fully consider other important attributes and indicators of ecosystem integrity. For instance, providing the historic *abundance* of structurally complex forests does not ensure support for healthy populations of wildlife if the habitat is fragmented and not arranged in an appropriate spatial pattern. BLM's analysis asks: "*What levels of habitat would be available under each alternative for [special status] species."* In the FEMAT report and 1994 FSEIS, "*The evaluation of late-successional and old-growth forest ecosystems is expressed as an expected likelihood of achieving long-term past conditions based on three attributes that characterize the quantity and quality of the ecosystem."*[166] Those three attributes are: (1) abundance and diversity, (2) process and function, and (3) connectivity.

II. AMOUNT OF LATE SUCCESSIONAL HABITAT IS INSUFFICIENT.

The current abundance of LSOG in the reserves is insufficient to provide a functional interconnected late-successional old-growth ecosystem, so any additional increment of LSOG outside the reserves (such as survey and manage buffers in the matrix) helps to provide important short-term functionality while the reserves regrow and recover from past logging. The following map of the 66,000 acre Fall Creek LSR clearly shows, with small light-green polygons, the fragmenting effect of past clearcutting. This LSR contains 44% late successional habitat, which is even more than the region-wide average for all reserves (37%).



[166] 1994 FSEIS vol I p 2-68.

III. DIVERSITY OF HABITAT IS IMPORTANT.

Diversity of habitat types is another important attribute LSOG considered by the 1994 FEIS. The survey and manage buffers help contribute to *diversity* simply because each one is in a unique location outside the reserves. Each physical location has a unique combination of geology, soils, slope, aspect, elevation, climate, and especially history of disturbance, therefore LSOG that is retained in different locations will represent a wider diversity of forest-types.

The scientists' Sept 4, 2001 letter to the RIEC says, "Species, species assemblages, and the genetic structure of populations may vary at relatively fine scales for small organisms (which account for by far the largest share of diversity), raising the possibility that each remaining older forest is to some degree unique in its biological structure."

Since survey and manage buffers retain LSOG outside of the reserves, the buffers protect different locations with different geophysical settings and different stand histories, and will thereby enhance the diversity of habitat types within the overall forest ecosystem.

IV. PROPOSED REMOVAL OF SURVEY AND MANAGE

All action alternatives remove the Survey and Manage measures that require the agency to survey for and protect sites of Bureau Sensitive Species when planning a site-specific logging project. The BLM is required pursuant to agency policy to "conduct[] evaluations of the distribution, abundance, population trends, current threats, or habitat for those species using available information." DEIS at 692.

As an initial point, the BLM is eliminating the survey and manage program which satisfied the agency's conservation duties towards these Bureau Sensitive Species. The BLM is eliminating these protections, but does not elaborate on the measures the BLM will take to satisfy their conservation duties. The BLM suggests that the reserve system being set up in WOPR will protect these species; however, this reserve system was not set up to benefit these species or takes into account these species whatsoever, because BLM plainly eliminates the goal of supporting viable populations of old-growth associated species from the WOPR revision. DEIS at 22. This is inadequate treatment of Bureau Sensitive Species.

Not all of these species react to forestry activities the same way the spotted owl does. For example, while thinning in reserves may benefit the spotted owl in the long run, thinning could extirpate many sensitive species from an area. The BLM needs to put a program in place to conserve and analyze impacts to Bureau Sensitive Species.

Also, the BLM's analysis of the vast impact of the removal of this program is woefully inadequate. First, the BLM claims that with complete and species specific surveys, the BLM could analyze the impacts to these species under the various alternatives, but says that the cost of conducting that analysis is too high to conduct all at once during this broad planning stage.

However, this is why Survey and Manage existed in the first place. The BLM has conservation and evaluation responsibilities towards these species, and the most effective way to meet this obligation was a project by project system of surveys, where project receipts would pay for the surveys. It is completely irrational for the BLM to assert that it cannot pay for surveys across the landscape, while also eliminating the only measure designed to mitigate that knowledge gap.

Secondly, the BLM should take into consideration the known sites of various species. The BLM states that for these sensitive species, the BLM will conduct evaluations of impacts to the species based on known information. Over the past two decades the BLM has surveyed for and discovered many known sites of various Bureau Sensitive Species. Those site locations and concentrations should be disclosed to the public in this NEPA process. The BLM could draw conclusions from the surveys conducted for these species concerning range, habitat, and distribution, because little is known about the range and distribution of these species. None of this analysis exists for any species with the exception perhaps of the red tree vole. Failure of the BLM to even attempt this analysis with the existing information it has from decades of survey efforts is a failure to take a hard look at the impact of removing these protections in the future.

Third, the BLM claims that the true analysis of the impact of removing protections for these species was conducted in 2004, the 2004 Final SEIS to Remove or Modify the Survey & Manage Mitigation Measure Standards and Guidelines. DEIS at 692. It incorporates that analysis here. There are several problems with this approach. First, the 2004 ROD and FEIS does not contemplate the various changes in the current alternatives with altering riparian reserve widths, altering the reserve system, altered protections for other late-successional species, like owls and murrelets. All of these changes render the analysis useless because all the underlying protection and buffer standards have changed. Further, there has likely been a lot of new information and significant changes that would render the baseline information in 2004 useless as well. Additionally, it is likely that the data concerning habitat and known sites that are over a decade old is now stale. It is plainly not accounting for the decade plus of surveys that have been conducted for all these species.

Additionally, the BLM cannot rely on a non-NEPA document to cure a lack of analysis in the present document. The 2004 ROD and FEIS, while it went through a NEPA process in 2004, the document was invalidated, DEIS at 692. Therefore, without a new decision on that NEPA document that analysis cannot be relied upon by connected later decisions.

As a final point, the BLM makes a massive faulty assumption regarding Bureau Sensitive Species in the DEIS. The BLM assumes that the habitat and sites of species that fall within the reserve system would receive protection. However, the BLM is permitting in the reserves various types of commercial timber harvest activities that downgrade or removal late-successional habitat. Without maintain the Survey and Manage program on reserve lands, the BLM cannot make this assumption. The BLM would also have to map out the location of every known sensitive species site in order to assure the protection of these sites on the reserves.

V. SURVEY AND MANAGE BUFFERS CONTRIBUTE TO THE FUNCTION OF LSOG FORESTS

The survey and manage species and buffers clearly contribute to the *function* of the LSOG forest, another important old-growth attribute considered in 1994. "Functions … refer to ecological values of the late-successional and old-growth ecosystem that (1) maintain or contribute to the maintenance of populations of species that use these ecosystems, …" [167] The survey and manage buffers contribute disproportionately to this attribute of forest ecosystems, because the buffers are not just randomly designated late successional areas; they are areas that have been surveyed and are known to actually harbor "populations of species that use these ecosystems," and not just any species, but rare and uncommon species that this forest plan was intended to protect. The presence of these rare and uncommon old-growth species is strong evidence that the survey and manage buffers contribute to the function of the old-growth forest ecosystem.

The 2000 and 2004 FEISs both recognize that if populations of survey and manage species are not maintained well-distributed across their native range there will be a "loss of normal biological function." [168]As a result of the 2004 ROD there are now 193 species that will have "insufficient habitat," resulting in some loss of biological function where those species are significantly reduced in population or no longer occur.[169]

The 1993 FEMAT Report also recognized the functional importance of many taxa included in the survey and manage program and the "broad benefits" of retaining even small fragments of LSOG in the matrix.

> *Although an important function of the Matrix is to provide for dispersal of organisms, perhaps of greater importance is the maintenance of organisms with key functional roles in the forest ecosystem. Taxa such as fungi, nitrogen-fixing organisms, and arthropods influence natural succession, nutrient cycling, and other ecosystem processes. Maintenance of populations of these organisms in the Matrix is essential to long-term forest productivity, as well as biodiversity.*
>
> *Old forest patches as small as only a few acres can also provide important refugia for sedentary organisms.... Lichens, fungi, bryophytes, mollusks, arthropods, vascular plants, and the less mobile vertebrates were consistently identified during the expert panel process as benefiting from even small fragments of old forest. Panelists consistently reiterated the important functional roles played by these organisms. Panelists highlighted the necessity of maintaining these organisms well distributed throughout the ecosystem, not just confined to reserves.*
>
> *Summary of mitigation measures having broad benefits*
> *(4) Retain small patches of late-successional or old-growth forest within the Matrix. These small patches can provide important habitat for arthropods, fungi, lichens, bryophytes, vascular plants, mollusks, small mammals, amphibians, and bats. Species*

[167] 1994 FSEIS vol. I p 3&4-37.
[168] 2000 FSEIS vol I p 191. 2004 FSEIS vol I pp 119-121.
[169] 2004 FSEIS vol I pp 124-125.

that are poor dispersers, narrow in their habitat requirements, have restricted geographic ranges and are sensitive to variation in microclimates will benefit most from retention of these patches of late-successional forest.
(6) Survey upland sites for rare, endemic, or sensitive organisms prior to any disturbance caused by management. Protect sites where these organisms occur (e.g. special habitats such as serpentine barrens, wetlands, rock outcrops).[170]

VI. CONSERVING SURVEY AND MANAGE SPECIES ENSURES THAT ECOLOGICAL PROCESS CONTINUE

Ecological processes are another important attribute of LSOG considered in the 1994 FEIS. Examples of ecological *processes* provided directly by survey and manage species include nitrogen fixation (by lichens), nutrient cycling (by fungi, arthropods, and mollusks), symbiosis (in which fungi provide water and nutrients to vascular plants, including virtually all the dominant trees species in the late successional forest, in exchange for photosynthate produced by the plants). Loss of survey and manage protections will lead to reduced benefits related to these processes.

The diversity of functions and processes represented by survey and manage species also enhances the resiliency of the entire forest ecosystem, which is particularly important in the face of climate change and other pressures. This resiliency value of biodiversity also refutes the assertion in the 2004 EIS that if survey and manage species are truly rare, then they must play only a minor role in ecosystem processes and functions.[171] As the climate changes, species that are rare today could become much more important tomorrow. Conserving survey and manage species helps ensure that ecological processes will continue under changing conditions.

VII. SURVEY AND MANAGE BUFFERS PROVIDE HABITAT CONNECTIVITY.

The survey and mange buffers provide important *connectivity* between larger fragments of suitable habitat. The 1995 FSEIS says "Connectivity is a measure of the extent to which the landscape pattern of the late-successional and old-growth ecosystems provides for biological and ecological flows that sustain late-successional old growth ecosystems and plant species across the range of the northern spotted owl." [172]

The current fragmentation of the landscape is not just *between* the reserves but also *within* the reserves themselves. The survey and manage buffers can be viewed as "stepping stones" that link larger patches of late-successional habitat wherever they occur. The added increment of connectivity provided by survey and manage buffers may be very important for enhancing persistence values while the fragmented forests recover.

The design of the Northwest Forest Plan includes large Late Successional Reserves, managed to protect LSOG habitat for species associated with LSOG, with intervening matrix areas, where

[170] 1993 FEMAT pp IV-186 to IV-190 (emphasis added).

[171] 2004 FSEIS vol II pp 207-208.
[172] 1994 FSEIS vol I p 3&4-38.

more logging is allowed. But the matrix is not a sacrifice zone. There are several standards & guidelines (including survey and manage) to ensure that the matrix plays a role in the ecosystem management scheme of the Northwest Forest Plan.

[F]orests in the matrix function as connectivity between Late Successional Reserves and provide habitat for a variety of organisms associated with both late successional and younger forests. Standards & guidelines for the matrix are intended to provide for important ecological functions such as dispersal or organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural elements such as down logs, snags, and large trees.[173]

Riparian reserves are also located between the LSRs, and, like the Matrix, they are intended to provide connectivity and dispersal. However, the riparian reserves, even more so than the LSRs, are highly impacted by past logging and construction of roads that follow streams, so they are not currently providing adequate connectivity. The objective is that 80 percent of the reserves will be covered with LSOG, but FEMAT estimated that the riparian reserves were only about 31 percent covered with medium and large conifers (versus 42% for the LSRs)[174]. While riparian reserves recover from past disturbance, the survey and manage buffers clearly help serve an important function for connectivity between the LSRs. The 2004 FEIS did not consider the benefit of survey and manage in this context.

Related to connectivity, there is concern for persistence of many species covered by the survey and manage program in part because of the species' limited dispersal capabilities.[175] The scientists' Sept 4, 2001 letter to the RIEC said, "Studies and modeling over the last few years suggest that many LSOG associates in the PNW may be limited more by dispersal than by the abundance of habitat per se, including species of lichens, bryophytes, mollusks, fungi, and invertebrates (Boughton 2001, Sillett et al. 2000). This implies that every remaining piece of suitable habitat becomes an important focus for eventual colonization of the surrounding landscape."

VIII. THE SURVEY AND MANAGE PROGRAM CONTRIBUTES TO KNOWLEDGE AND UNDERSTANDING.

Another "value-added" feature of the survey and manage program is the knowledge gains that contribute to the agencies' understanding of the ecosystem. This value was attributed to some other mitigation but also applies to survey and manage and has not been adequately recognized in the FEIS.

Many of the survey and manage species are included in the program because they are thought to be closely associated with late-successional old-growth forests, yet for some species little is known about their specific habitat associations and their specific role in a functional interconnected old-growth ecosystems.[176] The 1994 EIS said that "opportunities to enhance knowledge about ecosystem function and management in the Adaptive Management Areas of

[173] 1994 ROD pp B-1 to B-2.

[174] FEMAT pp IV-51, IV-54
[175] 1994 FSEIS Appendix J2.
[176] 1994 ROD p C-6

Alternative 9 actually increased the likelihood that this alternative would provide late-successional characteristics in the future." [177] A similar *knowledge-value* is provided by the survey and manage program which not only informs and improves the design of projects at the local scale through pre-disturbance surveys (2001 ROD p 15), but also includes a comprehensive program of strategic regional surveys designed to gain scientifically useful information about little-known, rare, and uncommon species.[178] 2004 ROD eliminates both pre-disturbance surveys and strategic surveys designed to increase knowledge. The objective of functional interconnected late-successional old-growth ecosystem will be reduced to the extent that future knowledge will not be generated by the survey and manage program.

The DEIS at 692 says:

> *...the information in the 2004 SEIS and 2007 SEIS does present analysis based on the incomplete survey information available that concludes that most Survey & Manage species would have sufficient habitat to support stable populations under the No Action alternative without the Survey & Manage measure. ... Compared to the No Action alternative, all action alternatives allocate more acres to the Late-Successional Reserve, which the Northwest Forest Plan expected to meet the needs of late-successional and old-growth related species.*

First, we find is very odd that BLM would attempt to tier to previous EISs that were found to be legally deficient by the courts. The analysis in the DEIS is just a few pages and does not address the flaws in those earlier EISs.

Second, the DEIS needs to take a hard look at species that would NOT have sufficient habitat. The fact that "most" species would have sufficient habitat does means that "some" won't.

Third, the DEIS needs to take a hard look at the consequences of increased logging in the reserves which is a likely result of weaker rules for logging in reserves. The standards & guidelines for LSRs allow far too much discretionary logging so the LSRs may not adequately protect rare and uncommon species (or listed species). This concern is amplified because riparian reserves are eliminated in LSRs. The action alternatives leave very little of the BLM landscape off-limits to logging. Subtracting structurally complex LSR, inner riparian zones, and congressionally reserves lands, leaves 63% of BLM lands open to logging under the preferred alternative.

2015 BLM RMP Analysis of what's open to logging

Open to logging	Acres	Not open to logging	Acres	
LSR	636,635	LSR that is structurally complex*	463,910	
outer riparian zone**	167,729	inner riparian zone	232,083	
HLB Low	77,384	cong reserved	40,537	
HLB mod	224,582	district reserves - not including road footprint*	187,926	
HLB uneven	274,199			
East Side Mgt Lands	151,885			
District Reserve Road Footprint**'	33,701			
Totals	1,566,115		924,456	2,490,571
Percentages	**63**		**37**	

[177] 1994 FSEIS vol I p 3&4-46. FEMAT p IV-72.
[178] 2000 FSEIS vol I p 330. The

Fourth, the DEIS needs to account for the increased uncertainty caused by climate change. Species may be less secure than previously assumed and more logging will cause greater risk to wildlife than assumed in previous analyses relied on here.

Fifth, the DEIS failed to take a hard look at the adverse effects on wildlife (including survey and manage species) caused by eliminating other key aspects of the Northwest Forest Plan, such as reducing protection for riparian reserves. The DEIS analysis seems to assume that survey and manage species are mainly dependent on the LSRs when in fact they are dependent on the combination of LSRs, riparian reserves, and other standards & guidelines (including the survey and manage requirements themselves). The matrix standards & guidelines for green tree retention, and down wood retention have significant benefits for wildlife. See 1994 ROD p 29; 1994 FSEIS, Appendix J2. The DEIS needs to clearly disclose the adverse wildlife effects of alternatives that remove these requirements. The EIS supporting the NWFP states:

> *[General Mitigation Measures] Application of Riparian Reserve Scenario 1 in the intermittent streams would benefit a wide variety of terrestrial and aquatic species by providing additional habitat. These species include the northern spotted owl, coho salmon, amphibians, small mammals, and some vascular plants. Connectivity of the ecosystem would also be improved.*[179]

The NWFP Record of Decision adopted Riparian Reserve Scenario 1 with the explicit intention to benefit: spotted owls, marbled murrelets, marten, red tree vole,[180] vascular plants, bryophytes, amphibians[181] (especially tailed frog, Van Dyke's salamander, clouded salamander, Del Norte salamander, black salamander, Cope's giant salamander, Cascade torrent salamander, southern torrent salamander[182]), bats,[183] birds, mammals, mosses, arthropods,[184] goshawk, fisher, bufflehead, harlequin duck,[185] 19 mollusks,[186] 12 species of lichen, 23 species of fungi,[187] and 130 species that were subject to "additional species analysis" because of viability concerns and received mitigation in the form of wider riparian buffers).[188]

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[179] 1994 FSEIS p 3&4 – 49.

[180] 1994 FSEIS, Appendix B-11, p B-143 -145.

[181] 1994 ROD p B-13.

[182] 1994 FSEIS p 3&4 – 176; 1994 FSEIS, Appendix J2, p 45.

[183] 1994 FSEIS pp 3&4 – 186-187.

[184] 1994 FSEIS, pp 3&4 – 61, 81.

[185] 1993 SAT Report, Ch 5, pp 296-298, 304, 308—309, 310.

[186] 1994 ROD p 38.

[187] 1994 FSEIS, Appendix J2, pp 20 – 23.

[188] 1994 FSEIS, Appendix J2; 1994 FSEIS, Appendix B11, pp B-143 – B-145. Martin Raphael. 2012. The Function of Riparian Reserves for Terrestrial Species – What Was the Intent? http://ecoshare.info/wp-content/uploads/2013/01/Raphael-buffers.pptx; See Heiken, D. 2013. Riparian Reserves Provide Both Aquatic & Terrestrial Benefits - A Critical Review of Reeves, Pickard & Johnson (2013). https://dl.dropboxusercontent.com/u/47741/Heiken%202013.%20Review%20of%20Reeves%20et%20al%20Riparian%20Proposal.pdf

BLM's DEIS fails to disclose the consequences of the fact that the old-growth forest ecosystem is currently non-functional. When such a high percentage of the historic amount of mature and old-growth has already been logged, protecting a high percentage of the small amount of remaining habitat does not ensure adequate protection. Likewise, including a high percentage of the forest plan area in the reserve system does not ensure adequate protection, because past logging has already affected such a high percentage of the reserves. Given the existing level of degradation, every acre of mature and old-growth forest is important. Acres with survey and manage species are even more important. Before cutting more of the remaining mature and old-growth forest, it is important to implement mitigation measures to protect species that contribute to the functionality of the overall mature and old-growth ecosystem.

Because the reserves are degraded and not fully functional and will remain so for the next century, the 1994 FSEIS considered, and the 1994 ROD adopted, a number of mitigations, including survey and manage, that will help maintain and restore some of the attributes of functional interconnected forest ecosystems and increase the likelihood that certain species will persist.[189]

The DEIS needs to disclose that Survey and manage buffers play a disproportionately important role in conservation of species because they are not randomly located, but rather they are (1) known to provide habitat for and be occupied by at-risk species and (2) they are located in areas that are threatened with immediate habitat modification.

The DEIS does not adequately disclose the ecological consequences of increased logging in the absence of the survey and manage program, nor does the DEIS explain how they expect to get rid of survey and manage now, after two courts have rejected prior efforts to eliminate the program. BLM must fully disclose the purposes of the program and provide a compelling rationale for abandoning it.

BLM cannot rely on the fact that a large fraction of the landscape is in reserve land allocation, when the old forests in reserves are highly fragmented and a large fraction of the reserves are covered by early and mid-seral forests that do not provide habitat for species of concern.

The scale of analysis makes the alternatives look similar, but this is misleading. At the site scale survey and manage makes a big difference. The 2004 Survey and Manage EIS clearly admits that implementing survey and manage "generally adds protection and reduces risk to species" compared to not doing it.

The DEIS fails to disclose that the Special Status Species Programs (SSSP) are far less protective than survey and manage. The scientific basis of these programs is weak. These programs are often under-funded and inconsistent. Special Status Species Programs give too much discretion to local managers causing inconsistent application and loss of occupied sites. BLM has far too much discretion (just in the fuzzy words) to make choices <u>not</u> to search for and <u>not</u> to protect SSSP. These program slack an "action forcing" mechanism, so the public will be unable to hold the agencies accountable for implementing the programs. Experience has shown that the agencies only act in the interests of wildlife when forced to do so. BLM and other federal

[189] See 2000 S&M FSEIS vol I pp 17-18. 2004 S&M FSEIS vol I p 17.

agencies are notorious for abusing such discretion and making choices in favor of timber extraction and against species conservation. The EIS should disclose the historical facts that lead Judge Dwyer to say in May 1991, that, "*...a deliberate and systematic refusal by the Forest Service and the Fish and Wildlife Service to comply with the laws protecting wildlife ...[demonstrates] a remarkable series of violations of the environmental laws."* [190]

"Site management" for SSSP is far less protective than for survey and manage species. BLM's approach to SSSP is to only protect high priority sites, but unlike survey and manage requirements, there are no consistent criteria or mechanisms to ensure that high priority sites are accurately and consistently identified and protected. The main difference between survey and manage and SSSP is the discretion SSSP affords local managers. This means that BLM's main expectation with the decision to eliminate the survey and manage program is to give local managers discretion to NOT conduct surveys and NOT protect sites. This means we are going from an accountable and consistent system to an unaccountable and inconsistent (i.e. arbitrary and capricious) system of species conservation.

> *Based on BLM Manual 6840, the BLM shall address Bureau Sensitive species (BSS) and their habitats in land use plans and shall implement measures to conserve these species and their habitats, to promote their conservation, and reduce the likelihood and need for these species to be listed under the Endangered Species Act." –DEIS page 680.*

The BLM DEIS largely ignores the binding direction to address and conserve BSS species in favor of a strategy that eliminates the Survey and Manage program, logs known sites, and relies on hypothetical future habitat to mitigate for the actual and certain loss of sensitive species from logging sites that they are known to inhabit.

The BLM presents no quantified analysis of the population levels or trends for any of the Survey and Manage species to be dropped from the program or the handful[191] that will be managed as BSS species. As disclosed on page 692 of the DEIS "there is incomplete and unavailable information relevant to the effects of the action alternatives on Survey and Manage species." What is certain is that the BLM intends to dramatically increase logging of known sites in the short term while relying on hypothetical future habitat. This strategy is not informed by actual species-specific population-informed data or analysis

IX. PACIFIC FISHER

As stated on page 703 of the DEIS the "BLM did not forecast population trends of fisher, because a quantified relationship between the specific number of individuals and the availability of habitat is unknown." This holds true for most BSS and S&M species. Yet the BLM is willing to conclude that hypothetical future habitat outweighs the impacts of refusing to look for, analyze, or buffer habitat for rare species in the planning area. This despite the fact that all of the action alternatives reduce denning habitat, resting habitat and total habitat for the first 10-20 years of implementation.

The fisher is likely to be proposed for federal listing during the RMP process. Management actions must be analyzed to protect and enhance specific habitat features critical to fishers.

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[190] http://clinton6.nara.gov/1993/07/1993-07-01-forest-background.html
[191] Only 5 of 28 current Survey and Manage Species are BSS species. DEIS 692.

Merely reporting generic fisher habitat types from various alternatives is necessary but fails to address needed conservation actions for specific habitat features (large denning trees, hollow logs, mistletoe trees, dense understory shrub, densely vegetated riparian reserves).

The Fish and Wildlife service is conducting a status review of the west coast fisher (78FR16828-16829) and a proposed listing is expected fall 2014. A 2012 update of fisher (77FR70010) states "*Existing regulatory mechanisms on Federal, State, and private lands do not provide sufficient protection for the key elements of fisher habitat, or the certainty that conservation efforts will be implemented or effective. The magnitude of threats is high as they occur across the range of the DPS, resulting in a negative impact on fisher distribution and abundance."* (Emphasis added) Thus, it would be prudent for the DEIS to analyze actual conservation actions to preserve and promote "key elements of fisher habitat" needing special management that would protect fishers and allow for them to increase abundance and range. A well-documented native fisher population is found primarily in the Medford BLM District.[192] A spatially explicit analysis is needed to identify lands with high habitat value as proposed, but analysis also needs to identify where specific conservation actions are needed. Some specific protections would be to protect all snags, live trees >32" dbh since these are used for denning and likely unavailable on most private timberlands. Fuels treatment projects are in conflict with fisher preferred habitat and spatially explicit analysis is needed to ensure that cumulative fuels treatment impacts do not harm fisher habitat. Fishers prefer undisturbed riparian areas. The robust riparian reserves in the no action alternative would best meet the needs of fishers and this conservation needs to identify for fishers. Current project level analysis simply assumes that project impacts are not important because there is abundant fisher habitat that is not being impacted. This is false and not scientific. Landscape scale spatially explicit analysis is needed in this RMP process to identify critical habitat for fishers for protection and enhancement of "key elements."

X. GOLDEN EAGLE AND BALD EAGLE

For the Golden Eagle, the BLM acknowledges that threats include "increased off-road recreation" [193] yet every action alternative includes more acres designated for ORV use while no analysis or data is provided regarding actual impacts to Golden Eagle populations and behavior.

The BLM analyzes impacts to the Bald Eagle at the entire planning level scale, and concludes that there will be "indistinguishable" differences between the action alternatives at this scale. Given that there are only approximately 250 thousand acres of nesting habitat on BLM lands, the BLM should be looking specifically at the impacts to these various habitat patches (older forest in close proximity to large water bodies). Merely concluding that there will be minimal differences at a scale of analysis taking into account millions of acres is inadequate under NEPA. Which sites will be logged, which sites will be retained? Does commercial thinning impact the species even if these sites are located in reserves? Please address these questions in the FEIS.

XI. BLACK-TAILED DEER AND ROOSEVELT ELK

[192] RMP Planning Criteria at 191.
[193] DEIS at 709.

BLM analyzes impacts of the plan revision process to deer and elk using early-seral habitat as a proxy for impacts to the species. BLM assumes that there is a need to increase early-seral habitat because ODFW has documented declines in deer populations across the state. DEIS at 676. To establish a proper baseline for analysis, the BLM instead needs to focus on deer population changes in the project area as opposed to state-wide. We are concerned that deer populations in the project area are stable, perhaps eliminating a need to create early-seral forests on BLM lands in the project area. Additionally, even though population numbers have declined since the 1980's we are concerned that this is an improper baseline for population analysis given the prevalence of clearcut logging in the years proceeding and programs to eliminate predators. In other words, deer numbers in 1979, might have been the highest in Oregon's recorded history, and do not necessary reflect an accurate or ecologically appropriate number of deer for the state and project area. Please develop a more accurate baseline for modeling and interpretation.

XII. WOLVES

Wolves are wide-ranging predators that can exist in a wide variety of habitat types. They are habitat generalists in terms of terrain and vegetation (Boyd 1999, Oakleaf et al. 2006). They are not wilderness dependent, but their survival depends on the availability of cover and relatively secure areas that allow them to avoid humans and escape persecution (Carroll et al. 2003). To successfully inhabit an area they require a year-round prey base of wild ungulates (Boyd et al. 1994, Fritts and Carbyn 1995). Deer, elk, beavers, wild turkeys, marmots, and other small mammals are probably preyed on also.

Because wolves are wide-ranging, disturbance and effects to the species will occur across BLM lands as the species continues to move west and south. Effects could occur during project activities from noise, road building, timber felling, yarding, hauling, smoke (prescribed fire), and increased human activity and presence. Additionally, effects will also be seen by grazing allotments.

Gray wolves are sensitive to road associated factors. (de Vos 1948, Mech et al. 1988, Thurber et al. 1994, Paquet and Callahan 1996, Boyd and Pletscher 1999). For gray wolves, both Mech et al. (1988) and Thiel (1985) found that when road densities exceed about 1 mi/mi$_2$, wolves avoided or were displaced from areas. Mladenoff el al. (1995) found that road density was the major predictor of wolf pack location. Jensen et al. (1986) reported that road densities >0.6 km/km$_2$ were apparent barriers to wolf dispersal. Wolves have also been documented to be killed by collisions with vehicles (Gibeau and Heuer 1996, Paquet and Callahan 1996).

The BLM needs to develop standards to ensure that road densities in the forests it manages remain below road densities over 1 mi/mi$_2$ or manage areas over this road density to prevent any new road construction temporary or permanent. The BLM in its DEIS failed to consider this issue at all, and a failure to do so is a failure to take a hard look at the issue under NEPA.

Specifically, to conserve complete arrays of species and associated ecological interactions, management schemes must consider the density of roads. Road densities greater than 1 mi/mil are considered detrimental to wolf and elk populations Qensen et al. 1986). Wolf pup survival rates indicate that wolves may tolerate road densities higher than 1 mi/mi2 if extensive roadless regions exist adjacent to wolf territories (Mech 1989). But road densities within much of eastside forests exceed 2.5 mi/mi2 (e.g., Colville and Winema National Forests), and remaining roadless regions are quickly disappearing. Protection of terrestrial vertebrates, as well as fisheries resources, requires a moratorium on road building plus efforts to remove existing roads. Henjum, M.G., J.R. Karr, D.L. Bottom, D.A. Perry, J.C. Bednarz, S.G. Wright, S.A.Beckwitt and E. Beckwitt. 1994. Interim Protection for Late-Successional Forests, Fisheries, and Watersheds: National Forests East of the Cascade Crest, Oregon and Washington. A Report to the Congress and President of the United States by the Eastside Forests Scientific Society Panel.

Pups are born at a natal den in spring (generally mid-to late April) and remain there with their mother for about 2 months (Mech 1970, Boyd 1999). During this time any disturbance that results in the female leaving the den may expose the pups to predation or inclement weather. The sensitivity of females to human disturbances at den sites varies greatly among individuals (Boyd 1999). Due to the potential disruption of breeding as a result of human activity associated with any timber harvest, hauling, or road construction activity, these activities and any other activities that could cause disruption should be restricted from April through June. BLM failed to take a hard look at this issue in violation of NEPA.

Wolves are also impacted by grazing activities and grazing allotments. There are 3 potential effects of the proposed grazing activities on gray wolf:

1) Cattle presence on the allotment could displace deer, the primary prey of gray wolves in this area, and thus cause wolves to move to other areas to hunt. Studies have found that deer either moved or changed their use patterns when cattle were turned into allotments (Mackie 1981). Wolves are wide-ranging predators that have been known to travel more than 20 miles away from a den or rendezvous site while hunting (Mech and Boitani 2003). Cattle use of the allotment may result in wolves having to travel further to hunt deer.

2) Human management of the grazing allotment; eg. maintaining fences and water developments, placing salt, moving cattle, looking for cattle, may disturb gray wolves that may be in the allotments. Human disturbance at natal den or rendezvous sites may result in abandonment of the sites (Fritts et al. 2003, Frame et al. 2005).

3) The possibility of livestock/wolf interactions that would result in wolf control actions. Although wolves normally prey on wild ungulates or other wild animals, they sometimes attack and kill livestock or other domesticated animals. Livestock depredation by wolves is difficult to predict and seems to be influenced by many factors. Newborn livestock in remote

places are more vulnerable than larger, older stock that are kept closer to humans, and leaving livestock carcasses out and available for scavenging may increase the risk of wolf depredation (Fritts et al. 2003). The proximity of livestock to wolf homesites can also be a factor in determining the potential for wolf to depredate on livestock (Stone et al. 2008).

The BLM needs to develop conservation measures for its grazing allotments that will deter, wolf-livestock conflict and reduce the need for lethal control actions. This should include, livestock carcass and bone pile removal from allotments, retirement of allotments near rendezvous or den sites, elimination of attractants for livestock near any den sites or rendezvous site, and active implementation of non-lethal techniques to deter conflict when necessary. Please take a hard look at these issues in the FEIS.

XI. RED TREE VOLE

Under the former management mandate (2001 ROD), vole surveys were required pursuant to the species Survey Protocol (now 3.0) and any sites discovered were required to be managed pursuant to the species Management Recommendations (2.0). There was a frequently used exception for pre-disturbance surveys in thinning projects in stands under 80 years old (Pechmann Exemption). WOPR greatly reduces these protections in all alternatives, completely eliminating the vast majority of the species range (all habitat south of Highway 20) from any survey or management regime.

The DEIS contains no analysis or disclosure regarding the impacts of the proposed actions on Red Tree Voles occurring outside the Northern Oregon Distinct Population Segment. What are the population levels and trends for Red Tree Voles (RTV) elsewhere in the planning area? How will genetic connectivity be assured? How many known active RTV sites will be logged? How many RTV will be harmed by such logging?

> *"Since every RTV site in the NOCDPS is a critical for persistence, the lack of provisions for pre-disturbance surveys and known site protection under alternatives A and C would negatively affect the species." DEIS at 738.*

Pages 738 and 744 of the DEIS indicates that Alternatives A and C would negatively affect the species by logging 136 of 383 known sites. Given the acknowledgment that "every RTV site in the NOCDPS is critical for persistence" of the species, the contention on page 744 that the BLM is unsure if such logging would contribute to the need to list the species under the ESA is in error.

A spatially explicit analysis for managing the red tree vole is needed on the entire planning area to assure abundance/distribution for its viability and as an important food source for northern spotted owls and other predators.

The simplistic modeling based on Huff et al 2012 is not adequate and the BLM needs to use Dunk and Hawley. The federal register notice for listing the north Oregon coast red tree vole states:

> *The most comprehensive analysis of current red tree vole habitat conditions specific to the North Coast Range DPS is a report by Dunk (2009, entire). Dunk (2009, p. 1) applied a red tree vole habitat suitability model (Dunk and Hawley 2009, entire) to 388 Forest Inventory Analysis (FIA) plots systematically distributed on all ownerships throughout the DPS (the FIA is a program administered by the USDA Forest Service, and is a national scientific inventory system based on permanent plots designed to monitor the status, conditions, and trends of U.S. forests).*[194]

Certainly the BLM has access to similar plot information identified by the Fish and Wildlife Service to conduct recommended analysis. We are particularly concerned about habitat fragmentation and decreased abundance due to proposed heavy thinning on the Medford District that would space mature trees to the extent that red tree voles would be locally extirpated (e.g. 40% canopy for spotted owl dispersal habitat). Management for abundant and continuous distribution of red tree voles needs to be spatially linked to management for northern spotted owl recovery.

Sites in Reserves: In the WOPR analysis of effects to red tree voles, the BLM forecasted effects to the species by "applying observed detection rates and mean size of occupied stands against acreage of habitat in the Harvest Land Base" and "assumed all sites would be protected in reserves." However, there is no requirement it appears from the management objectives and actions that surveys be conducted in reserves for red tree voles when activities are planned that could remove red tree vole habitat.

Any timber harvest activities in reserves will remove and displace voles. "Continuing timber harvest in younger forest areas adjacent to remaining patches of older forest diminishes the habitat quality of these stands by maintaining them in an isolated and fragmented condition that may not allow for persistent populations of red tree voles." Federal Register /Vol. 76, No. 198 /Thursday, October 13, 2011 / Proposed Rules 63735. Thinning younger stands occupied by tree voles can reduce or eliminate voles from these stands (Biswell 2010, pers. comm.; Swingle 2010, pers. comm.), and Carey (1991, p. 8) suggests activities that result in rapidly developing (changing, unstable) younger forests are a limiting factor for red tree voles. *Id.* at 637-38.

If the BLM wants to make the assumption that all vole sites are reserved in its analysis, all timber removal activities in the reserves should require full and complete red tree voles surveys, and the adequate protection of these red tree vole sites. *Id.* at 637-38. This should include protections of large blocks of habitat not just isolated patches of older forests created by the current Management Recommendations because the FWS's "evaluation of the remaining older forest patches within the DPS indicate they are likely insufficient to sustain red tree voles over the long term due to their relatively small size and isolated nature." *Id.* at 637-38.

Non-high priority sites: Although the baseline No Action Alternative takes into account the 2001 ROD, it does not mention or consider the "Non-High Priority" process that has designated many acres of existing red tree vole sites as non-high priority and cleared them for

[194] 76FR63724

logging. Not factoring in this option would allow the BLM to selectively log certain new red tree vole sites and it overlooks an option existing land managers had under the NFP. Its availability could influence the BLM's decision to eliminate Survey and Manage for red tree voles in most of the alternatives. Please disclose the amount of acres that have been designated or are proposed to be designated non-high priority. The BLM should develop an alternative that uses the survey and non-high priority approach to managing sites in the Harvest Land Base. Further surveys would contribute to a greater understanding of this imperiled species and inform future management and recovery decisions, not to mention the listing status of the species.

Additionally, will it be possible for the BLM to use the non-high priority process north of highway 20? This is not clear.

Need to List the Species: Based upon the findings of the FWS's Warranted but Precluded Findings for the North Coast Oregon DPS of the red tree vole, any reduction in federal vole protections will result in threats to the persistence of the species, and a potential need to list the species. The North Oregon Coast DPS extends north of the Siuslaw River to the Columbia, and the FWS concluded "that the ongoing effects of the destruction, modification, and curtailment of its habitat, in conjunction with other factors described in this finding, pose a significant threat to the persistence of the North Oregon Coast DPS of the red tree vole." FR 63740.

"Clearly, existing and projected amounts of older conifer forest habitat conducive to red tree vole persistence are less than the amounts projected to have occurred historically and with which tree voles have evolved. High-quality older forest habitat remains in isolated fragments, most of which are too small to support tree voles, and are so widely separated as to be likely well beyond the dispersal capability of the species. Unlike historical conditions, which were highly stochastic, these changes are likely to be permanent. Based on our analysis of best available information, we conclude the remaining high-quality habitat within the DPS is likely insufficient to support red tree voles over the long term, and persists in a fragmented and isolated condition that renders local populations of red tree voles vulnerable to extirpation or extinction through a variety of processes, including genetic stochasticity, demographic stochasticity, environmental stochasticity, and natural catastrophes." FR 63754.

Based on these conclusions by FWS, any reductions to protections to the species will contribute to the need to list the species. This is particularly true because "red tree voles are afforded more protection on Federal lands than on State Forest and private lands within the DPS, primarily as a result of the Survey and Manage protections" *id,* and every BLM DEIS Alternative aside from the no-action alternative removes Survey and Manage protections, or reduces these protections dramatically. Based on the WPB findings by the FWS, the BLM should have developed an alternative that set aside specifically large blocks of habitat in areas critical for red tree vole persistence, dispersal, and genetic connectivity. The BLM did not develop any alternative to this regard and did not analyze these issues at all.

Further, the BLM DEIS assumes a large number of sites will be treated as non-high priority, this was not the understanding of the FWS that concluded "all sites on Federal land within the DPS are considered high-priority sites with the exception of 198,000 ac (80,130 ha) of the southernmost portion of the DPS (primarily located within the Siuslaw River drainage)."

Undermining survey and manage protections and the high-priority treatment of vole sites will lead to threats to the species persistence within the North Oregon Coast DPS, not just the area north of Highway 20.

XII. BLACK BACKED WOODPECKER

Spatially explicit analysis is needed to identify expected areas of snag shortages over the entire landscape. Snag retention standards are needed for black-backed woodpeckers. Adjacent industrial private timber management produces virtually no snags.

Post fire forests that are aggressively clear-cut do not provide habitat for the Black Baked Woodpecker. Numerous mammals, birds and amphibians are dependent on snags and down wood. Fishers, black-backed woodpeckers and other future candidates for federal listing need active management to assure snag habitat is protected or artificially created. The BLM needs to reconsider assumptions about stand replacing fire regimes and treatments to reduce high intensity fire (Odion et al. 2014). Standards for snag retention during post fire logging are needed to assure viability of snag dependent animals currently in decline (e.g. fishers, black-backed woodpecker, olive sided flycatcher). Areas with existing or modeled snag shortages would be candidates for snag creation where unwanted competing trees exist within outer Riparian Reserves. There needs to be systematic active management to maintain desirable snag densities at appropriate spatial scales. At a minimum snags, live trees >32" dbh and hollow logs need to be protected in fisher areas during timber harvest. Similarly, dense stands of trees and fire-killed snags need to be maintained for black-backed woodpeckers.

The BLM must identify a spatially explicit analysis of the effects of salvage logging, thinning, and fire suppression on wildfire dependent black-backed woodpeckers. The black-backed woodpecker is undergoing a federal status review and a proposed listing is likely during summer 2014. The findings from the Federal Register notice (78FR21097)[195] states:

> *On the basis of our determination under section 4(b)(3)(A) of the Act, we find that information in the petition and readily available in our files presents substantial scientific or commercial information indicating that listing the Oregon Cascades-California population and the Black Hills population of the black-backed woodpecker may be warranted. This finding is based on information provided in the petition, in addition to information readily available in our files, on the possible loss of black-backed woodpecker habitat due to* ***salvage logging, fire suppression, and forest thinning****, and on the possible negative population effects due to small population size and climate change. We will initiate a status review to determine whether listing each population as endangered or threatened under the Act is warranted.* (emphasis added)

Thus, the BLM needs to analyze management options that would improve viability of black-backed woodpeckers by instituting conservation measures to provide large patches of intact burned forest, manage for dense forests with no thinning, curtail fuels treatment, and reduce the intensity of fire suppression efforts in appropriate potential habitat.

XII. MARBLED MURRELET

[195] http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0F5

In the NFP and original BLM RMPs, the agency would survey prior to logging in any potential Marbled Murrelet habitat. If there is any indication of occupancy, the agency would protect a 0.5 mile radius of all contiguous existing and recruitment habitat (stands capable of becoming habitat in 25 years). These areas would be managed as LSR. Recruitment habitat was required to "protected and enhanced" by any silvicultural treatment. (Eugene RMP at 62).

WOPR alters this regiment in all alternatives as laid out below. In the preferred alternative, murrelet surveys are restricted to the first 35 miles from the coast, and marbled murrelet habitat generally can extend up to 55 miles inland. Additionally, survey habitat is much more strictly defined as detailed out below. Timber harvest is allowed without surveys if large legacy trees are withheld from harvest and habitat is "maintained."

*Alternative A: No surveys, protect existing sites, seasonal disruption restrictions

*Alternative B: Surveys 35 miles from Coast in "mature or structurally-complex coniferous forest" and "conifer forests under 80 years old with platform trees (must be within 35 miles of coast, conifer, dbh greater than 19.1, over 33 meters tall, potential structure over 10 meters from ground, and contains platform over 4 inches in diameter. If stand occupied protect all occupied habitat plus 300 foot buffer around occupied stand. In stands under 80 with platforms, no surveys needed if platform trees aren't removed; maintain habitat (need to define); seasonal restrictions during breeding season.

*Alternative C: surveys in conifer stands over 120 years old, protect sites same as above for 10 years, and existing site protection lasts 10 years

*Alternative D: surveys same as B (but no 35 mile limitation), buffer all contiguous habitat within .5 mile radius of occupied stand (no gaps wider than 100 meters in forest)

Existing Sites: Marbled Murrelets have high nest-site fidelity, and as such, the PSG protocol recommends treating all occupied Marbled Murrelet sites as occupied sites indefinitely. A murrelet site, due to the inability to locate an exact nest location, occupies the entire area of contiguous forest. Given that the BLM is under direction from the FWS to protect occupied habitat, a majority of BLM alternatives say that the BLM will protect existing sites, but it is unclear what this means. DEIS at 722.

Pursuant to the PSG Protocol and available murrelet studies, occupied habitat means all the trees in a contiguous stand, including platform and non-platform trees. Any logging within this occupied habitat opens up the stand to predators and fragments the bird's habitat, resulting in take.

The BLM states that under three of the four action alternatives, all existing murrelet sites would be "retained." DEIS at 733. The BLM needs to elaborate on what this means. We assume it means that the entire survey area, i.e. contiguous forest stand, for each murrelet nest site is to be

protected, off limits from any kind of logging. Marbled Murrelet nest sites are compromised by forest and canopy openings that can be created by thinning or adjacent clearcutting. The BLM if indeed it is committed to protecting existing occupied sites, needs to ensure that all these sites are off limits from commercial harvest of any kind, because logging will create forest edges and openings that will expose these nest sites to an increased risk of predation. Additionally, even if these sites are in reserves this does not guarantee their protection because of the logging permitted in reserves that can downgrade or remove older forest.

300 Feet: In two of the BLM Alternatives the BLM proposes to protect Marbled Murrelet nest sites with a buffer of 300 feet as opposed to a half mile. This results in marbled murrelet occupied sites are approximately 6.5 acres in size as opposed to approximately 500 acres in size. The BLM provides no analysis or scientific justification that these 300 feet buffers will ensure protection of the nest site. Almost assuredly, a 6 acre nest site for the murrelet will result in the failure or predation of that nest site. We have attached numerous studies on the murrelet to that regard. Therefore, the BLM's assumption in the DEIS, that these sites will not be "taken" because of this 300 foot buffer is false and has zero scientific justification or rationale. This prescription will result in violations of the ESA, the MAMU Recovery Plan, the 5 Year Review Recommendations, and the NWFP Recommendations.

Potential or Suitable Habitat: We are concerned that the BLM is defining potential or suitable survey habitat for these alternatives too narrowly, and will accordingly miss certain types of Marbled Murrelet nest sites from this survey regiment. Murrelets will nest in younger stands if a single legacy tree is present, but the BLM is taking a stand level approach. When averaged, stands that provide nesting trees and habitat for murrelets could have average DBH, tree height, and various measurements that will not satisfy the BLM survey standards laid out above. Please provide scientific justification for the assertions that a large cohort of legacy trees within a forest stand is necessary for marbled murrelet habitat.

The BLM either needs to delete the DBH and height limitations or any limitations based on the number of platform trees present, or the BLM needs to factor in the percentage of nest sites that will occur outside of survey habitat and account for their loss and destruction in the modeling of the impacts. As an illustration, the BLM admits that over 10% of the existing occupied sites exist outside of what the agency has modeled or considered "nesting habitat." DEIS at 733. The agency needs to take a hard look at this issue.

35 Mile Delineation: Please explain or provide ecological or scientific justification for the 35 mile mark in Alternative B. It seems entirely arbitrary and will result in the take of murrelets nesting outside this area.

Habitat "Maintenance": Under the alternatives where surveys are required in the future, we are concerned that the BLM's habitat maintenance program will not result in adequate protection of the newly discovered nest site, not make it safe to assume that new sites will be retained, or that

Marbled Murrelets will continue to reproduce at these locations. The BLM is permitting logging, as long as the large legacy trees with platforms are not removed. Again, it is inadequate to just protect potential Marbled Murrelet nest trees in a stand. Logging trees that provide canopy closure around these legacy trees opens the stand up to corvids and will result in dramatic risk of nest predation and failure. The entire contiguous stand with large buffers needs to be protected in perpetuity to protect murrelets.

Large Block Habitat: The BLM should have considered blocking up large areas of habitat known to contain legacy and platform trees to provide refuges for the marbled murrelet. Aside from the no action alternative, it appears every alternative is reducing protections for the Marbled Murrelet. Given the species flat lining or declining population levels, coupled with an alarming drop in juvenile numbers which signal problems with reproduction, should implicate an alternative that strengthens protections for the species and creates special reserves for the species to guarantee viability of the species.

False Assumptions: In numerous places throughout the DEIS, the BLM assumes that murrelet populations are increasing. This is false, and we have attached numerous recent studies to this regard. Alternatives that all reduce protections for the species because they are based upon this false assumption flaws the NEPA process.

Studies: We have attached numerous studies that provide scientific support for the points made above. Please contact us for further scientific information or any questions regarding the studies and science provided.

XIII. OREGON SPOTTED FROG

Analysis and survey data are needed for the Oregon spotted frog because it has been proposed for federal listing and proposed critical habitat identified. The federal register notice (78FR53582-53632) for proposed listing of the Oregon spotted frog identifies two Oregon spotted frog populations in the planning area. The BLM must identify the need for a field survey in the decision area to locate additional populations in the Lakeview District and Medford District Ashland Resource Area. In the absence of a systematic field survey the BLM must assume that suitable spotted habitat is occupied and will be adversely impacted from grazing, water withdrawals, and potential introductions of alien predator species. The BLM must identify suitable Oregon spotted frog habitat for spatially explicit analysis purposes and to guide needed field surveys. The BLM must treat a species proposed for listing as if it is already listed. The RMP must identify conferencing with US Fish and Wildlife Service to guide the final decision of needed conservation actions and field surveys for the Oregon spotted frog.

XIV. NORTHERN SPOTTED OWL

WOPR Proposed Actions Common to All Action Alternatives:

"Protect stands of older, structurally complex conifer forest" and "maintain habitat for NSO" In LSR.

*Maintain means keep Nesting Roosting and Foraging Habitat (NRF) and dispersal. (Cites III-15 of recovery plan for management allowed in NRF)

*Maintain NRF, Nesting Roosting and Foraging Habitat defined as multi-layered, multi-species canopy, diameter over 30 inches dbh and canopy cover over 60% and decadence components

*Harvest generally prohibited, but road construction allowed, hazard logging allowed unless it downgrades habitat (NRF to dispersal).

*Fire suppression, fuels reduction, insect and disease logging, or any other logging to promote overall health of stand allowed even if it downgrades or removes habitat.

*No requirement for surveys.

*Alternatives A and C: No protections for spotted owl known or historic sites, no requirement for spotted owl surveys. Entirely based on land allocations.

*Alternative B: Is the same as A, except that the Sub-Alternative will protect known and historic sites within the Harvest Land Base, treating these areas as Reserves.

*Alternative D: Maintains all known and historic sites, like Sub B.

NRF and Recovery Action 32 Habitat: It is unclear from the DEIS, but is NRF habitat now being defined as only multi-layered, multi-species canopy, diameter over 30 inches dbh and canopy cover over 60% and decadence components? Spotted owls can and do nest in forests over 80 years old, even if they have not yet developed full decadence components present in unique old-growth forests like RA 32 habitat. In this new plan and DEIS, is the BLM equating RA 32 habitat to NRF habitat?

Better Comparison with NFP:

Generally, spotted owl management under the Northwest Forest Plan consisted of a land allocation approach (Late-Successional Reserves, Riparian Reserves, etc.) and site specific management. In LSRs, timber harvest was not allowed in stands over 80, and in stands under 80 only thinning was permitted to accelerate growth of the stand. In the Matrix, the agency was required to retain 100 acres of best NSO habitat as close as possible to the nest site or owl activity center as a core. Cores are managed as LSR, even if later unoccupied. Additionally within an owl home range (historic, modeled, or documented), the agency is required to maintain certain percentages of the owl's home range (appx. 1.5 mile radius) and certain percentage of the owl's nest core (appx. .6 miles radius). This maintenance of owl habitat generally required the agency to maintain over 60% canopy cover in the area post-treatment.

Also across the Matrix were Connectivity Blocks, where individual tree retention was higher, and the agency was required to maintain 25% of the best habitat within these blocks. Also within each fifth field watershed, 15% of all Matrix lands had to be late-successional forest to help meet spotted owl needs.

The agency is also required to survey for the species in potential habitat, and abide by recommendations made by USFWS to mitigate or eliminate adverse impacts to the species and critical habitat. The agency is also required to comply with the owl's recovery plan.

Under WOPR, almost every alternative shifts these various layers of protection to one land allocation based approach. But the WOPR analysis is unclear and not specific on the impact of the removal of these various protections. For example, if the BLM retained that 15% standard what would still be protected vs. what would be lost? This side by side comparison specific to former individual protective standards is needed to fully grasp the impact of the proposed changes, and to better analyze which changes would be most beneficial or harmful to the species. Please elaborate on a protective standard by standard basis in the FEIS.

Importance of BLM Lands: As an initial point, it is unclear from the NEPA documents produced by the BLM how important BLM lands are to the northern spotted owl. From the logging numbers and conclusions from the modeling in Appendix S, it appears that the differences in harvest land base allocations and volume to be logged will not make any significant impact on owl habitat or recovery objectives. Accordingly, BLM concludes that the primary role of its lands for the northern spotted owl is connectivity in the "central Klamath," coast province.

But this contradicts the DEIS (p 746), that states that BLM are "indispensable" for the northern spotted owl, and critical for both east-west and north-south dispersion. Given the critical nature of BLM reserves, and the critical dispersal element these lands play, the BLM should choose an alternative or modification of an alternative that maximizes reserve size and maximizes dispersal corridors.

In the agency description of riparian reserve objectives, the contribution of conservation and recovery of species is limited to "special status riparian associated species". Formerly the reserves contributed to dispersal and connectivity corridors for terrestrial species as well.

Riparian reserves were originally designed in part to facilitate spotted owl movement between reserves. Given the BLM's lands indispensable need towards owl connectivity, these riparian dispersal corridors should be increased, but it appears that almost every alternative is moving to shrink these riparian corridors. In fact, in the purpose and need for riparian corridors, benefit to terrestrial species like the northern spotted owl was completely ignored, even though this was one of the primary reasons for this allocation's original creation. The BLM should consider an alternative that increased riparian reserve size and protections in order to benefit dispersal capabilities for the northern spotted owl and other terrestrial species. Also it appears the BLM failed to take a hard look at the terrestrial species benefits that are provided by the riparian reserves, or the potential for these benefits to continue.

Scale of Analysis: We are concerned that the spotted owl's scale of analysis was too broad, and may have eliminated many conservation potential benefits by operating on such a large scale. We understand that this scope of analysis is needed for overall harvest projections and a bigger picture, but more local and detailed analysis is needed to more fully capture impacts to individual owl sites, areas of threatened connectivity, and how to rehab or connect isolated patches of owl habitat.

It is clear from the conservation needs of the spotted owl, spelled out on page 747-48, that all high quality habitat is needed for owl recovery, and all sites need to be protected. We are concerned that the definitions of what is considered high-quality habitat has changed, and may have led to much potential habitat falling through the cracks.

Generally under the Northwest Forest Plan, forests over 80 years in age were considered to have developed some older forest characteristics that benefited spotted owls, and was considered nesting, roosting, and foraging habitat (NRF). NRF habitat was considered high-quality owl habitat. It appears that the BLM has not adapted this definition of owl habitat, but has used a more complex metric by factoring in tree height, diameter, canopy cover and a range of other variables that are captured in a rating based on owl selection, i.e. "strongly selected for" or "strongly selected against."

The WOPR NEPA description of the models used for spotted owl habitat are not elaborated upon well. Spotted owl habitat suitability is rated on a 0 to 100 scale (higher numbers indicating better habitat) and the scale is based upon canopy cover, mean tree diameter, and slope. This new metric raises a lot of questions. Exactly what variables were included, and how are they weighted? Were legacy trees accounted for or secondary older cohorts accounted for and how? Additionally, the BLM divided owl habitat into four categories "strongly selected for", "selected for", "selected against", and "strongly selected against." I believe this means that a "strongly selected for" area had a high proportion of northern spotted owl nest locations based on the relative habitat suitability value.

It would be beneficial to the public and our organization to see how this new metric rates against the more simple analysis of stand age. In other words, we would like to know and see maps of how much of the BLM land is over 80 years in age, and how much of this land falls within the different new allocations. We need to see these maps and tables side by side with the new interpretations of owl habitat. How many forests over 80 were lost with this new metric and in what areas, or how many forests were gained based on this new habitat value interpretation?

It was make sense based on the owl's crashing demography that the BLM would err on the side of caution, and use the definition of habitat that would capture the most possible acreage to conserve based on the owl's needs and the indispensable nature of BLM lands to these needs. Additionally, it appears that the BLM excluded habitat that was not in large chunks of certain sizes from its modeling or consideration for conservation. Again it would be nice to see on a map and in tables, how much habitat was lost through these consolidations, and in what areas were they lost. It is a hard reality that much of BLM land in western Oregon is in the checkerboard and highly fragmented, but it would be nice to know that the habitat restoration efforts over the past 20 years were not in vain. Perhaps many of these isolated areas are close to being connected by recovering riparian corridors, or recently thinned forests nearing 80 years in age and attaining mature forests characteristics.

We are worried, that this block defining may have incidentally excluded a good deal of habitat that was formerly the focus of numerous recovery efforts. It would also be beneficial to see maps of where thinning had formerly taken place, so that the BLM could take full advantage and consideration of past restoration efforts. It could be that forests poised to more quickly attain habitat characteristics that would benefit the owl because of restoration efforts, will be lost in the definition shuffle and large scale approach taken by the BLM here.

Please include this analysis, these tables and maps, and comparisons in the FEIS.

Appendix S Modeling: The BLM states that it modeled in all potential timber harvest when calculating and modeling effects from the alternatives to the species. They specifically did not

include any patches under 10 acres, any forests over 500 meters from a road, any early-seral forest, and any forest logged within 50 years. DEIS at 1484.

We are concerned that BLM also did not account for in the model logging defined as "fire-suppression, fuels reduction, insect and disease control, and other activities needed to protect health of the stand or adjacent stands." This type of logging is permitted in LSRs even if it downgrades or removes spotted owl habitat. DEIS at 938.

We have seen numerous timber sales under the Northwest Forest Plan that have logged extensively, downgrading and removing spotted owl habitat that has been classified as "fire-suppression, fuels reduction, insect and disease control" and almost every timber sale planned is justified as a promotion of stand health.

Based on historic rates of this logging, the BLM needs to anticipate and account for a similar degree of this type of forest activity into the future, and needs to model its impact to the Northern Spotted Owl. BLM's failure to do so fails to satisfy the "hard look" required under NEPA.

Additionally, the modelling for the northern spotted owl appears to have an improper baseline. The No Action Alternative is defined as the existing 1995 RMPs for the various BLM districts. DEIS at 27. However, the models for impacts to Northern Spotted Owl habitat uses a baseline of no timber harvest. Appendix S, Page 1464. This is misleading to the public. Under the existing 1995 RMPs, the BLM was largely focused on restorative thinning projects to expedite the creation of Northern Spotted Owl habitat. By in essence changing the baseline to no timber harvest when analyzing impacts to the owl, the BLM masks the beneficial effect of the thinning regiment because under a no timber harvest baseline, these plantations are going to take much longer to development into taller, larger trees and other metrics the BLM is using to define good spotted owl habitat, or "strongly selected for" spotted owl habitat.

The analysis needs to be consistent with its baseline approach, and the modeling for the Northern Spotted Owl needs to be based upon the current management regime under the 1995 RMPs.

Protection of existing sites:

Generally, Northern Spotted Owl management under the 1995 RMPs consisted of a land allocation approach (Late-Successional Reserves, Riparian Reserves, etc.) and site specific management. In LSRs, timber harvest was not allowed in stands over 80, and in stands under 80 only thinning was permitted to accelerate growth of the stand. In the Matrix, the agency was required to retain 100 acres of best NSO habitat as close as possible to the nest site or owl activity center as a core. Cores are managed as LSR, even if later unoccupied. Additionally within an owl home range (historic, modeled, or documented), the agency is required to maintain certain percentages of the owl's home range (appx. 1.5 mile radius) and certain percentage of the owl's nest core (appx. .6 miles radius). This maintenance of owl habitat generally required the agency to maintain over 60% canopy cover in the area post-treatment. To facilitate this management surveys were required for Northern Spotted Owls, and the BLM was also required to comply with the spotted owl's recovery plan.

It appears in every action alternative that surveys for Northern Spotted Owls are not required. Are spotted owl surveys required for management actions in reserves under the various alternatives? The purpose of creating and protecting these reserves is to protect and recover the

Northern Spotted Owl. Thinning efforts that have been occurring for decades in Late-Successional Reserves were done to accelerate the development of spotted owl habitat. Riparian Reserves and dispersal habitat have been maintained to allow spotted owls to recolonize this new habitat, which the BLM models to be extensive in the future in Appendix S.

However, as touched on above, management activities and logging is permitted in the reserves even if it downgrades or removes spotted owl habitat. Surveys should be required for the Northern Spotted Owl for projects in the reserves because the BLM is not modeling for future owl sites, and we want to protect owls that are recolonizing thinned/restored habitat. This would also be an essential monitoring tool for the species, to determine if indeed the species is recolonizing commercially thinned forests.

In order to satisfy Recovery Action 10 and the mandate to conserve spotted owl sites, the BLM needs to conduct surveys for spotted owls and protect sites that it finds. The BLM states that it will, "[i]n areas of significant population decline, sustain the full range of survival and recovery options for the species in light of significant uncertainty." Page 747. The entire planning area is defined as an area of significant population decline. The BLM's insistence on abandoning the unified federal management plan for public lands within the range of the Northern Spotted Owl (NSO) may result in significant unintended consequences that curtail timber production. Existing Habitat Conservation Plans (HCP) and designated critical habitat necessary for the survival and recovery of NSO populations rested upon the assumption that the BLM would implement the NWFP including the protection of terrestrial connectivity values provided by full NWFP Riparian Reserve buffers. The BLM's action alternatives call that assumption into question.

As stated on page 749 of the DEIS:

> *analyses differs from the analyses done by the US Fish and Wildlife Service to inform its decisions on NSO recovery and NSO critical habitat (USDI FWS 2011Aa, Appendix C; USDI FWS 2012). These differences arise from differences in planning needs and regulatory requirements, as well as differences in data availability. The Service delineated critical habitat units, in part, assuming that existing NWFP land use allocations and management standards would continue, including on BLM-administered lands. In contrast, the BLM evaluated scenarios in which NWFP land use allocations and management standards would change on BLM-administered lands in the planning area." –DEIS page 749.*

By withdrawing from the NWFP, the BLM puts existing HCPs, the NSO Recovery Plan, and the basis for NSO critical habitat designations at immediate risk. In contrast, the NWFP provided regulatory certainty that contributes directly to the stated purpose of the RMP Revision Process to contribute to economic stability.

Please note page 769 of the DEIS acknowledges that alternatives A and C would provide less east-west NSO habitat connectivity between the Oregon Coast Range and the Oregon Western Cascades. This is a key distinction in that the USFWS has "identified east-west connectivity through this area as essential the conservation" of the species. DEIS page 769.

Given that the NSO Recovery Plan identifies habitat loss via fire as a significant issue for NSO survival and recovery, the BLM decision on page 774 of the DEIS not to analyze the effects of

its management on this aspect of NSO recovery is noteworthy. We would again point out that page 194 of the DEIS indicates that:

> *The HITA includes management such as thinning and regeneration harvest with no retention and rapid reforestation on a relatively short rotation. This management approach would result in continuous horizontal and vertical fuel profiles and conditions more closely aligned with high severity fire.- DEIS page 194.*

As stated on page 798 of the DEIS "*the NSO currently is under significant biological stress, and at risk of extirpation, over much of the moist forest portion of its range."* Given this reality, and given the BLM's proposal to dramatically increase even-age harvest that increases fire hazard in moist forests, the BLM must analyze and disclose the impacts of its activities on NSO survival and recovery.

Page 804 of the DEIS indicates that the BLM is aware of Recovery Action 6 which calls for thinning of moist forest plantations in order to develop structurally complex forests. Yet the DEIS contains no analysis of the BLM's proposal to greatly increase the creation of moist forest plantations that will presumably then require thinning to attain structural complexity. Indeed, the BLM appears committed to eliminating the leave tree and wood retention standards and guidelines that provide at least some structural complexity in NWFP regeneration harvest units. The US Fish and Wildlife Service relied upon the retention of structural legacies in harvest units over time in development of the NSO Recovery Plan and in the designation of NSO critical habitat.

The final decision on this plan revision should emphasize a large, well-connected reserve system, and do the most to emphasize the unique role of BLM lands in terms of connectivity, productive low-elevation habitat, and demographic support.

DEIS at 746 says -

> *In the Coast Range, the BLM has no opportunity, through habitat management, to reduce risks to the northern spotted owl during the next 50 years, and there are no substantive differences among the alternatives in their potential effects on those risks. However, in the western Cascades and Klamath Basin, the BLM, under all alternatives, would contribute to self-sustaining northern spotted owl populations during the next 50 years. ... The alternatives differ substantively in their contributions to east-west northern spotted owl movement between the Coast Range and western Cascades.*
>
> ** BLM-administered lands are indispensable:*
>
> ** To northern spotted owl reproduction, movement and survival in the southern half of the Coast Range, and in western and central portions of the Klamath Basin;*
>
> ** And in supporting north-south species movement through the southern portion of the Coast Range, and east-west species movement between the Coast Range and western Cascades."*

The final decision must address these "indispensables" with larger reserves, and high quality dispersal habitat (e.g., wider stream buffers, light-touch forestry, etc.) We remain concerned that the scale of analysis under-represents the importance of BLM lands elsewhere.

XV. BARRED OWL: INCREASED LOGGING OF HABITAT WILL INCREASED SPOTTED OWL EXTINCTION RISK

The Revised Recovery Plan for the Northern Spotted Owl includes Recovery Action 32 (RA 32) which recommends protection of a subset of high quality spotted owl habitat. The DEIS fails to clearly articulate the specific purpose of RA 32, which is to mitigate for the invasion of the barred owl. BLM should definitely meet FWS' RA 32 recommendation, but BLM must also consider how to address the more fundamental issue, which is how to manage owl habitat so that the two owls are more likely to co-exist on the landscape.

Since the Revised Recovery Plan for the NSO is not a NEPA document, BLM must conduct a full NEPA analysis to evaluate the efficacy of RA 32 as a mitigation and whether there is more than BLM can do to achieve the goal of spotted owl recovery in the face of barred owl competition, such as conserve *all suitable owl habitat* instead of just a *subset of high quality habitat*. Neither BLM nor FWS has conducted a NEPA analysis to consider whether conserving all suitable habitat, rather than just a subset, would better meet spotted owl recovery objectives. A NEPA analysis of this issue will show that protecting all suitable NRF habitat will not only increase the chances of spotted owl recovery, but provide a host of complementary benefits, including clean water, carbon storage, prevent new species listings, enhance recreation and scenic values, maintain quality of life, and provide community stability.

When deciding whether to protect all suitable nesting, roosting, foraging habitat for the spotted owl or just a subset of high quality habitat, it is important that BLM consider the best available information which is contained in part in the latest meta-analysis of all the spotted demography studies. We expect this report to show that the spotted owl is doing worse than expected, providing support for a cautionary decision to protect all suitable owl habitat instead of just a subset. BLM and others appear to be trying to keep this information out of the public record by saying it is in peer review. Nevertheless, the Department of Interior helped pay for this study; its employees helped collect data and write the report; the report is likely in BLM's possession; and we understand the BLM officials have been briefed on its contents, so it would be arbitrary and capricious not to fully consider the latest meta-analysis and make it part of the administrative record.

In DEIS Appendix S, BLM considered a model that segregated landscape patches into groups ("bins"), including "selected for" owl habitat and "strongly selected for" owl habitat. BLM should protect all selected for habitat, not just strongly selected for. Conserving all suitable/all selected habitat is more likely to advance recovery in several ways. First, it prevents the loss of habitat available for both species, thus reducing the risk of adverse competitive interactions between the two owls. (See more on that below.) Second, it increases the likelihood of future recruitment of additional high quality habitat. Suitable habitat that is not yet "high quality" habitat, is likely the best candidates for future recruitment of high quality habitat. If such habitat is instead logged it will prevent or delay recruitment of more high quality habitat.

The DEIS also needs to critically review the assumption implicit in RA 32 that "allowing for other threats, such as fire and insects, to be addressed by restoration management actions" will in fact enhance rather than detract from spotted owl recovery objectives. As explained in great detail in the fire and fuel section, forest treatments intended to reduce the threat of fire are more likely to cause harm to the owl than fire itself. See the fire and fuel section and Heiken, D. 2010. Log it to save it? The search for an ecological rationale for fuel reduction logging in Spotted Owl habitat.[196]

Barred owl competition and displacement are significant concerns documented in the recent status reviews for the northern spotted owl. The 2004 status review panel unanimously identified barred owls as a future threat to the spotted owl. [197]

The invasion of the barred owl undermines a critical assumption underlying the Northwest Forest Plan - that all *suitable* owl habitat is *available* to spotted owls. With the invasion of the barred owl, tens of thousands of acres old forest owl habitat (which was in short supply even before the barred owl arrived) are now occupied and defended by barred owl to the exclusion of spotted owls. Many acres that were previously assumed to be available to spotted owls is no longer available because the barred owl is there. The logical response now is to protect and restore more suitable owl habitat to reach previously established spotted owl recovery goals.

Based on well-established scientific principles, such as the species/areas relationship, BLM needs to protect more suitable habitat to ensure that these two owl species can co-exist, and to decrease the likelihood of competitive exclusion. This is corroborated by FWS' Final Recovery Plan for the Northern Spotted Owl, which recommends protection of "substantially all of the older and more structurally complex multi-layered conifer forest outside of MOCAs" in westside provinces (as well as on non-federal lands). "These forests are characterized as having large diameter trees, high amounts of canopy cover, and decadence components such as broken-topped live trees, mistletoe, cavities, large snags, and fallen trees."[198] This recovery action is intended to reduce competitive pressures between spotted and barred owls, but unfortunately an analysis has not been done to show *how much* additional habitat needs to be protected to help assure co-existence of the competing owls, and the USFS and BLM have not taken steps to implement this recovery plan recommendation.

The FY2014 Annual Report On Northern Spotted Owl Monitoring states:

> *There is mounting evidence that barred owls may be negatively impacting the spotted owl population within the KSA [Klamath Study Area]. This is illustrated by several apparent population trends: (1) spotted owl detections have been steadily decreasing (Figure 6) and reached the lowest point in 2014, when barred owl detections reached their highest level; (2) fecundity rates appear to be declining (Figure 8) and in only 2 of the previous 10 years was the rate above the 25 year average; and (3) the fecundity rate for sites with known barred owl presence was lower than at other sites and is continuing to decline. Forsman et al. (2011a) noted that the consistency of the negative associations between spotted owl demographic rates and the presence of barred owls supports the conclusion*

[196] Oregon Wild. V 1.0. May 2010. http://dl.dropbox.com/u/47741/Heiken_Log_it_to_Save_it_v.1.0.pdf
[197] https://web.archive.org/web/20060927184758/http://www.sei.org/owl/meetings/Presentations/June/Gutierrez%20Threats.pdf.
[198] See Recovery Action 32.

that barred owls are having a negative effect on spotted owl populations. The recent KSA data, with the combination of decreasing occupancy and reduced fecundity, appears to reinforce this conclusion.[199]

A recent telemetry study showed that in fragmented landscapes barred owls have a survival advantage relative to spotted owls, but that survival advantage diminishes in landscapes with a higher proportion of older forest. In other words, conservation of mature & old-growth forest should be favored because spotted owls are able to compete nearly equally with barred owls in landscapes with a high proportion of old forest.

[200]

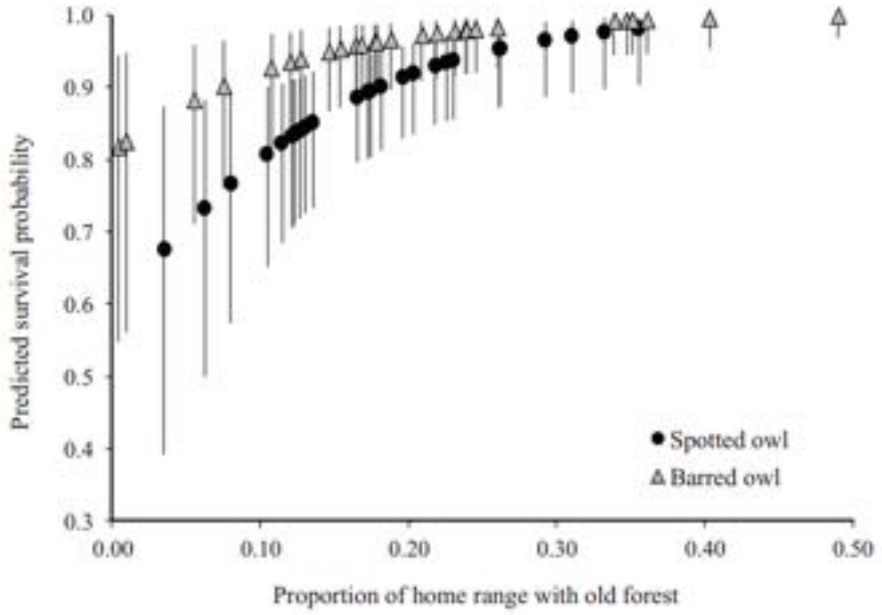

Figure 13. Predicted relationship between mean proportion of old conifer forest within the home range and seasonal (6-month) survival probabilities of radio-marked northern spotted owls ($n = 29$) and barred owls ($n = 28$) in western Oregon, USA, 2007–2009. We calculated point estimates with 95% confidence intervals at observed mean values for each individual under the best-supported model of survival, which included the additive effects of species and proportion of old conifer forest within the home range.

BLM has no NEPA analysis to tier to that supports RA 32 and addresses (on a range-wide scale) how to mitigate the adverse competitive interactions between spotted owls and barred owls. Before BLM adopts a plan that degrade more suitable owl habitat they must consider a range of NEPA alternative that protects more than just the "structurally

[199] Hollen, Horn, et al 2015. Demographic characteristics of northern spotted owls (*Strix occidentalis caurina*) in the Klamath Mountain Province of Oregon, 1990-2014.
http://www.reo.gov/monitoring/reports/nso/KLA%20nso%20demog%20annual%20report%202014.pdf

[200] Wiens, J.D., Anthony, R.G., and E.D. Forsman. 2014: Competitive Interactions and Resource Partitioning Between Northern Spotted Owls and Barred Owls in Western Oregon. Wildlife Monographs 185:1–50; 2014; DOI: 10.1002/wmon.1009.
https://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/48214/AnthonyRobertFisheriesWildlifeCompetitiveInteractions.pdf

complex older forest" in order to increase the chances that spotted owls and barred owls can co-exist.

The final Recovery Plan for the Northern Spotted Owl has partially addressed the barred owl issue by adopting Recovery Action 32 which urges the FS and BLM to "Maintain substantially all of the older and more structurally complex multi-layered conifer forests on Federal lands outside of MOCAs…" based on the idea that "protecting these forests will not further exacerbate competitive interactions between spotted owls and barred owls as would occur if the amount of shared resources were decreased.[201]" The revised critical habitat for the northern spotted owl was also expanded to "… increase the likelihood that spotted owls would be able to persist in areas where barred owls are also present. … [A]dditional critical habitat may allow for coexistence of the two species, potentially reducing competition. [202]

In considering this recommendation the agencies must prepare NEPA analysis which considers the full potential of suitable habitat quantity and quality and its mediating influence on the interactions between spotted owls and barred owls. Maintaining a subset of suitable habitat as recommended by the recovery plan is one option, but the agencies must consider the full benefits of protecting all suitable habitat, not just a subset, and providing additional mitigation in matrix areas such as managing the matrix to enhance habitat for owl prey species. The recovery plan is not a NEPA document and FWS was not required to consider all reasonable alternatives. Action agencies like the FS and BLM on the other hand are required to fully consider alternatives. It would be wise to do so at a range-wide level, but until that is done, the agencies should not adversely modify any suitable habitat. The recovery plan purports to offer the agencies an exception to the recommendation in Recovery Action 32 ("Land managers have made significant investments of time and resources in planning projects that may have been developed prior to the approval of this Recovery Plan, thus some forests meeting the described conditions might be harvested…"[203] however, FWS cannot exempt the action agencies from NEPA. Protection of additional suitable habitat in order to reduce competitive interactions between the two owls is now a recognized tool in the toolbox and represents significant new information about *any* proposal to modify suitable habitat regardless of how far the planning process may have proceeded.

A 2010 Draft report "Population Demography of Northern Spotted Owls" corroborates the need to protect more than just the highest quality spotted owl habitat as contemplated in the draft Recovery Action 32.

> *We also found a negative relationship between recruitment rates and the presence of Barred Owls and a positive relationship between recruitment and the amount of suitable owl habitat in the study areas. Recruitment was higher on federal lands where the amount of suitable owl habitat was generally highest. [p 96].*
>
> *While our observational results do not demonstrate cause-effect relationships, they provide support for the hypothesis that the invasion of the range of the Spotted Owl by Barred Owls is at least partly the cause for the continued decline of Spotted Owls on*

[201] FRP p 34.
[202] Dugger et al. 2011; Forsman et al. 2011." FWS 2012. CHU draft EA, p 53, 62. http://www.fws.gov/oregonfwo/Species/Data/NorthernSpottedOwl/Documents/CH_DRAFTEnvAssmnt_6.1.12.pdf.
[203] FRP p 35.

federal lands. Our results also suggest that Barred Owl encroachment into western forests may make it difficult to insure the continued persistence of Northern Spotted Owls.[204] *The fact that Barred Owls are increasing and becoming an escalating threat to the persistence of Spotted Owls does not diminish the importance of habitat conservation for Spotted Owls and their prey. In fact, the existence of a new and potential competitor like the Barred Owl makes the protection of habitat even more important, since any loss of habitat will likely increase competitive pressure and result in further reductions in Spotted Owl populations.*[205]

Our results and those of others referenced above consistently identify loss of habitat and Barred Owls as important stressors on populations of Northern spotted Owls. In view of the continued decline of Spotted Owls in most study areas, it would be wise to ***preserve as much high quality habitat in late-successional forests for Spotted Owls as possible****, distributed over as large an area as possible. This recommendation is comparable to one of the recovery goals in the final recovery plan for the Northern Spotted Owl,*[206] *but* ***we believe that a more inclusive definition of high quality habitat is needed*** *than the rather vague definition provided in the 2008 recovery plan. Much of the habitat occupied by Northern Spotted Owls and their prey does not fit the classical definition of "old-growth" as defined by Franklin and Spies (1991), and a narrow definition of habitat based on the Franklin and Spies criteria would exclude many areas currently occupied by Northern Spotted Owls. [p 99]...*[207] *"Population Demography of Northern Spotted Owls." DRAFT COPY 17 December 2010. This draft manuscript is in press at the University of California Press with a projected publication date of July 2011. It will be No. 40 in Studies In Avian Biology, which is published by the Cooper Ornithological Society.*[208]

A well-known axiom of the species-area relationship from island biogeography holds that as habitat area increases, the number of cohabiting species also increases.[209]

The major causes of population and species extinction worldwide are habitat loss and interactions among species. ... The most robust generalization that we can make about population extinction is that small populations face a particularly high risk of extinction. ... [E]mpirical support for the extinction-proneness of small populations has been found practically wherever this issue has been examined. ... The loss of habitat reduced population size ... Larger habitat patches have larger expected population sizes than smaller patches. Therefore, other things being equal, we could expect large habitat patches to have populations with a lower risk of extinction than populations in small

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[204] *See also* Olson et al. 2004.
[205] Horn and MacArthur 1972, Olson et al. 2004, Carrete et al. 2005. [pp 97-98]
[206] USDI Fish and Wildlife Service 2008.
[207] Eric D. Forsman, Robert G. Anthony, Katie M. Dugger, Elizabeth M. Glenn, Alan B. Franklin, Gary C. White, Carl J. Schwarz, Kenneth P. Burnham, David R. Anderson, James D. Nichols, James E. Hines, Joseph B. Lint, Raymond J. Davis, Steven H. Ackers, Lawrence S. Andrews, Brian L. Biswell, Peter C. Carlson, Lowell V. Diller, Scott A.Gremel, Dale R. Herter, J. Mark Higley, Robert B. Horn, Janice A. Reid, Jeremy Rockweit, Jim Schaberl, Thomas J. Snetsinger, and Stan G. Sovern.
[208] http://www.reo.gov/monitoring/reports/nso/FORSMANetal_draft_17_Dec_2010.pdf.

[209] *See especially,* Part III - Competition in a Spatial World *in* Tilman, D. and P. Karieva, Eds. 1997. Spatial Ecology: The Role of Space in Population Dynamics and Interspecific Interactions. Monographs in Population Biology, Princeton University Press. 368 pp.

patches. … More generally, the relationship between patch size and extinction risk provides a key rule of thumb for conservation: other things being equal it is better to conserve a large than a small patch of habitat or to preserve as much of a particular patch as possible. … [T]here are likely to be many complementary reasons why large patches have populations with low risk of extinction. " [210]

The territorial occupancy model developed by Lande (1987), extended here to include two competing species, represents a useful tool for evaluating how equilibrium breeding numbers could be affected by changes in habitat availability, demographic parameters, dispersal behavior and interspecific competition … Its application shows that **increases in the exclusive suitable habitat of each species is the best option to maintain viable populations of territorial competitors** in a same area, given that it reduces competition for territories. Increases in habitat overlap by reducing the exclusive habitat available for one species strongly affected the outcome of competition, resulting in extinction of the species for which exclusive habitat had been eliminated.[211]

From these ecological foundations, one can see that the barred owl, by invading, occupying suitable habitat and excluding spotted owls, has reduced the effective size of the reserves that were established in 1994, and thereby reduces the potential population of spotted owls. Extinction risk is increased by this loss of habitat and smaller population. If we provide more suitable habitat, the population potential increases, and the risk of extinction decreases. The most rational way to respond is to protect remaining suitable habitat, expand and restore the reserve system to provide more suitable habitat to increase the likelihood that the two owl species can co-exist.[212]

This view is corroborated by owl biologist David Wiens who was interviewed on the Lehrer News Hour, he said: "*The more habitat you protect, the more you're going to alleviate the competitive pressure between the species. Rather than reducing it and increasing the competitive pressure between these two species, we need to provide as much habitat as possible for them*."[213] Robert Anthony agrees, "*If you start cutting habitat for either bird, you just increase competitive pressure."*[214] And in the same article Eric Forsman added "*You could shoot barred owls until you're blue in the face," he said. "But unless you're willing to do it forever, it's just not going to work*."

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[210] Oscar E. Gaggiotti and Ilkka Hanski. 2004. Chapter 14 - Mechanisms of Population Extinction. *In* Ecology, Genetics, and Evolution of Metapopulations. Elsevier. 2004. http://web.archive.org/web/20070612211945/http://www.eeb.cornell.edu/sdv2/Readings/Gaggiotti&Hanski.pdf

[211] Martina Carrete, Jose´ A. Sa´nchez-Zapata, Jose´ F. Calvo and Russell Lande. Demography and habitat availability in territorial occupancy of two competing species. OIKOS 108: 125-136, 2005 http://www.ebd.csic.es/carnivoros/personal/carrete/martina/recursos/13.%20carrete%20et%20al%20%282005%29%20oikos%20108-125.pdf.

[212] Put another way, when threatened with extinction, "the best defense is a strong offense" that is, species are more likely to persist if they have a large, well-distributed population size and if we minimize all manageable threats. Dunham, Jason. 2008. Bull trout habitat requirements and factors most at risk from climate change. http://www.fs.fed.us/rm/boise/AWAE/projects/bull_trout/bt_Dunham.html

[213] DAVID WIENS. News Hour interview. "Biologists Struggle to Save the Spotted Owl." December 18, 2007. http://www.pbs.org/newshour/bb/science/july-dec07/owl_12-18.html.

[214] Welch, Craig. 2009. The Spotted Owl's New Nemesis. Smithsonian Magazine. January 2009. http://www.smithsonianmag.com/science-nature/The-Spotted-Owls-New-Nemesis.html?c=y&page=2

The book "Signs of Life: How Complexity Pervades Biology" by Sole and Goodwin has an interesting discussion that immediately brings to mind the barred owl/spotted owl issue. Chapter 7 of the book describes work being done by a Japanese researcher named Kaneko who developed and explored a modeling concept called "coupled map lattices." The lesson from these models is that when habitat is abundant, competing species operate within the "coexistence regime" but when habitat becomes scarce the model switches to a new attractor and operates in the "exclusion regime." This model strongly supports the idea that retaining more habitat increases the likelihood that spotted and barred owls can coexist, and if we eliminate reserves or continue to log suitable habitat in the matrix, then barred owl may competitively exclude and extirpate the spotted owls. Similar results are demonstrated in resource competition models described by Tilman, Lehman, and Thompson. 1997.[215]

XVI. SISKIYOU MOUNTAIN SALAMANDER

The proposal to eliminate the survey and manage program and to allow for ground-disturbing activities in the majority of Siskiyou Mountain Salamander (SMS) sites managed by the BLM may directly contribute to the need to list the species under the Endangered Species Act (ESA). Implementation of the action alternatives in the DEIS would undermine several key elements of the 2007 SMS Conservation Strategy that were deemed necessary in order to "maintain well-distributed populations" and "avoid a trend towards listing under the ESA."

The BLM is planning to eliminate the Adaptive Management Area (AMA) land use allocation that contains 67% of known SMS sites according to page 12 of the 2007 SMS Conservation Agreement to which the BLM is a party. The BLM is also proposing to significantly reduce the width of Riparian Reserves that were relied upon as a selection criterion for determining "high priority" SMS sites.

Page 5 of the SMS 2007 Conservation Agreement and page 5 and 40 of the 2007 Conservation Strategy indicate that "*significant changes in Forest Service or BLM land-use allocation within the area of the conservation strategy"* must trigger *"immediate review of the Conservation Agreement."*

Page 3 of the Conservation Agreement acknowledges, *"habitat loss, degradation and additional fragmentation of discrete populations are all potential threats to the species."* The BLM RMP action alternative may directly contribute to all three of these threats to species persistence.

Page 4 of the Conservation Strategy indicates that the location of reserves (including Riparian Reserves) influenced the selection of high priority SMS sites and page 18 indicates that an objective of the strategy was to *"utilize the existing federal land use allocations as a foundation*

[215] Tilman, Lehman, and Thompson. 1997. Plant diversity and ecosystem productivity: theoretical considerations. Proceedings of the National Academy of Sciences. 94:1857-1861. http://www.cedarcreek.umn.edu/biblio/fulltext/t1694.pdf. See also, Tilman, D. and P. Karieva, Eds. 1997. Spatial Ecology: The Role of Space in Population Dynamics and Interspecific Interactions. Monographs in Population Biology, Princeton University Press. 368 pp. and Valenti D., Fiasconaro A., Spagnolo B. Pattern formation and spatial correlation induced by the noise in two competing species http://arxiv.org/PS_cache/cond-mat/pdf/0401/0401424v1.pdf.

for providing a high likelihood of continued persistence." This objective, and the underlying assumptions of the Conservation Strategy, are undermined by BLM plans to abandon the land-use allocations of the NWFP.

Page 17 of the Conservation Strategy indicates that it rests upon the reasonable assumption that *"clearcut logging is no longer carried out on Forest Service or BLM lands within the range of this species."* The RMP DEIS renders this assumption invalid.

Please note that page 21 of the Conservation Strategy indicates *"if intervening lands become highly disturbed and unsuitable habitat conditions predominate, connectivity to retain interacting individuals across the landscape may need to be re-addressed."*

Page 21 of the Conservation Strategy also notes "long-term effects on the species from federal land management of occupied salamander habitat sites that are not chosen as high priority sites are unknown." The RMP DEIS does not disclose or analyze the uncertainties associated with BLM plans for non-high priority SMS known sites.

Please note that the January 24, 2008 Federal Register Notice by the USFWS denying ESA protection to SMS specifically states that "*given the stability of Federal Land and Resource Management Plans and the Northwest Forest Plan since its establishment in 1994, we assume that significant changes to current land management practices on Federal lands are not likely to occur within 20 years*."[216] This RMP DEIS renders that assumption invalid.

The USFWS also relied upon the belief that SMS management would include *"NWFP Matrix Standards and Guidelines [that] are designed to provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components…"* 4388. The BLM RMP revisions undermine the NWFP conservation strategy relied upon by the USFWS in its determination that SMS need not be listed.

Additionally, as stated by the USFWS, the "*Survey and Manage guidelines have provided additional security for salamander populations across the vast majority of the range of the Siskiyou Mountains salamander.*" 4390. That security would be removed under every BLM RMP action alternative.

The USFWS determination not to list SMS under the ESA specifically mentions the 2007 Conservation Agreement and its assumption that *"many additional populations will continue to persist in reserved lands and in Matrix where habitat is retained for other reasons."* 4390. As discussed above, the BLM is proposing to reduce the size of Riparian Reserves and eliminate Matrix tree retention standards that were relied upon in both the Conservation Agreement and in the USFWS listing assessment.

XIII. PROPOSED TO BE LISTED SPECIES

Original RMPs under the NFP required the protection and conservation of proposed to be listed species. The new purpose and need for BLM WOPR eliminates this category of species for conservation mandates (likely overlooked in No Action Alternative). There is no analysis in the

[216] Vol. 73, No. 16. 4381.

DEIS of these particular limbo species. These species would be considered Bureau Sensitive Species, but the BLM states that it will only be providing conservation measures for these species to the extent that they are compatible with O&C Act purposes. Proposed to be listed species, deserve ESA protections, but the FWS is unable to address these protections given other higher priorities. These species should deserve special treatment under the plans, as they did under the NFP. Merely conserving to extant compatible with the O&C Act will lead to conflicts with the ESA, and potential future listings of these species.

OFF ROAD VEHICLES

While there is responsible Off Road Vehicle (OHV) use in western Oregon, illegal off road vehicle (ORV) use is predictable, widespread, and systemic on some BLM lands in the analysis area.

> *In this analysis, the BLM assumed that OHV users would operate vehicles consistent with BLM decisions about OHV use. Although the BLM has some site-specific and anecdotal information about illegal OHV use, the BLM does not have a basis for predicting the location or effects of any widespread or systemic illegal OHV use. – DEIS, 321*

Throughout the DEIS, the BLM refuses to analyze or disclose the significant, predictable, ongoing impacts of illegal off-road vehicle (ORV)[217] use. There is no rationale basis for the agency's contention that off-road vehicle users will abide by BLM rules and regulations.

Off-road vehicle damage to meadow and riparian habitats is particularly pronounced, significant, and predictable. Numerous meadow and riparian sites have been blocked or rehabilitated by the BLM on a continuous basis, only to be trashed by motorized use again and again.

The analysis contained in the DEIS repeatedly assumes that off-road vehicle damage is limited by steep forested landscape, yet page 623 of the document acknowledges that in "most of the interior south, the ability to track numerous different routes across the open space can lead to degradation and erosion…."

Rather than disclosing and analyzing the foreseeable impacts of illegal ORV use, the DEIS repeatedly claims that "the BLM does not have a basis for predicting the location or effects of any wide spread or systemic illegal OHV use." This is not an accurate statement. By observing past illegal OHV impact acres, it is reasonable to assume that sites that have been repeatedly trashed will be trashed again. Additionally, the BLM ignores the need to create an ORV enforcement strategy rather than relying on a strategy of user compliance that has been proven ineffective.

Please note that there is at least one website dedicated to advocating that the public violate BLM travel management policies in the Medford District.[218]

[217] Please note, the BLM refers to such vehicles as "off highway vehicles" (OHVs) when it is much more accurate to describe them as "off road vehicles" (ORVs).

The agency's reliance on regulations and land use allocations to mitigate significant and foreseeable ORV damage to watersheds, wildlife and recreation has been proven ineffective. Approximately 75% of ORV riders regularly ignore regulations such as speed limits and closures. *See, e.g.*, Testimony of Jack Gregory, Special Agent in Charge (Ret.) USFS Southern Region, Before Subcommittee on National Parks, Forests, and Public Lands, U.S. House of Representatives, March 13, 2008, (hereafter "Gregory Testimony"). The testimony at 8 states:

> *Even if agency ORV route planning makes sense in downtown offices and public meeting rooms, there must also be a well-funded on-the-ground monitoring and enforcement component. This is where [agencies have] failed time after time. Once plans are drawn up and implemented, there is not adequate funding for field resources to police this activity where it's actually occurring. Throughout my years of working for the FS, I witnessed the development of many good plans, but a failure to provide the field resources to properly execute them. It is unfortunate that the FS is long on "plans" and seemingly good intentions, but very short on effective field implementation, particularly with providing necessary LE [law enforcement] resources for dealing with serious problems.*

Similarly, another law enforcement officer has publicly testified "about the growing burden on local law enforcement caused by a growing minority of reckless OHV riders and the need for effective management." Statement of Frank Adams, Executive Director of the Nevada Sheriffs' and Chiefs' Association, at the Senate Energy and Natural Resources Off-Highway Vehicle Management on Public Lands, Jun 2008. Sheriff Adams noted that "any kind of public lands law enforcement [is] challenging, but particularly with OHVs given the technology that allows users to cover vast distances in remote areas over a short period of time." *Id*. The Sheriff observed:

> *With such great land-masses and so few enforcement officers, it does not take a large group of individuals disobeying federal and local laws to cause a problem. We have determined that a small number of individuals riding OHVs that use our outdoors for recreation are causing the problems. They are reckless in the operation of their vehicles; they disregard instructions to stay off of sensitive lands and are destructive to the facilities that are provided for their use. This is evident by the increase in the number of injuries that are being reported and the increase in the number of search and rescue mission that occur. We see blatant disregard for areas that are posted as "do not travel" as they have been designated sensitive areas. Part of the problem that encourages this reckless behavior stems from the feeling of anonymity that many of the OHV riders have because there is no way of identifying them or their vehicles. Most States do not require a license plate for such vehicles. Those States that do require tagging, the tags are not large enough to be seen with out being in almost on top of the vehicle. If you are able to determine that there is a tag on the OHV, determining the tag number is almost impossible. Id*. at 3.

While assuredly many ORV riders have lawful intentions and "follow the rules," a disturbingly high percentage show a pronounced preference and practice among off-road vehicle

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[218] http://www.grantedright.com/Home_Page.html

recreationists to travel cross-country and ride off of legal routes. Indeed, this conclusion is derived from publically available data generated by the ORV community itself.

Monaghan and Associates, a marketing research firm, conducted a 2001 study at the behest of the Colorado Coalition for Responsible OHV Riding, a coalition of off-road vehicle representatives, environmentalists and public officials. *See* Status and Summary Report; OHV Responsible Riding Campaign. Researchers surveyed Colorado off-road vehicle riders through a series of three focus groups.

Monaghan and Associates found that the majority of off-roaders understand that staying on designated routes is "fundamental trail etiquette" and that going off trail is not "correct" off-road vehicle behavior. *Id*. at 11. The survey revealed, however, that regardless of this knowledge "as many as two-thirds of adult users go off the trail occasionally." *Id*. A significant percentage of riders, 15-20%, admitted to frequently breaking the rules and riding off of legal routes often. *Id*. Survey participants also stated that "others" ride off-route and cause most of the damage. *Id*. at 7. "Many reluctantly admit to having gone off trail 'a couple times' but felt that it is permissible if rarely done .... '*just this one time. '*" *Id.* (emphasis in original). Tellingly, the report concluded: "In a 'nutshell,' it is our premise that further ***information*** and ***education*** per se - will <u>not</u> result in substantial behavioral change." *Id*. at 1 (emphasis in original).

Similar results were found in Utah. In 2002, the Utah Division of Parks & Recreation commissioned Utah State University to survey riders to determine their "OHV uses and owner preferences." The university conducted a telephone survey of 335 riders from a random sample of the 50,676 people who registered off-road vehicles with the state in 2000. *See* Fisher, Andrea L., Dale J. Blahna, and Rosalind Bahr, 2001; Off Highway Vehicle Uses and Owner Preferences in Utah. Logan, Utah. Utah State University, at iv,

The Utah report reveals that an inordinate number of riders prefer to ride "off established trails." Of the ATV riders surveyed, 49.4% prefer to ride off established trails, while 39% did so on their most recent excursion. Of the dirt bike riders surveyed, 38.1% prefer to ride off established trails, while 50% rode off established trails on their most recent excursion. *Id*.

It should be noted that pro-ORV groups commissioned both of the studies cited above. Additionally, these data are ratified by two other recent reviews. In 2006, the Montana Fish, Wildlife and Parks received survey responses from 446 owners of registered off-road vehicles. *See* Lewis, M.S., and R. Paige. 2006: Selected Results From a 2006 Survey of Registered Off-Highway Vehicle (OHV) Owners in Montana. Responsive Management Unit Research Summary No. 21. Prepared for Montana Fish, Wildlife and Parks. Among the full sample of respondents, almost a quarter, 23%, "never" or "sometimes" comply with Montana's law against cross-country driving even though off-route riding has been illegal there since 2001. *Id*. at 2. Over 28% "never" or "sometimes" avoid riparian areas and wetlands, in violation of rules for federal and state public lands in Montana. Sixty-four percent of those surveyed have used an off-road vehicle while hunting. *Id*. at 2. The majority of this hunting subset admits to illegally riding cross-country — over 58% have traveled off of legal routes to retrieve downed game. *Id*. In the context of the assumption that land use allocations and designated BLM routes will cure unlawful ORV behavior, this figure is notable to the extent that the survey found that "[t]wo-thirds of the respondents who have used an OHV when hunting reported they have seen written materials (e.g., brochures, posters, articles, etc.) that address the topic of hunting and responsible OHV

use." *Id*. The survey concluded, therefore, "most OHV owners in Montana have been exposed to a variety of safety and responsible use information." *Id*. at 4. Regardless of this "education," the survey noted:

> *OHV owners do not always follow important guidelines for responsible use when operating OHVs. For instance, about a third of the respondents who have used an OHV when hunting disagree or strongly disagree that "OHV users should NOT travel off legal routes to retrieve harvested game." Only 42 percent of the respondents who have used an OHV when hunting reported they always follow this guideline. Nearly 7 percent reported they never follow this guideline. And, 52 percent reported they follow this guideline sometimes. Id*. (emphasis in original).

Echoing these findings are the results of a 2003 survey of Wisconsin ATV users. A study of "motivations and attitudes" by graduate student Robert A. Smail at the University of Wisconsin - Steven's Point, included a survey of user preferences for riding and found nearly two-thirds of respondents prefer to ride off maintained trails.

> *[S]urvey respondents were asked to indicate where they prefer to ride their ATV. Of the five possible choices, 'On maintained trails' (28.5%) ranked third. The top choice was 'On user created trails' (33.3%) followed closely by 'Cross country, off trails and roads' (32.0%). In other words, 65.3% of all users prefer to ride off of maintained trails." Id. Dr. Smail concluded that the survey results demonstrated that past orthodoxies premised on education and the assumed "positive peer-pressure" flowing from membership in established "rider clubs" are not adequate to generate trail-riding compliance; they had "no influence." Id. at 69. Rather, "[t]hese results indicate that messages promoting responsible ATV riding or use will need to be reformulated and law enforcement will need to be increased in order to prevent resource damage and user conflict.*[219]

Finally, the U.S. Fish and Wildlife Service found a near universal disregard for motorized guidelines when the BLM experimented with a "voluntary off-road vehicle route system" in Nevada. The area in question serves as a refuge for the disappearing Sand Mountain Blue butterfly, a species proposed for listing under the Endangered Species Act. A 2006 monitoring report compiled over a three-year period found that "98 percent of all existing routes continued to be used and new routes were created, indicating an ongoing expansion of habitat degradation." Nevada Fish and Wildlife Office, U.S. Fish and Wildlife Service. 2007. 12-Month Finding on a Petition to List the Sand Mountain Blue Butterfly (*Euphilotes pallescens ssp. arenamontana*) as Threatened or Endangered with Critical Habitat. Federal Register, Vol. 72, No. 84. *See* pages 24260-61. The study also found that "about 50 percent of all noncompliance points occurred *at or near red carsonite posts installed to alert riders that travel was discouraged in areas behind the posts*" to protect sensitive butterfly habitat. *Id*. at 24261, (emphasis added). The cumulative impacts of such "noncompliance points" were four-fold as each discouraged route experienced multiple incursions. *Id*. The FWS noted that "[h]igh levels of noncompliance occurred *from the*

[219] Robert A. Smail, July 2007, Wisconsin All Terrain Vehicle Owners: Recreational Motivations and Attitudes Toward Regulation, A Thesis Submitted in partial fulfillment of the requirements of the degree Master Of Science In Natural Resources Resource Policy And Planning College Of Natural Resources University Of Wisconsin, Stevens Point, Wisconsin, copy obtained from author.

onset of implementation of the voluntary system, and the number of incursions into habitat outside of the encouraged routes *increased* in 2006. *Id*. at 24260-61.

Providing a broader overview, in September 2007, the Izaak Walton League, one of the country's oldest conservation groups, released a study of state game and fish managers revealing that 83% of wildlife managers have seen "resource damage to wildlife habitat" caused by ORVs and 72% cited "disruption of hunters during hunting season" as another impact from ORVs. "Off-Road Vehicle Impacts on Hunting and Fishing, The Izaak Walton League of America, 2007, at 15.

Similarly, fully 60% of fisheries managers deemed ORV use to generate adverse impacts on Riparian resources. *Id*. at 16. Notably, 41% of wildlife and 50% of fisheries managers do not believe that current standards and protections adequately protect the resources they are responsible for with the perceived attitude of lawlessness playing a central role: "We have numerous rules and regulations, but many ORV riders have an attitude that they should not apply to them and many just ignore some rules because they want to ride someplace. It increases law enforcement effort and takes time from other areas." *Id*. at 15. "There seems to be a misconception that just because you own a piece of equipment that can go almost anywhere, that you are entitled to go almost anywhere including public land dedicated to wildlife management. This needs to change." *Id*. at 16. Further, "They go where they please, when they please, if they please. Not all do this, but many do. They cause significant upland erosion as well as stream side and in-stream damage." *Id*. "Many ORV riders seemingly have no conservation ethic or appreciation for habitat management or understanding of the damage they cause." *Id*. Another said: "While there is regulatory ability, there is insufficient enforcement response capability to adequately respond to illicit ORV use." *Id*. at 15.

In a tracking review on federal land managers, in December 2007, the Public Employees for Environmental Responsibility ("PEER") released the first-ever survey of federal rangers' views on off-road vehicle issues. "Rangers for Responsible Recreation: Off-Road Vehicle Issues Survey of SW Law Enforcement Professionals - Bureau of Land Management (BLM) & Forest Service (FS), 2007.

Strikingly:

> *• 91% of respondent rangers agree "off-road vehicles present a significant law enforcement problem in my jurisdiction";*
>
> *• More than half (53%) feel "off-road vehicle problems in my jurisdiction are out of control"; and*
>
> *• 74% say that off-road abuses "are worse than they were five years ago" while fewer than one in six (15.2%) believe the situation is improving. Id. at 1.*

Moreover, the survey found that rangers believe their agencies are unequal to the task of controlling ORV abuse:

> *• 62% believe their agency is not "prepared to deal with the ORV problems we are experiencing"; and*

• 78% do not think their department "devotes adequate resources to cope with ORV problems." Id. at 3.

An article published in the Washington Post entitled "'Off-Road Rage' Climbs as Trails Get More Crowded," was published on August 12, 2008, and appeared in section A at page 2. The report provides additional documentation of many ORV riders' unlawful — even violent — disregard of the rules and regulations applicable to ORV use on public lands.

Additionally, in the Roseburg BLM District, the White Rock OHV area is listed in Table N-287 (Appendix N, page 1284) as "managed as Extensive Recreation Management Areas (ERMA)" under alternatives C and D. However, this is the only place in the entire DEIS where the White Rock OHV area is mentioned. There is no NEPA analysis of the environmental impacts of creating this new OHV area. In fact, the DEIS makes it seem as if it is an existing OHV emphasis area. It is not. Local OHV enthusiasts have asked the BLM to create the White Rock Emphasis Area, but the Roseburg BLM has not acted on this request. The BLM cannot now choose alternative C or D and create it without any NEPA analysis.

OHV recreationists have severely degraded this area by riding off trails, riding through wetlands, and by creating play mud-bogs in areas like Yellow-Jacket Springs. They have violated closed and barricaded roads to do this. The Roseburg BLM has admitted they are powerless to enforce current regulations that forbid resource damages. Making a new White Rock OHV area, without NEPA analysis would only exasperate this problem.

I. THERE IS GREATER DEMAND FOR NON-MOTORIZED RECREATION THAN FOR EXPANDED ORV OPPORTUNITIES.

As illustrated on Table 3-126 (page 448) of the DEIS, there are currently three times as many participants interested in wildlife viewing and nature study on BLM lands than in motorized off-highway vehicle travel. Similarly, driving on *existing BLM roads,* camping and picnicking, non-motorized travel and hunting all draw more than one million participants yearly and significantly exceed the demand for motorized ORV travel.

In the Medford District the demand for non-motorized recreation compared to ORV use is even more pronounced. Page 462 of the DEIS projects 85,000 hiking trail users at sites within 30 minutes of Medford and only 18,589 ORV visits in the same area. Within an hour of Medford the BLM anticipates 137,371 hiking visits and only 30,041 ORV participants.

Please note that page 493 of the DEIS clearly establishes that "the most common outdoor recreation activities, requiring the least equipment or specialized skill, have the greatest participation numbers, and…provide the greatest total net benefit."

Given that the public prefers non-motorized recreation and that it provides the most social and economic benefits, it is arbitrary and capricious for the BLM to continue to emphasize ORV use

on tens of thousands of acres of public lands to the detriment of terrestrial and aquatic forest resources, neighboring landowners and other forest users.

II. BLM ORV ROUTE DESIGNATION CRITERIA

Page 638 of the DEIS indicates that the agency is aware of the route designation criteria in 43 CFR 8342 which directs the agency that ORV "[a]reas and trails shall be located to minimize damage to soil, watershed, vegetation, air, or other resources of the public lands and to prevent impairment of wilderness suitability." Yet all of the action alternatives appear to codify ORV routes that directly harm soils, streams, riparian vegetation, and lands with wilderness character.

Page 638 also acknowledges that 43 CFR 8342 directs the BLM that ORV"[*a]reas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect[ing] endangered or threatened species and their habitats."* Yet the action alternatives appear to codify numerous ORV routes that directly harm listed species such as the northern spotted owl (NSO).

The DEIS must analyze, disclose, avoid, or mitigate the impacts of foreseeable ORV noise harassment from proposed motorized use on NSO reproductive success and behavior patterns.

We bring to your attention the following language from pages 82-83 of the Rogue River/South Coast Biological Assessment FY04-08 for the Medford District BLM and the Rogue River-Siskiyou National Forests, July 11, 2003:

> *Noise above ambient levels may disturb or flush from their nest site, could cause a juvenile to prematurely fledge or could interrupt foraging activity. While the effects of noise are not clear, any of these impacts could result in the reduced fitness or even death of an individual bird due to missed feedings, or reduced protection of the young if adults are disturbed.*
>
> *There has been little data regarding the impacts of noise on spotted owls and other listed species. However, the Service has recently analyzed the available data on spotted owls, murrelets and other species (USFWS 2003c; Appendix D), and has consulted species experts who have worked extensively with spotted owls to determine the extent to which above-ambient noises affect spotted owls. The results of this analysis indicate that spotted owls may flush from their nest or roost or may abort a feeding attempt of their young when the following activities occur up to the specified distances (Table 11). The Lacy Washington office of the Service in two biological opinions has used this data and it is the Service's current understanding of harassment distances based on the best available science. Consequently, it will be incorporated into this Opinion as current guidance for harassment distances for various activities as it relates to adverse effects to the spotted owl from harassment due to disturbance. If the Services' understanding of these distances changes, adjustments to these distances may be recommended in the future.*
>
> *Above-ambient noises further than these Table 11 distances from spotted owls are expected to have ether negligible effects or no effect to spotted owls. The types of reactions that spotted owls could have to noise that the Service considers to have a*

negligible impact, include flapping of wings, the turning of a head towards the noise, hiding, assuming a defensive stance, etc.[220]

The risk to spotted owls from noise disturbance is tied to the timing of the activity and is highest when adults are defending young or eggs in a nest or are feeding and protecting recently fledged juveniles. During this period, the separation of adults and their young could result in death or injury to the young as a result of predation. The leading known causes of mortality in juvenile spotted owls are starvation and predation by great horned owls (Miller 1989; USDI 1990a~listing document). The time period when adults or offspring are unable to move away from threats or noises is between the time that the eggs are laid and when the young can fly, which is generally about two weeks after the young fledge from the nest. After the young are able to fly, we assume that adults and young may move, but would stay together if annoyed by noise from the proposed action.

The timing of these development benchmarks (nesting and fledging) varies geographically, although spotted owls are generally believed to start laying their eggs around the beginning of March. In Oregon, data based on fledge dates indicate June 30th is the date by which almost all juveniles are capable of flight. This 1 March – 30 June period of vulnerability is called the "critical nesting period."

Activities that may result in above-ambient noise levels include the use of mechanized tree harvest equipment, road hauling, aircraft/helicopters, heavy equipment, hydraulic hammers, blasting, and road construction and maintenance equipment. In some instances, noise levels produced by these activities can remain above ambient levels out to one mile (for blasting) and still affect spotted owls. If potentially disturbing activities are implemented during the spotted owl critical nesting season (March 1 – June 30) within the prescribed distances in Table 11 of occupied or unsurveyed spotted owl habitat, those activities may adversely affect spotted owls by causing adults to flush from their nest site, abandon a nest, or cause juveniles to prematurely fledge, interrupt foraging activity, or result in increased predation due to less protection when the adult flushes. After June 30, it is presumed that most fledgling spotted owls are capable of sustained flight and can avoid harmful disturbances; thus, disturbance from proposed actions within the prescribed distances shown in Table 10 of known activity centers or unsurveyed suitable habitat, and between July 1 and September 30, may affect, but are not likely to adversely affect, spotted owls.

The SW Oregon administrative units typically utilize minimization measures to avoid adverse impacts to nesting spotted owls wherever they occur, but it is likely that some adverse impact may occur to owls due to disturbance in unsurveyed habitat within or adjacent to project areas. The SW Oregon administrative units and the Service, used an average of the new Service disturbance distances to assess the potential impacts associated with tree harvest activities (the average of disturbance distances associated with tree harvest =100 yards - Table 10), they estimated 40 percent of an average zone of 300 feet around a standard project area (presumed to be 50 acres) would be NRF (as

[220] USFWS 2003.

determined by the percentage of suitable habitat in the matrix according to the Environmental Baseline Tables in the Assessment).

We also bring to your attention that page III-85 of the Rogue River-Siskiyou Draft Environmental Impact Statement for Motorized Vehicle Use indicates that noise disturbance from OHV use is roughly the equivalent of that which occurs from chainsaw use:[221]

Page 638 of the DEIS further acknowledges that 43 CFR 8342 directs the BLM that ORV:

> *"[a]reas and trails shall be located to minimize conflicts between of[f]-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors."* Yet the BLM continues to emphasize and prioritize ORV use near homes and communities. As stated on page one the May 5, 2009 comments of the City of Jacksonville regarding the Draft Timber Mountain Recreation Management Plan DEIS, "[*n]oise from BLM sponsored OHV trails is not compatible with the existing and proposed non-motorized reaction of Jacksonville land. The BLM must provide sufficient distance and buffers between BLM trails and Jacksonville land so that OHV noise does not disturb the peace and quiet desired by hikers, equestrians, picnickers and other non-motorized recreational pursuits."*

With regard to public off-road vehicle travel the BLM must analyze the "closed" option for the as a first step to protect sensitive public lands from motorized vandalism and associated illegal activities (trash dumping, poaching, meth labs, marijuana gardens, soil/plant destruction, invasive plant introduction, pathogen introduction of *P. lateralis*, and mobilization of fish killing fine sediment).

Circumstances have changed since 1995 with exponential growth of motorized vehicle activity on public lands. Deferring analysis for basic RMP decision about motorized use designations would jeopardize other outcomes for soil productivity, timber production, quality traditional recreation, fire prevention, public safety, endangered species recovery, and water quality. Deferring basic analysis and motorized use designations would not be consistent with BLM directives to minimize damage from motorized use. Analysis needs to clearly distinguish between unauthorized motorized use that damages lands (vandalism) and motorized use that is currently authorized (recreation). Lumping these creates huge amounts of confusion and misinformation.

It is prudent to single out the Medford District for motorized use analysis and subsequent designations with RMP decision as the Medford District has had unprecedented and ongoing damage from motorized users due to its context. A network of historic but unauthorized mining roads are regularly used by off highway vehicles to access fragile Jeffrey pine savannas, meadows, and wetlands where rare plants are destroyed and meadow hydrology irreparably damaged. Similarly, a large system of abandoned native service logging roads are regularly damaged during the wet season to access off road areas within timber stands. The French Flat ACEC on the Medford District receives nearly daily damage by off road vehicles despite official

[221] http://www.fs.fed.us/r6/rogue-siskiyou/projects/travel/deis.shtm

vehicle closures to protect *Lomatium cookii*, a federally listed species. Similar damage occurs on most serpentine lands in the Medford District with naturally sparse vegetation, mining history, and gentle slopes that make these areas attractive to motorized vandals. The interspersion of hundreds of home-owners adjacent Medford District BLM lands provides for illegal motorized access that is largely unregulated.

Analysis must inform the public and decision makers that ongoing and largely unregulated motorized access to Medford District BLM lands is connected to illegal and undesirable activities such as: destruction of critical habitat for coho salmon; destruction of listed plant species critical habitat; increased soil compaction; destruction of upland and riparian plants; animal poaching; timber theft; toxic trash dumping; meth labs; stream water pollution; marijuana gardens; rodenticide use that kills spotted owls, fishers, foxes; fertilizer applications that poison streams with excessive nitrates; stolen vehicle abandonment and stripping; wildfire ignitions; chronic illegal occupancy; and illegal mining. All of these transgressions have been repeatedly reported on Medford District lands by our staff and others. BLM cannot dismiss this as a "law enforcement" issue because no amount of law enforcement could effectively reverse current trends and impacts because of the network of off road activity not visible from most system road. The DEIS needs to analyze a combination of actions for the Medford RMP to effectively address motorized vehicle activities that can easily undermine other resource allocations. Streams and wetlands in the Medford District predicted to be protected from logging are being severely damaged with off road vehicles. In severe cases, cumulative soil impacts from OHV and past logging would exceed the 15% soil compaction standard making some timber stands off limits for programmed harvest.

We recommend that motorized analysis include a combination of spatially explicit "closed" designations, legal administrative prohibitions, law enforcement, physical barriers, coordination with adjacent land owners (especially the Forest Service), signs, agency monitoring, citizen monitoring, outreach, and education. We agree that intensive recreational development for off highway vehicle could be deferred from this RMP decision, but ongoing off highway vandalism must be effectively reduced. Currently, it is not practical to have "limited" off highway use areas on the Medford District except for areas currently being analyzed for legitimate recreation (e.g.,Johns Peak, Quartz Creek). Managed recreation and unregulated vandalism are two distinct issues and must be kept separate. Analysis assumptions that areas designated "closed" would not have significant impacts is false, however, anticipated off highway damage would be accounted for in "cumulative effects" that would include "illegal" use.

Recovery actions need to be incorporated into an alternative in the DEIS. At a minimum, coho passage issues both on and off public lands need to be addressed in systematic and timely manner. Similarly, reductions in non-point pollution from roads and off road use need to by systematically addressed with spatially explicit analysis. Priorities for restoration and protection would focus on spatially explicit occupied critical coho habitat. An annual timetable for specific recovery actions must be incorporated into analysis. Habitat quality contingent for increasing coho abundance is directly correlated with road densities in small 6th or the coho spawning watersheds.

III. THE DEIS UNDER-ESTIMATED THE ECONOMIC VALUE OF RECREATION

Recreation and other amenity values associated with forest conservation, not only provide direct economic benefit to those who enjoy those activities, but there are indirect benefits for the whole economy. Public land recreation and amenities like clean water and scenic views, help attract people to the region, help create jobs in non-recreation sectors, and help grow the whole economy.

Speaking about the natural amenities in the Northern Rockies, the National Parks and Conservation Association says:

Three million acres of national parks and protected wildlands—and eight million more of other public lands— give rise to our rivers and lakes, and support world-class biodiversity as well as ski hills, hiking trails, and fishing access sites.

Combined, these amenities drive a powerful economic engine, fueled by a core of national parks and adjacent protected lands. Tourism brings more than $3 billion to the Crown each year—Glacier National Park alone generates more than $110 million in new money to local economies, not to mention those entrepreneurial tourists who choose to relocate and start businesses here.

The stories in this report point to the Crown's spectacular wildlife, its scenic appeal, and its unmatched outdoor recreation as anchors to which our economic success is tethered.

[A] growing number of "footloose" businesses—outfits that locate where they choose, often far from markets, but close to amenities that deliver a high quality of life.[222]

From this perspective, recreation is not just another industry that provides a few direct jobs, rather recreation and amenities are an engine of economic growth across diverse economic sectors. The EIS needs to recognize this.

In 2012 Oregon BLM lands recreation generated $223 million in economic activity while timber production only provided $23 million. DEIS at 472.

"*The most common outdoor recreation activities, requiring the least equipment or specialized skill, have the greatest participation numbers, and...provide the greatest total net benefit."* [223] BLM should therefore reduce emphasis on OHV recreation. These noisy, dangerous, polluting machines displace and conflict with other low impact recreation. Only a small fraction of all recreation visits are associated with OHVs. There were 10.8 million recreation participants on Oregon BLM lands in 2013. Only 826,556 "participants" utilized BLM lands for ORV travel in 2012, while 2,564,574 "participants" visited Western Oregon BLM lands for wildlife viewing and nature study.

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[222] NPCA 2012. Pathways to Prosperity - The Natural Roots of Economic Success in the Crown of the Continent http://www.npca.org/assets/pdf/Pathways-to-Prosperity-Final.pdf. See also, Todd Cherry, Dan Rickman, 2010, "Environmental Amenities and Regional Economic Development", Routledge, 336 pages. http://www.gbv.de/dms/zbw/597954267.pdf ; https://books.google.com/books?id=PWiNAgAAQBAJ&printsec=frontcover#v=onepage&q&f=false

[223] DEIS at 493.

Oregon/BLM recreation related jobs are growing at a much faster rate (and with less volatility) than are timber jobs. DEIS at 567.

SALVAGE LOGGING

I. BLM CANNOT ADOPT A PROGRAM OF SALVAGE LOGGING WITHOUT TAKING A HARD LOOK

This is a programmatic EIS and BLM is clearly contemplating a program of salvage logging where commodity extraction trumps ecological values after natural disturbance events, including within reserves. This will conflict with a wide variety of management objectives (late successional habitat, complex early seral habitat, recovery of listed species, watershed protection, carbon storage, community stability, fire hazard reduction, etc.)

This program of salvage logging will cause very significant cumulative effects. BLM has never produced an adequate programmatic analysis of the effects of salvage logging, yet significant salvage logging was conducted during the last 20 years without any credible programmatic analysis of its effects on late successional habitat objectives. There is significant new information about the adverse effects of salvage logging since the last programmatic NEPA analysis was done. Now is the time to take the required "hard look" at the effects of salvage logging, and the time to adopt scientifically sound and ecologically appropriate policies for management of forest ecosystems following natural disturbance.

II. SALVAGE LOGGING IS INCOMPATIBLE WITH ECOSYSTEM MANAGEMENT

The DEIS (p 434) says "In all alternatives, salvage would take place in the Harvest Land Base after a high or moderate severity fire event." And under Alternative C "Within the Late-Successional Reserve, the BLM would conduct timber salvage after disturbance,…" (DEIS p 62). This is not consistent with the best available science regarding how to achieve ecological objectives in reserves. BLM was a cooperating agency in the Interior Columbia Basin Ecosystem Management Project which asked (and concluded) –

> **Can salvage timber sales be compatible with ecosystem-based management?**
> … Our findings suggest that this type of harvesting is not compatible with contemporary ecosystem-based management. Ecosystem-based management would emphasize removing smaller green trees with greater attention to prevention of mortality rather than removal of large dead trees.[224]

The DEIS does not fully and accurately describe the benefits of retaining large dead trees and the benefits of natural recovery after natural disturbance, nor does the DEIS fully and accurately describe the adverse effects of salvage logging.

[224] Quigley, Thomas M., tech. ed. 1996; The Interior Columbia Basin Ecosystem Management Project: Scientific Assessment.) Gen. Tech. Rep. PNW-GTR-382; Page 178.

We strongly urge BLM to adopt an alternative that prohibits post-disturbance salvage logging in all reserves (only allowing felling of imminent hazard trees in areas of high public use). Based on current ecological science, this is the best way to meet objectives for reserves. Large dead trees which are the target of salvage logging are old growth structurally elements that provide significant ecological value even if they are not surrounded by green trees. Large snags provide "life boats" allowing many late successional organisms to persist in "young" forests. Science shows that best way to develop complex old forest is to maintain complex young forest and allow forest to regenerate naturally and move through succession without interference. Salvage logging is adverse to reserve objectives because it removes late successional habitat components that take a long time to develop once they are removed and creates atypical simplified habitat structures and patterns.

BLM cannot take a hard look at the issues of snag habitat and complex young forests without considering the dynamics of snags and dead wood in natural forests. Natural young forests are typified by large amounts of dead wood. Salvage logging results in atypical and undesirable ecological conditions.

> Spies et al. (1988) reported that amounts of CWD were high in the youngest successional stages, were lowest in 60-80-year-old forests, and were high in old stands (< 500 years). After 500 years CWD amounts declined to an intermediate level. Spies and Franklin (1988) reported that CWD input may be low in young stands because of the small size of dead and dying stems. Volumes in these stands are often high, however, due to residual CWD from the previous stand.[225]

Jerry Franklin's long career studying old forests led him to the conclusion that salvage logging is not compatible with conservation of old growth ecosystems.

> There are implications for management of old-growth stands selected for perpetuation. Salvage logging is inappropriate since it removes at least two of the major structural components -dead and down- that are key elements of the system. In all likelihood, some of the more decadent, live trees would also be removed. Salvage logging is also inappropriate because of the damage inevitably done to root systems and trunks of the residual stand which results in accelerated mortality of trees and overall deterioration of the stand.[226]

We also urge BLM to minimize salvage logging in other areas including the timber management areas. The purpose of this recommendation is to realize the benefits of complex early seral

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[225] Lofroth, Eric. 1998. The dead wood cycle. In: Conservation biology principles for forested landscapes. Edited by J. Voller and S. Harrison. UBC Press, Vancouver, B.C. pp. 185-214. 243 p.
http://www.for.gov.bc.ca/hre/deadwood/DTrol.htm.

[226] Franklin, J.F., K. Cromack, Jr., W. Denison, A. McKee, C. Maser, J. Sedell, F. Swanson, and G. Juday. 1981. Ecological characteristics of old-growth Douglas-fir forests. PNW-GTR-118. USDA Forest Service. PNW Research Station. February 1981.
http://www.fs.fed.us/pnw/pubs/gtr118part1.pdf
http://www.fs.fed.us/pnw/pubs/118part2.pdf

habitat which is one of the most under-represented forest habitat types in western Oregon. Unsalvaged, naturally regenerated, young stands are one of the rarest forest types in the Pacific northwest, and their biodiversity rivals that of old-growth forests.

> Indeed, naturally developed early-successional forest habitats, with their rich array of snags and logs and nonarborescent vegetation, are probably the scarcest habitat in the current regional [Pacific Northwest] landscape.[227]
>
> "There has been a loss of diverse young forests on all ownerships. … Conservation of diverse young forests has received little attention in forest policy."

Janet Ohmann; Science Findings, Issue 56; Seeing the trees for the forest: mapping vegetation biodiversity in coastal Oregon forests; (September 2003).
http://www.fs.fed.us/pnw/sciencef/scifi56.pdf.

III. BLM NEEDS TO CONSIDER ALTERNATIVE APPROACHES TO SALVAGE LOGGING

In timber management areas BLM should consider alternative approaches to salvage logging modeled on the recommendations of the Beschta report. Specifically:

- prohibit post-fire logging AND roadbuilding on all sensitive sites, including: severely burned areas (areas with litter destruction), on erosive soils, on fragile soils, in roadless/unroaded areas, in riparian areas, on steep slopes, and any site where accelerated erosion is possible. We would add: Late-Successional and Riparian Reserves, and protective land allocations or designations including Botanical and Scenic River Areas;
- protect all live trees;
- protect all old snags over 150 years old;
- protect all large snags over 20 inches dbh;
- protect at least 50% of each size class of dead trees less than 20 inches dbh.[228]

BLM should also consider alternatives for salvage logging that address the recommendations in the following publications:

- *Society for Conservation Biology Scientific Panel on Fire in Western U.S. Forests. Reed F. Noss (editor), Jerry F. Franklin, William Baker, Tania*

[227] Lindenmayer, David B. and Jerry F. Franklin. 2002. Conserving Forest Biodiversity: A Comprehensive Multiscale Approach. Island Press. Washington, DC: 69. *See also*, DellaSala, D.A., J.E. Williams, C. Deacon-Williams, and J.F. Franklin. Beyond smoke and mirrors: a synthesis of fire policy and science. Conservation Biology, Pages 976–986. Volume 18, No. 4, August 2004.
http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/17521/Beyond%20smoke%20and%20mirrors.pdf

[228] *See* Beschta RL, Frissell CA, Gresswell R, Hauer R, Karr JR, Minshall GW, Perry DA, and Rhodes JJ. 1995. Wildfire and Salvage Logging: recommendations for ecologically sound post-fire salvage logging and other post-fire treatments on Federal lands in the West. Corvallis, OR: Oregon State University. Available at: http://www.fire-ecology.org/science/Beschta_Report.pdf.

Schoennagel, and Peter B. Moyle. Ecological Science Relevant to Management Policies for Fire-prone Forests of the Western United States. February 24, 2006. http://www.conservationbiology.org/sections/namerica/FireWhitepaper.pdf.

- *See also the published version, Reed F. Noss (editor), Jerry F. Franklin, William L. Baker, Tania Schoennagel, and Peter B. Moyle. 2006. Ecology and Management of Fire-prone Forests of the Western United States. Society for Conservation Biology Scientific Panel on Fire in Western U.S. Forests. August 2006. http://www.conbio.org/images/content_policy/2006-8_SCB_NA_Statement_Wildland_Fire.pdf.*

BLM in the DEIS at 212 states "The ability to conduct salvage harvest for purposes of protecting human health and safety within the dry forest would be available under all alternatives." We are concerned that this authority is not adequately constrained. We support felling of real and imminent hazard trees in areas that are frequently used by workers and the public (e.g., in developed recreation sites and along paved roads). However, we have too often seen hazard tree removal used as an excuse for commodity extraction in areas that are not a high priority for hazard removal (e.g., remote locations where people visit infrequently and/or risk exposure is brief periods such as passing by large snags along a remote road or trail). BLM should consider (1) felling and retaining hazard trees onsite for ecological benefits, (2) keep workers out of the way of hazards as a way to retain high value large snags; (3) recognize that the public is risk tolerant when they are visiting wild forests. The public does not want a sanitized recreational experience on their public lands.

The DEIS at 813 concludes "In northern spotted owl critical habitat in the Harvest Land Base, the No Action alternative and Alternative B, Sub-alternative B, and Alternative D would allow salvage operations that meet down wood and snag retention standards, the minimum level needed 'to conserve and restore habitat elements.'" We are concerned about "managing for minimums." BLM should be managing for optimal levels of key habitat elements such as large trees, and dead and down wood. This requires retaining abundant levels of green trees for long-term recruitment of high levels of snags. BLM should consider alternatives that meet DecAID 50-80%+ tolerance levels for species associated with dead wood and sensitive to low levels of dead wood.

Appendix B "Management Direction" regarding salvage logging raises several concenrs. It urges BLM to minimize commercial loss and deterioration" but it does not balance with objective with any of the significant trade-offs including: recovery of listed species; protecting soil, water, and watersheds; mitigating the landscape shortage of large snags in the checkerboard lands; mitigating the temporal "snag gap" caused by stand replacing disturbance; development of future complex habitat (early seral or late seral); or carbon storage.

IV. BLM MUST TAKE A HARD LOOK AT THE ADVERSE EFFECTS OF SALVAGE LOGGING

Salvage logging also causes a host of adverse effects associated with logging in general, e.g., watershed degradation, erosion, sedimentation, road impacts, habitat fragmentation, soil

compaction, visual blight, etc. Many of these effects are worse than green timber sales because the soil lacks structure and protection normally found in green forests.

Renowned fisheries expert James Karr said:

> … I joined eight other scientists to explore whether forests might be restored by logging soon after a fire. We had among us a wealth of knowledge across a wide range of fields. We pored over several decades of research but found nothing to show that fire-adapted forests might be improved by logging in the wake of a fire.
>
> In fact, we found just the opposite: Most plants and animals in these forests are adapted to periodic fires; they have a remarkable way of recovering – literally rising from the ashes.
>
> These forests have evolved with fire. Periodic fires have been part of a normal cycle lasting thousands of years. Logging a burned forest damages the soil, carrying away nutrients, robbing seedlings of moisture and clogging nearby streams. Trees in a burned landscape, both dead and alive, continue to provide homes for wildlife after a fire and form the building blocks of new forests.[229]

BLM should carefully review the post-fire science summary prepared by the World Wildlife Fund in 2006.

> In general traditional forestry has viewed fire as bad and dead trees as a waste. These views have skewed public policies about post-fire logging. However, current scientific understanding recognizes that disturbance and dead trees are in fact critical to forest health. Of the approximately thirty scientific papers on post-fire logging and additional government reports published to date, not a single one indicates that logging provides benefits to ecosystems regenerating post-disturbance. In general, post-fire logging impedes regeneration when it compacts soils, removes "biological legacies" (e.g., large dead standing and downed trees), introduces or spreads invasive species, causes soil erosion when logs are dragged across steep slopes, and delivers sediment to streams from logging roads. Further, a large body of science on disturbance ecology (e.g., recent books on Mt. St Helens and studies in the Yellowstone Ecosystem and elsewhere) indicate that when natural disturbance events are preceded and/or followed by land management activities they often impair the recovery of forest ecosystems.[230]

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[229] Karr, James. 2005 Nature doesn't benefit from logging fire-damaged lands | The News Tribune, Tacoma, WA. ftp://ftp2.fs.fed.us/incoming/r5/Klamath/Mt.HebronRestoration/MountHebron.Records/MtHebronRestoration.ProjectRecord/D.%20ScopingComments.Analysis/ArtleyAttachment9.FullArticles/Pub10.Karr2005.Tribune.pdf

[230] Dominick A. DellaSala 2006. POST-FIRE LOGGING SUMMARY OF KEY STUDIES AND FINDINGS. World Wildlife Fund, February 2006. ftp://frap.cdf.ca.gov/pub/incoming/IMMP/Post%20Fire%20Salvage%20Logging%20Papers/Post%20Fire%20Logging%20Review%202006.pdf

In October 2013, 250 scientists signed a letter urging greater attention to the conservation of complex early seral forests and natural recovery after fire. These scientists conclude that the

> *"current state of scientific knowledge, … indicates that [salvage logging] would seriously undermine the ecological integrity of forest ecosystems on federal lands. … This post-fire habitat, known as 'complex early seral forest,' is quite simply some of the best wildlife habitat in forests and is an essential stage of natural forest processes. Moreover, it is the least protected of all forest habitat types and is often as rare, or rarer, than old-growth forest, due to damaging forest practices encouraged by post-fire logging policies. While there remains much to be discovered about fire in our forests, the scientific evidence indicates that complex early seral forest is a natural part of historical fire regimes in nearly every conifer forest type in the western U.S. (including ponderosa pine and mixed-conifer forests) … Numerous studies also document the cumulative impacts of post-fire logging on natural ecosystems, including the elimination of bird species that are most dependent on such conditions, compaction of soils, elimination of biological legacies (snags and downed logs) that are essential in supporting new forest growth, spread of invasive species, accumulation of logging slash that can add to future fire risks, increased mortality of conifer seedlings and other important re establishing vegetation (from logs dragged uphill in logging operations), and increased chronic sedimentation in streams due to the extensive road network and runoff from logging operations."*[231]

The EIS needs to carefully and comprehensively disclose and consider the following issues before approving a program of post-disturbance salvage logging:

a. the natural range of variability and existing rarity of complex young forests (e.g., young forests that are unsalvaged after disturbances). Since large snags are outside the natural range of variability across the landscape, the agency must retain all large snags to start moving the landscape toward the natural range of variability, or the agency must carefully justify in the NEPA analysis every large snag it proposes to remove. See Jerome J. Korol, Miles A. Hemstrom, Wendel J. Hann, and Rebecca A. Gravenmier. Snags and Down Wood in the Interior Columbia Basin Ecosystem Management Project. PNW-GTR-181. http://www.fs.fed.us/psw/publications/documents/gtr-181/049_Korol.pdf. This paper estimates that even if we apply enlightened forest management on federal lands for the next 100 years, we will still reach only 75% of the historic large snag abundance measured across the interior Columbia Basin, and most of the increase in large snags will occur in roadless and wilderness areas.
b. the ecological values (such as wildlife habitat) associated with snags, dead wood, and complex young forests. See Rose, C.L., Marcot, B.G., Mellen, T.K., Ohmann, J.L., Waddell, K.L., Lindely, D.L., and B. Schrieber. 2001. Decaying Wood in Pacific

[231] Della Sala, D. et al (2013) Open Letter to Members of Congress from 250 Scientists Concerned about Post-fire Logging. October 30, 2013. http://geosinstitute.org/images/stories/pdfs/Publications/Fire/Scientist_Letter_Postfire_2013.pdf or http://www.scribd.com/doc/181401520/Open-Letter-to-Members-of-Congress-from-250-Scientists-Concerned-about-Post-fire-Logging-October-30-2013

Northwest Forests: Concepts and Tools for Habitat Management, Chapter 24 *in* ***Wildlife-Habitat Relationships in Oregon and Washington*** (Johnson, D. H. and T. A. O'Neil. OSU Press. 2001) http://web.archive.org/web/20060708035905/http://www.nwhi.org/inc/data/GISdata/docs/chapter24.pdf

c. Given the regional deficit of young complex forests and the fact that many species, such as woodpeckers and secondary cavity users, appear to be adapted to exploit the structure and resources available within disturbed forests, the agencies should comprehensively consider and disclose the direct and indirect effects of salvage logging on species associated with young complex forests. The Forest Service has numerous Management Indicator Species whose populations have not been monitored, so the agencies lack the information necessary to that the salvage logging program will maintain species viability.

d. the effects of salvage logging on the development of complex forest habitat; "The early post-disturbance period of forest ecosystem development - pre-tree-canopy closure - is profoundly important!" because it is heterogeneous, light-energy rich, structure rich, biodiversity rich, and process rich. "**Removal of legacies is most profound long-term impact**" because of the "Importance of Coarse Wood:
   - Habitat for species
   - Organic seedbeds (nurse logs)
   - Modification of microclimate
   - Protection of plants from ungulates
   - Sediment traps
   - Sources of energy & nutrients
   - Sites of N-fixation
   - Special source of soil organic matter
   - Structural elements of aquatic ecosystems"

   Jerry Franklin - What is a 'Good' Forest Opening? – Powerpoint http://courses.washington.edu/esrm315/Lectures/FranklinEarlySuccession.pdf

e. all the new science related to salvage logging and dead wood, including but not limited to: Beschta R.L., J.J. Rhodes, J.B. Kauffman, R.E. Gresswell, G.W. Minshall, J.R. Karr, D.A. Perry, F.R. Hauer, and C.A.Frissell, 2004. Postfire management on forested public lands of the western USA. Cons. Bio.,. http://pacificrivers.org/files/post-fire-management-and-sound-science/Beschta-etal2004.pdf and Rose, C.L., Marcot, B.G., Mellen, T.K., Ohmann, J.L., Waddell, K.L., Lindely, D.L., and B. Schrieber. 2001. Decaying Wood in Pacific Northwest Forests: Concepts and Tools for Habitat Management, Chapter 24 in Wildlife-Habitat Relationships in Oregon and Washington (Johnson, D. H. and T. A. O'Neil. OSU Press. 2001) http://web.archive.org/web/20060708035905/http://www.nwhi.org/inc/data/GISdata/docs/chapter24.pdf

f. "Conservation of diverse young forests has received little attention in forest policy." USDA PNW Research Station. *Science Findings.* Sept 2003. http://www.fs.fed.us/pnw/sciencef/scifi56.pdf. "[T]here's a looming shortage of diverse young forests - where seedlings intermingle with fallen logs, standing dead

snags, and shrubs - that provide specialized habitat for certain animals and plants. … there's a looming gap in diverse, young, early-successional conifer forest, the type of forest that once came in naturally after forest fires. These young forests, up to 10 years old, have a diversity of forest structures - fallen logs and dead snags - and a diversity of plant life. They are important habitat for the western bluebird and other birds that prefer open areas, as well as some shrub species. Today, because of intense timber management on private lands, young forests don't get the chance to develop much diversity." OSU. 2001. Press Release: Researchers Assess Forest Sustainability. http://web.archive.org/web/20060914032259/http://oregonstate.edu/dept/ncs/newsarch/2001/Oct01/assess.htm According to the CLAMS project: "Diverse young forests: also rare but receiving less attention. Legacy tree habitat: uncertain future.." Ohmann, Spies, Gregory, Johnson. 2002. Vegetation Biodiversity in the Oregon Coast Range. http://www.fsl.orst.edu/clams/download/presentations/j02s_ohmann_10june02.pdf (slide 24).

g. Hutto, R.L., 2006. Toward Meaningful Snag-Management Guidelines for Postfire Salvage Logging in North American Conifer Forests. Conservation Biology Volume 20, No. 4, 984–993. http://web.archive.org/web/20090310114517/http://avianscience.dbs.umt.edu/documents/hutto_conbio_2006.pdf ("Species such as the Black-backed Woodpecker (*Picoides arcticus*) are nearly restricted in their habitat distribution to severely burned forests. Moreover, existing postfire salvage-logging studies reveal that most postfire specialist species are completely absent from burned forests that have been (even partially) salvage logged. I call for the long-overdue development and use of more meaningful snag-retention guidelines for postfire specialists, and I note that the biology of the most fire-dependent bird species suggests that even a cursory attempt to meet their snag needs would preclude postfire salvage logging in those severely burned conifer forests wherein the maintenance of biological diversity is deemed important.")
h. A recent study of birds that use post-fire mosaics highlighted the importance of resprouting shrubs and forbs on the re-establishment of nesting birds following wildfire. "Of the 39 species for which nests were found, 14 (37%) used cavities and 25 (63%) built open-cup nests.... Species that built cup nests used snags, residual live trees, resprouting hardwoods, and other ground vegetation and downed wood. The associations between the presence of breeding species and forb and shrub cover indicate that these are important components of the early establishment of bird populations following stand-replacing fires. These data suggest that post-fire management of resprouting hardwoods and herbaceous vegetation should consider potential impacts to bird species that nest and forage in burned forests." CFER 2007. Response of Birds to Fire Mosaics. CFER News. Winter 2007. http://www.fsl.orst.edu/cfer/pdfs/Vol7_1.pdf.
i. BLM's Western Oregon Plan Revision (WOPR) DEIS (p. LII) admits that structurally complex young forests develop old forest characteristics twice as fast as structurally deprived initial conditions.
j. Mark E Swanson, Jerry F Franklin, Robert L Beschta, Charles M Crisafulli, Dominick A DellaSala, Richard L Hutto, David B Lindenmayer, and Frederick J

Swanson 2010. The forgotten stage of forest succession: early-successional ecosystems on forest sites. Front Ecol Environ 2010; doi:10.1890/090157

k. Bats find favorable habitat in burned areas with abundant and diverse snags and abundant and diverse flying insects. Salvage logging will remove potential roost sites, and food sources. Carol Chambers and Erin Saunders. BATS IN THE BURNS - Studying the impact of wildfires and climate change. BATS. Bat Conservation International. Winter 2013, Volume 3, No. 4. http://www.batcon.org/index.php/media-and-info/bats-archives.html?task=viewArticle&magArticleID=1154

l. "Leaving a damaged forest intact means the original conditions recover more readily," says David Foster, … director of the NSF Harvard Forest LTER site. "Forests have been recovering from natural processes like windstorms, fire and ice for millions of years. What appears to us as devastation is actually, to a forest, a natural and important state of affairs." 10-16-2012 Press Release 12-198, In Blown-Down Forests, a Story of Survival To preserve forest health, the best management decision may be to do nothing. http://www.nsf.gov/news/news_summ.jsp?cntn_id=125744; Audrey Barker Plotkin, David Foster, Joel Carlson, and Alison Magill 2013. Survivors, not invaders, control forest development following simulated hurricane. Ecology, 94(2), 2013, pp. 414–423. http://harvardforest.fas.harvard.edu/sites/harvardforest.fas.harvard.edu/files/publications/pdfs/BarkerPlotkin_Ecology_2013.pdf

m. "Unmanaged early-seral stages of forest development are now considered to be among the most threatened habitat types in coniferous regions of the western United States (Noss et al. 2006, Thomas et al. 2006). Not surprisingly, concern has arisen over viability of populations that use broadleaf vegetation in early-seral forest, particularly as this habitat type contributes disproportionately to forest biodiversity (Halpern and Spies 1997). In the northwestern United States, a number of bird species thought to be strongly associated with early-seral broadleaf habitat have declined and are considered conservation priorities (Altman 1999, U.S. Fish and Wildlife Service 2002). Because the PNW represents a substantial portion of the ranges of these species, loss of quality early-seral habitat could increase risk of extinction." M. G. BETTS, J. C. HAGAR, J. W. RIVERS, J. D. ALEXANDER, K. MCGARIGAL, AND B. C. MCCOMB. 2010. Thresholds in forest bird occurrence as a function of the amount of early-seral broadleaf forest at landscape scales. Ecological Applications, 20(8), 2010, pp. 2116–2130. http://www.fsl.orst.edu/flel/pdfs/Betts%20et%20al%202010%20Ecol%20Apps.pdf

Before adopting a widespread salvage logging program, BLM needs to carefully consider and disclose reasons NOT to remove snags. Science tells us that natural forests develop after disturbance with abundant structural legacies. These legacy features include snags and down wood which play a wide variety of valuable ecological services for the developing forest, including but not limited to:

- nutrient uptake, storage, and release
- water uptake, storage, and release
- mycorrhizal colonization

- wildlife habitat, in particular for primary cavity species which are recognized as a "keystone" element of healthy forests
- allowing some forest species to linger in burned forests after disturbance and to recolonize burned forests sooner after disturbance, thereby shortening the period during which burned stands are unsuitable for wildlife
- providing food for insects that in turn feed a wide variety of other wildlife such as birds and bats
- favorable sites for seed germination and establishment
- mechanical thinning of the regenerating stand due to the process of snag fall
- shade and cover for everything from seedlings to big game
- perches, nest, and den structures.
-

In general, the larger the piece size, the longer they tend to last. But salvage logging removes those very elements that are most valuable for wildlife and most difficult to replace.

Since this project involves post-fire commodity extraction (also often referred to erroneously as "salvage" logging) please carefully analyze, consider, and disclose the site-specific analysis of the many reasons NOT to do post-fire commodity extraction, including but not limited to:

- adverse impacts to soil, such as erosion, compaction, displacement, litter disturbance, nutrient depletion; loss of chemical buffering; loss of soil organic matter; loss of burrowing wildlife that help aerate soils; reduction of nitrogen fixing plants that boost soil fertility; loss of slope and snow stabilizing effects which could lead to mass wasting or eliminate mechanisms that may mitigate mass wasting;
- loss of down wood functions s such as trapping sediment and aiding water infiltration, and creating microsites favorable for germination and establishment of diverse plants, and habitat for diverse wildlife;
- loss of decaying wood and depletion of the "savings account for nutrients and organic matter" which affects site productivity through the removal of dead trees which store nutrients and slowly release them to the next stand. Marañón-Jiménez, S., Fernández-Ondoño, E., and J. Castro. 2013. Charred wood remaining after a wildfire as a reservoir of macro- and micronutrients in a Mediterranean pine forest. International Journal of Wildland Fire. http://dx.doi.org/10.1071/WF12030 ("Partially charred wood represented a considerable pool of nutrients, due to both the relatively high concentrations and to the great amount of biomass still present after the fire. Potential contributions of the charred wood were particularly relevant for N and micronutrients Na, Mn, Fe, Zn and Cu, as wood contained 2–9 times more nutrients than the soil. Post-fire woody debris constitutes therefore a valuable natural element as a potential source of nutrients, which would be lost from ecosystems in cases where it is removed")
- Recent studies indicate that wood may release nutrients more rapidly than previously thought through a variety of decay mechanisms mediated by means other than microbial decomposers, i.e. fungal sporocarps, mycorrhizae and roots, leaching, fragmentation, and insects;
- loss of nutrients from live trees that are determined to be "dying." Live trees produce serve as refugia for animals, invertebrates, and mycorrhizae; produce litter fall; and help cycle nutrients which are all extremely valuable in the post-fire landscape;

- loss of wood that serves to buffer soil chemistry and prevent extreme changes in soil chemistry;
- water quality degradation;
- loss of water storage capacity in down logs;
- altered timing of storm run-off which could lead to peak flows that erode stream banks and scour fish eggs;
- delaying the pace of vegetative recovery and reducing the quality/diversity of the vegetation community;
- dead trees serve as a natural fence that protects young seedlings from browse by cattle and big game. This is one way that young aspen and other valuable species can get their start;
- spread of invasive weeds through soil disturbance and extensive use of transportation systems;
- loss of legacy structures that can carry species, functions, and processes over from one stand to the next;
- loss of terrestrial and aquatic habitat (mostly snags and down logs) potentially harming at least 93 forest species (63 birds, 26 mammals, and 4 amphibians) that use snags for nesting, roosting, preening, foraging, perching, courtship, drumming, and hibernating, plus many more species that use down logs for foraging sites, hiding and thermal cover, denning, nesting, travel corridors, and vantage points for predator avoidance;
- Depletion of large wood structures in streams that can cause: 1) simplification of channel morphology, 2) increased bank erosion, 3) increased sediment export, 4) decreased nutrient retention, 5) loss of habitats associated with diversity in cover, hydrologic patterns, and sediment retention;
- commercial salvage usually removes the largest trees, but this will disproportionately harm wildlife because: (1) larger snags persist longer and therefore provide their valuable ecosystem services longer and then serve longer as down wood too, and (2) most snag-using wildlife species are associated with snags >14.2 inches diameter at breast height (dbh), and about a third of these species use snags >29.1 inches dbh.
- Truncation of symbiotic species relations and loss of biodiversity. Sixteen species are primary cavity excavators and 35 are secondary cavity users; 8 are primary burrow excavators and 11 are secondary burrow users; 5 are primary terrestrial runway excavators and 6 are secondary runway users. Nine snag-associated species create nesting or denning structures and 8 use created structures.
- Reduced avian and terrestrial species diversity which affects plant and invertebrate diversity. Since different wildlife help disperse different sets of seeds and invertebrates, reduced wildlife diversity can significantly affect pace of recovery and the diversity of the regenerating stand. Snag- associated wildlife play a greater role in dispersal of invertebrates and plants, while down wood-associated wildlife play a greater role in dispersal of fungi and lichens. Down wood-associated species might contribute more to improving soil structure and aeration through digging, and to fragmenting wood which increases surface area encouraging biological action that releases nutrients.
- loss of partial shade that helps protect the next generation of forest;
- loss of cover quality and fawning areas for big game;

- loss of future disturbance processes such as falling snags that help thin and diversify the next generation of forest;[232]
- increased human activity and human access that can increase fire risk;
- increased fine fuels on the forest floor that can cause an increase in fire hazard;
- loss of seed sources, and
- loss of diversity of vegetation and microsite conditions.
- The fact that regional standards for snags and down wood fail to incorporate the most recent science indicating that more snags and down wood (especially large snags and logs) are required in order to maintain species viability and sustain site productivity.
- Arguments in support of the "reburn hypothesis" are specious. (1) partial reburn may be completely natural and desirable in some cases to consume some fuel and diversify the regenerating forest, and (2) salvage logging will cause a pulse of fine fuels on the ground and actually increase the reburn risk/hazard above natural levels, and (3) fuels that fall to the ground over time will to some extent decay as they fall.
- Uncertainty calls for a cautious approach.
-

Compare these adverse impacts of salvage logging to the few scant reasons to salvage (e.g., economic recovery of fiber).

V. THE DEIS FAILS TO RECOGNIZE THE SIGNIFICANT ECOLOGICAL VALUE OF RETAINING LARGE SNAGS

Protecting large snags from salvage logging is particularly important. Because large snags last much longer than small snags, large snags are disproportionately valuable as wildlife habitat, nutrient and water reservoirs, soil stabilizers, etc. If the agency chooses to conduct a salvage operation in this fire area, they must use a diameter cap and protect these scarce and valuable forest structures.

Jerry Franklin, in commenting on a large fire salvage project in 2015 said:

> Large snags and logs are the most important surviving structural elements or biological legacies of a forest disturbance (Franklin et al. 2002), excepting only surviving large live trees. Importance, in this case, refers to the roles of these structures in:
>
> (1) Providing essential habitat for an immense array of species;
>
> (2) Maintaining important ecosystem functions; and
>
> (3) Structurally enriching the young forest stand, making it possible for mid- and latesuccessional species to re-colonize the stand much earlier in its chronological development than would otherwise be the case (Franklin et al. 1987).

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[232] JAMES A. LUTZ AND CHARLES B. HALPERN. 2006. TREE MORTALITY DURING EARLY FOREST DEVELOPMENT: A LONG-TERM STUDY OF RATES, CAUSES, AND CONSEQUENCES. Ecological Monographs, 76(2), 2006, pp. 257–275. This study showed that mortality from mechanical damage ("crushing disturbance") from falling limbs and trees and snow loads can be a more significant factor than suppression mortality. See also, Brown, Martin J.; Kertis, Jane; Huff, Mark H. 2013. Natural tree regeneration and coarse woody debris dynamics after a forest fire in the western Cascade Range. Res. Pap. PNW-RP-592. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 50 p. "Snag fall and fragmentation added so much wood to the ground—thousands of meters of log length per hectare—that it probably constitutes a significant ecological disturbance in itself, a kind of rain of logs.")

The importance of large snags and down wood for a broad array of species is recognized in the EIS document. These structures provide habitat for early as well as late successional species and sustain many important ecosystem processes (e.g., Harmon et al. 1986). However, the long persistence and multiple roles played by the large pulse of snags, logs, and other CWD provided by the stand-replacement event (Harmon et al. 1986; Maser et al. 1988) do not appear to be adequately recognized in the analysis of how much of this wood should be retained. For example, large Douglas-fir logs continue to fulfill important ecological functions, such as habitat for small mammals and salamanders, for 200 to 250 years after their death. Cedar snags can persist for at least as long as 1 ½ centuries and as logs for over twice that long.

The massive input of large dead wood is characteristic and critical to stand development processes and the ultimate provision of habitat for late-successional species following stand replacement fires (Maser et al. , 1988; Franklin et al. 2002). As noted these wood structures may persist and play functional roles for several centuries, particularly in the case of decay resistant species. Large pines may also persist as snags for several decades and additional periods as logs on the forest floor. In fact, the entire recovering forest ecosystem will depend upon this pulse of CWD until it reaches a point in its development where the new stand begins to generate snags and logs of comparable size and heartwood content-generally between 100 and 200 years (Maser et al. 1988; Franklin et al., 2002). Consequently, basing snag and CWD retention following salvage on levels of these structures found in existing mature and old forests is not appropriate; *all of this initial pulse of wood is needed to reach those levels one to two centuries from now!* Indeed, the use of mature forests as a standard for CWD is particularly inappropriate since this is the period when CWD levels are at their lowest level during the entire natural developmental sequence from stand-replacement fire to old growth (see diagram in paper by Spies in Maser et al. 1988). It certainly does not appear to me that the approach taken in the DEIS reflects an appreciation of the fact that this one-time input oflarge and decay resistant CWO is all that the recovering forest ecosystem is going to get for the next 100 to 200 years.

The importance of snags, logs, and other CWD is recognized in FEMAT's (1993) scientific analysis. For example (my underlining for emphasis):

> *Because of the important role of dead wood in late-successional and old-growth forest ecosystems, and because there is much to learn about the role of dead wood in the development of forests, only limited salvage is appropriate in Late-Successional Reserves. .. The Final Draft Recovery Plan [for the NSO] would allow removal of small-diameter snags and logs, but would also require retention o[snags and logs likely to persist until the new stand begins to contribute significant quantities of coarse woody debris." FEMAT 1993, p. IV-37.*
>
> *Snags provide a variety of habitat benefits for a variety of wildlife species associated with late-successional forests. Accordingly, following stand-replacing disturbances. management should focus on retaining snags that are likely to*

> *persist until late-successional conditions have developed and the new stand is again producing large snags. FEMAT 1993, p. III-37.*
>
> *Following a stand replacing disturbance, management should retain adequate coarse woody debris quantities in the new stand so that in the.fi1ture it will contain amounts similar to natural regenerated stands. The analysis that determines the amount of coarsewoody debris to leave must account for the filii period of time before the new stand begins to contribute coarse woody debris .... FEMA T 1993, p. III-37.*

In summary, general salvage of large snags and logs is clearly antithetical to the goal of rapid recovery of fully functional late-successional forest habitat and inappropriate within the Late Successional Reserves.

Jerry Franklin. Comments on the Klamath NF, Westside Fires Salvage DEIS. 6 April 2015.

Retaining large snags is necessary to mitigate the "snag gap" caused by stand replacing disturbance. It may seem counter-intuitive but fire results in a snag shortage. One of the most significant and lasting effects of stand replacing disturbance such as fire, wind, or regeneration logging is to bring the process of snag recruitment to a virtual standstill for many decades. Even if snags are not removed by the disturbance, snags created by the disturbance will fall down over time and few if any snags are created. This results in a "snag gap" that has serious adverse consequences for habitat and many other ecological processes. The apparent abundance of large snags after a stand replacing disturbance masks a severe shortage of large snags down the road.

In Congressional testimony in July 2004, Jerry Franklin said:

> It is sometimes argued that following a stand-replacement fire in an old-growth forest that snags and logs are present in "excess" of the needs of the site, in terms of ecosystem recovery. In fact, the large pulse of dead wood created by the disturbance is the only significant input of woody debris that the site is going to get for the next 50 to 150 years—the ecosystem has to "live" off of this woody debris until the forest matures to the point where it has again produced the large trees that can become the source for new snags and logs (Maser et al. 1988).

Dr. Jerry F. Franklin, Professor of Ecosystem Studies, College of Forest Resources, University of Washington. July 15, 2004. TESTIMONY FOR THE RECORD ON OVERSIGHT HEARING ON "RESTORING FORESTS AFTER CATASTROPHIC EVENTS" BY HOUSE COMMITTEE ON RESOURCES, SUBCOMMITTEE ON FOREST AND FOREST HEALTH. http://www.signaloflove.org/clearcutting/reports/fire3/Franklin%20Jerry%20July%202004%20testimony.pdf.

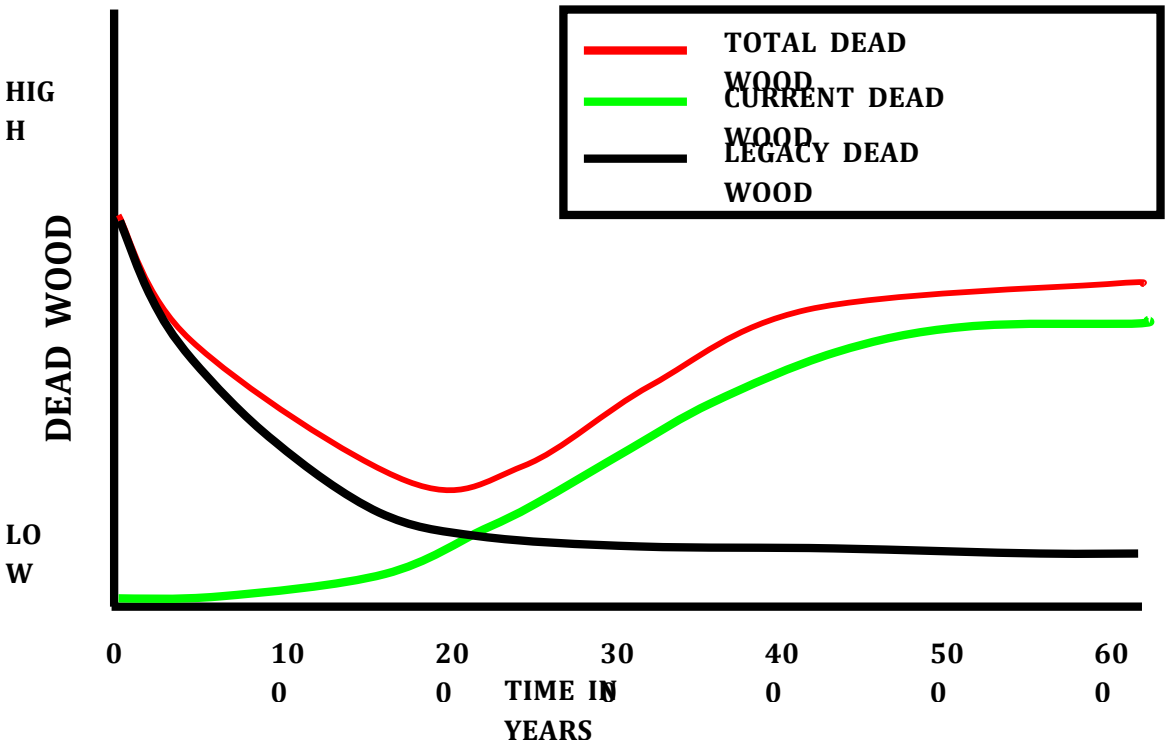
Similarly, Johnson & Franklin's 2008 Forest Plan for the Klamath Tribes says of large fires;

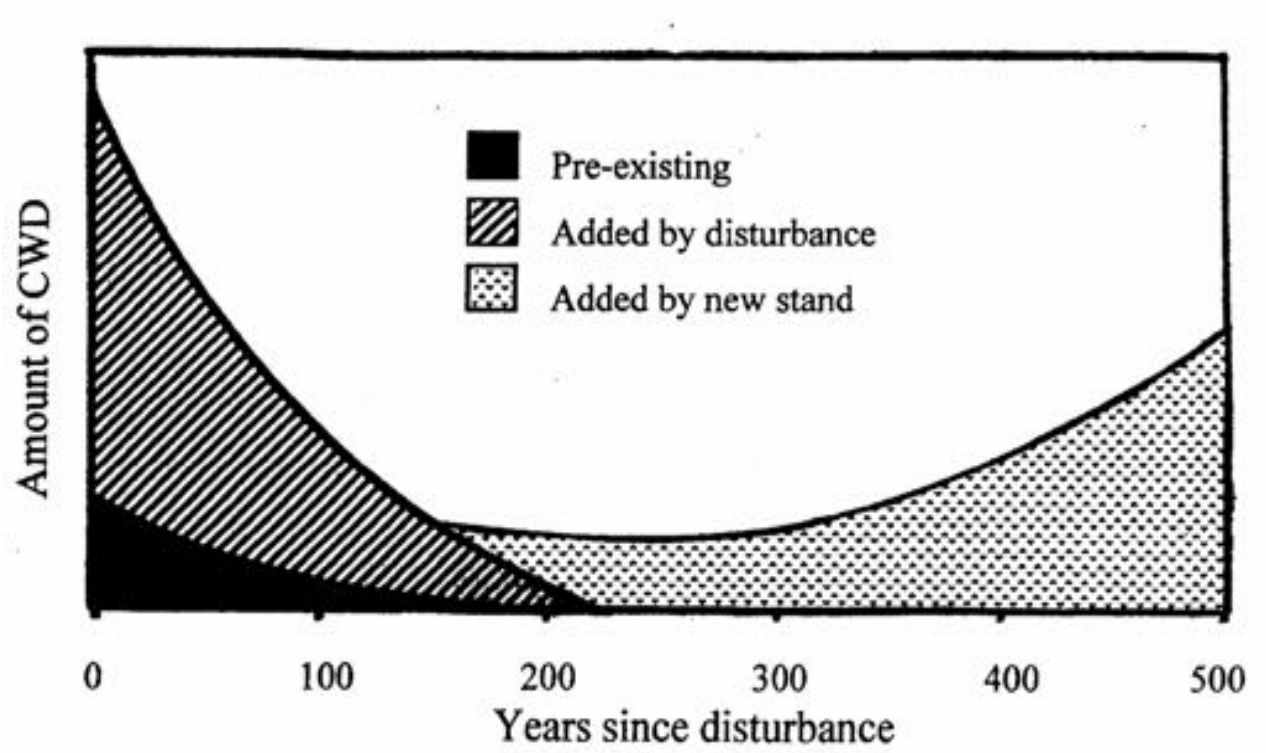
> Such fires do generate a large pulse of dying, dead and down material. After a stand-replacement fire, that pulse of large wood is all of the large wood that the recovering

ecosystem is going to get for the next century or more—i.e., until trees of large size are once again a part of the stand. Some of this dead wood legacy will persist and fulfill important functional roles in the recovering forest for many decades and, in the case of the largest and most decay resistant material, even for a century or more.

1. The agency must recognize the asymmetric nature of snag dynamics after all types of stand replacing disturbance. High rates of snag fall would be expected in the decades following disturbance, while low rates of snag recruitment would be expected in the decades following a disturbance. This unavoidably results in a serious deficit of snags at some point in the future.
2. In order for the NEPA analysis to fully address the snag habitat issue it must look carefully at the snag gap from both ends.
    a. The snag gap begins when too many of the current snags are gone. So the snag gap is exacerbated on the front end by salvage logging which removes too many large snags.
    b. The snag gaps ends when the next stand grows to the point that it contains large trees and some of them die, so the snag gap is exacerbated on the back end if there is a significant delay in tree regeneration.
3. The agency has a tendency to focus on the back end of the snag gap which is allegedly mitigated by tree replanting, but this benefit is in the distant future and remains speculative. The agencies tend to ignore the effect of logging on the front end of the snag gap (which is concrete and unavoidable).
4. Logging which retains only enough snags to meet snag requirements after harvest will not meet snag requirements in a few years after those few retained snags fall.
5. Both the RMP and the Northwest Forest Plan (p C-13) require that snags be maintained through time, so our goal must be to manage snags to minimize the time period that there is a deficit of snags.
6. The NEPA analysis must account for snag fall rates and figure out how to minimize the snag gap. Every day that the "snag gap" is lengthened by salvage logging is a violation of the RMP. Models that may be used to analyze snag dynamics can be found here: http://www.for.gov.bc.ca/hre/deadwood/DTmod.htm.
7. There is a strong correlation between the size of the snags and the length of time it is likely to remain standing, so salvage must be designed to retain all the large snag and only remove trees from smaller size classes.
8. Consider this example: Assume that the stands currently have 30 large trees/acre and 24 of those will be removed via salvage logging while 6 trees/acre will be retained for snag habitat. Further assume that in 50 years 2 percent of the large snags will remain standing as snag habitat. Two percent of 6 trees/acre is FAR LESS than 2 percent of 30 trees/acre, so there is a virtual statistical certainty that salvage logging will exacerbate the snag gap.
9. The snag gap is really exacerbated by salvage logging in two ways — first by targeting removal of the large and most persistent component of the snag population, and second by accelerating the rate that remaining snags fall and are lost from the snag population. New science from Idaho reveals that Ponderosa pine snags persist longer in unlogged areas. See Russell, R.E., Saab, V.A., Dudley, J.G., and J.J. Rotella. 2006. Snag longevity in relation to wildfire and postfire salvage logging. Forest Ecology and Management 232 (2006) 179-187. http://www.fs.fed.us/rm/pubs_other/rmrs_2006_russell_r001.pdf ("The predicted half-life of

a ponderosa pine snag was 7-8 years in salvage logged plots and 9-10 years in unlogged plots.")





The agency often compares their proposed snag retention levels to the *average* number of snags across the landscape, without recognizing that after a significant disturbance such as fire "the

rate of input [of snags] to the CWD pool is 100-1000x the rate expected for an unburned steady-state forest (Harmon et al 1986). Even afterwards, in the next 5 or 6 years, the rate of input is still 5 or 10 or even 100 times that steady-state rate."
http://web.archive.org/web/20050428020846/http://www.brownandbrown.tv/warner-presentation-2002-05-14b.pdf

The shortage of snags in the decades following stand replacing fire is acknowledged by the Forest Service on page 136 of the Wallowa-Whitman National Forest's Trail Vegetation Management Project EA (October 2012). http://www.fs.usda.gov/project/?project=34482

The BLM has previously admitted that a "high proportion" of snags "are expected to persist for at least 50 years." Roseburg BLM 2009, Little Wolf 3 Density Mgt EA. http://www.blm.gov/or/districts/roseburg/plans/files/LittleWolf3EA.pdf. This means that salvage logging can exacerbate the snag gap the front end by at least 50 years.

An example of how salvage would lengthen the period that a forest remains inhospitable to wildlife is provided by the following study, Payer, D.C., and D.J. Harrison. 2000. Structural differences between forests regenerating following spruce budworm defoliation and clear-cut harvesting: Implications for marten. Canadian Journal of Forest Research 30(12): 196572. ("Summary: The authors looked at the use of clearcuts and areas where spruce budworm has caused mortality in relation to the American marten. When establishing new territories, martens avoid clearcuts but do not avoid stands with a history of extensive tree mortality caused by eastern spruce budworm. Although live tree basal area was similar between stand types, the results showed that the vertical structure provided by large snags can offset the limited availability of live trees for the marten, particularly where coarse woody debris and understory vegetation are plentiful.") http://www.umaine.edu/cfru/documents/payer.pdf

Salvage Logging is Incompatible with Watershed Recovery
Salvage logging should be avoided and minimized because it will violate the O&C Act mandate to protect watersheds and favorable conditions of water flow. Salvage retards watershed and aquatic recovery.

> In short, by adding another stressor to burned watersheds, postfire salvage logging worsens degraded aquatic conditions accumulated from a century of human activity (CWWR 1996,NRC 1996, 2002,McIntosh et al. 2000). The additional damage impedes the recovery and restoration of aquatic systems, lowers water quality, shrinks the distribution and abundance of native aquatic species, and compromises the flow of economic benefits to human communities that depend on aquatic resources (Beschta et al. 2004).

Karr, J. R., J. J. Rhodes, G. W. Minshall, F. R. Hauer, R. L. Beschta, C. A. Frissell, and D. A. Perry. 2004. The effects of postfire salvage logging on aquatic ecosystems in the American West. BioScience 54:1029-1033.

http://www.sierraforestlegacy.org/Resources/Conservation/FireForestEcology/SalvageLoggingScience/Salvage-Karr04.pdf *citing* Beschta, ,R.L., J. J. Rhodes, J. B. Kauffman, R. E. Gresswell, G. W. Minshall, J. R. Karr, D.A. Perry, F.R. Hauer, C. A. Frissell. 2004. Postfire Management on Forested Public Lands of the Western United States. Conservation Biology 18: 957–967.

Downloadable at:
https://www.researchgate.net/publication/227654964_Postfire_Management_on_Forested_Public_Lands_of_the_Western_United_States?ev=prf_pub

The quantity, quality, and rate of revegetation has a direct contribution to controlling erosion and sedimentation. USGS has described the role of vegetation in slope stability and erosion as follows:

> In a watershed, vegetation provides five major physical functions that help control soil erosion during rainfall events (Spittler, in press):
>
> - Interception of rainfall, which extends the time for water to reach the ground surface and absorbs raindrop impact energy.
> - Mulching of the ground surface to provide temporary water storage and slow release, slope roughness, and energy absorption.
> - Structural support of loose, surficial material.
> - Reinforcement of the deeper soil by roots, which increases the natural slope stability.
> - Maintains conditions necessary for soil micro-organisms that provide soil structure.
> -

http://web.archive.org/web/20040218052053/http://landslides.usgs.gov/html_files/ofr95-508/skrep2.html *citing* Spittler, T.E., in press, Fire and the debris-flow potential of winter storms, in, Proceedings of the Symposium on Brush Fires in California Wildlands: Ecology and Resource Management: International Association of Wildland Fire.

Wagenbrenner et al (2015) found that –

- Post-fire salvage logging increased soil compaction and decreased vegetative cover.
- Salvage logging greatly increased sediment production from more disturbed plots. ("Sediment production from the skidder plots was 10–100 times the value from the controls.")
- Salvage logging delayed post-fire recovery of vegetation and sediment production. ("The relative differences in sediment production between the disturbed plots and the controls tended to increase over time as the controls exhibited more rapid regrowth." Data were taken 2-8 years post-harvest.)
-

Joseph W. Wagenbrenner, Lee H. MacDonald, , Robert N. Coats, Peter R. Robichaud, Robert E. Brown. 2015. Effects of post-fire salvage logging and a skid trail treatment on ground cover, soils, and sediment production in the interior western United States. Forest Ecology and Management. Volume 335, 1 January 2015, Pages 176–193.
http://www.nrel.colostate.edu/assets/nrel_files/labs/macdonald-lab/pubs/Salvage-logging-Wagenbrenner%20et%20al-ForEcolMgmt-2015.pdf

Salvage logging will set back vegetative recovery that has already started and thereby retard attainment of riparian and aquatic management objectives. In research on post-fire logging on the Winema NF, Sexton (1998) found that salvage logged sites produced only about 38% of the

understory biomass of that on the unlogged site; and one year later produced only about 27% of the understory biomass of that on the unlogged site. In fact, Sexton's (1998) study comparing salvaged and unsalvaged areas of a fire on the Winema NF one and two years after logging showed:

Salvage Areas	**Unsalvaged Areas**
reduced vegetation biomass	greater vegetation biomass
reduced species diversity	greater species diversity
reduced species richness	greater species richness
reduced growth of planted seedlings	greater growth of planted seedlings
reduced survival of planted seedlings	greater survival of planted seedlings

Sexton, Timothy O. 1998. Ecological effects of post wildfire activities (salvage-logging and grass-seeding) on vegetation composition, diversity, biomass, and growth and survival of *Pinus ponderosa* and *Purshia tridentata*. MS Thesis Oregon State University. Corvallis, OR. 121p

Similarly, Dan Donato, looked at the effects of salvage logging at the Biscuit fire in SW Oregon and found that cutting down dead trees and hauling away logs killed 71 percent of the naturally established seedlings which were abundant after the fire but scarce after logging. D. C. Donato, J. B. Fontaine, J. L. Campbell, W. D. Robinson, J. B. Kauffman, B. E. Law. Post-Wildfire Logging Hinders Regeneration and Increases Fire Risk. www.sciencexpress.org. 5 January 2006. Shatford and Hibbs recently found similarly encouraging results of natural regeneration.

> Over the 2005 field season, natural regenerating conifers were sampled in 38 plots within 11 historic fires in the Klamath-Siskiyou Region … Years since stand replacing wildfire ranged from [18 years to 9 years] … The density of natural regenerating conifers ranged over three orders of magnitude … Although the abundance of natural regeneration was frequently high, the age and size of saplings ranged considerably … Frequently, the regenerating saplings were overtopped by shrubs and hardwoods. There was no evidence of recent conifer mortality (i.e. no dead or dying saplings) caused by competition … Saplings were generally in good condition with dominant trees having live crown ratios of 50% or greater.

Shatford, J., Hibbs, D.E. 2005. Predicting Post-fire Regeneration Needs: Spatial and Temporal Variation in Natural Regneration in Southwestern Oregonadn Northern California. Pp 29-32 *in* Cooperative Forest Ecosystem Research Program (CFER) 2005 Annual Report. http://www.fsl.orst.edu/cfer/pdfs/CFER_ar05.pdf. This data reveals that natural regeneration is not only demonstrably successful but also species diverse and variable both spatially and temporally. All of these attributes are highly beneficial in terms of both wildlife habitat and fuel hazard.

The adverse effects of salvage logging on vegetative recovery described by Sexton are not unique to the Ponderosa pine forest type. The results are in fact quite consistent with the results found by Michael Grifantini et al after salvage logging in Douglas fir forests in northwestern California. Grifantini, M.C., Stuart J.D., and L. Fox III, 1992. "Deer Habitat Changes Following Wildfire, Salvage, Logging and Reforestation, Klamath Mountains, California," Proceedings of

the Symposium on Biodiversity of Northwestern California, Oct 28-30, 1991, Santa Rosa, CA. UC Wildland Resource Center Report 29. December 1992.

Climate change is expected to increase the magnitude and intensity of rain events which can cause significant erosion, especially after disturbances such as fire and logging. It would be wise to retain extra material on site after fire in order to intercept and absorb the energy of rain drops, absorb and store water, stabilize soil, capture and store mobile sediment, etc. Garbrecht, J. D., J. L. Steiner, and C. A. Cox (2007), Climate change impacts on soil and water conservation, Eos Trans. AGU, 88(11), 136. http://www.agu.org/eos_elec/2007/11-136_climate.html. The agency needs to ensure that the hydrology and erosion models used in the NEPA analysis accurately account for the expected increase in storm impacts due to climate change.

The adverse effects described by Sexton appear to be long lasting. Busse at al 1996 found that the annual growth rate of pines was reduced by almost 20% where understory vegetation had been removed thirty years earlier. In addition, research has shown a direct relationship between the level of on-site coarse woody debris and the amount active ectomycorrhizal root tips. Graham, R. T., Harvey, A. E., Jurgensen, M., F., Jain T. B., Tonn, J. R., and Page-Dumroese, D. S. 1994. Managing coarse woody debris in forests of the Rocky Mountains. Res. Pap. INT-RP-477. Ogden, UT: U. S. Department of Agriculture, Forest Service, Intermountain Research Station, 13 p. See also Russell T. Graham, Theresa Benevidez Jain, and Alan E. Harvey FUEL: LOGS, STICKS, NEEDLES, DUFF, AND MUCH MORE. The Joint Fire Science Conference and Workshop
http://web.archive.org/web/20060829024013/http://jfsp.nifc.gov/conferenceproc/T-10Grahametal.pdf

Undisturbed litterfall after wildfire reduces soil erosion caused by both rain and overland-flow. By disturbing needle cover and effectively reducing the soil coverage, logging and yarding will cause increased in erosion compared to not logging. Pannkuk, C. D., and P. R. Robichaud. 2003. Effectiveness of needle cast at reducing erosion after forest fires, *Water Resources Research*, Vol. 39, No. 11, doi:10.1029/2003WR002318, 2003.
http://www.agu.org/pubs/crossref/2003/2003WR002318.shtml They found that a 50 percent ground cover of Douglas fir needles reduced water flow erosion by 20 percent and rain-induced erosion by 80 percent. A 50 percent ground cover of ponderosa pine needles reduced water flow erosion by 40 percent and rain-induced erosion by 60 percent.

VI. SALVAGE LOGGING IS INCOMPATIBLE WITH SPOTTED OWL RECOVERY

The Revised Recovery Plan for the northern spotted owl recommends retention and restoration of structure function and process across the dry forest landscape. This includes legacy retention after fires. The 2011 Final Revised Recovery Plan for the Northern Spotted Owl says,

> In general, we recommend that dynamic, disturbance-prone forests of the eastern Cascades, California Cascades and Klamath Provinces should be actively managed in a way that reconciles the overlapping goals of spotted owl conservation, responding to climate change and restoring dry forest ecological structure, composition and processes,

including wildfire and other disturbances (Noss et al. 2006, Spies et al. 2006, 2010a, Agee and Skinner 2005, Healey et al. 2008, Mitchell et al. 2009). …

…[O]ur intent in this Revised Recovery Plan is to embed spotted owl conservation and recovery within broader dry forest ecosystem restoration efforts to increase the likelihood spotted owl habitat will remain on the landscape longer and develop as part of this fire adapted community … To accommodate future disturbances and restore ecosystem resiliency, we believe it is essential to restore ecosystem structure, composition and processes. Restoring ecosystem structures that provide resiliency will necessitate maintaining and restoring the biological legacies that typically persist through disturbance events and influence the recovery process in the post-disturbance landscape (Franklin et al. 2000). With respect to the dry forest landscapes, structural legacies include not only the large trees that tend to be fire tolerant, but the snags and downed wood that were created as a result of the disturbance event. Structural legacies serve valuable functions such as reproductive structures that facilitate plant propagation, modifying microclimates, or improving connectivity through the disturbed area (Franklin et al. 2007). … These principles should be part of any dry forest restoration treatment: … Retain and restore heterogeneity within stands (i.e., manage for fine-scale mosaic within stands). This includes both vertical and horizontal diversity. …

… [P]ost-fire timber harvest activities "undermine many of the ecosystem benefits of major disturbances" (Lindenmayer et al. 2004:1303) and frequently "ignore important ecological lessons, especially the role of disturbances in diversifying and rejuvenating landscapes" (DellaSala et al. 2006:51). … studies of spotted owls in post-fire landscapes indicate that spotted owls use forest stands that have been burned, but generally do not use stands that have been burned and logged. Consistent with restoration goals, post-fire management in these areas should promote the development of habitat elements that support spotted owls and their prey, especially those which require the most time to develop or recover (e.g., large trees, snags, downed wood). Such management should include retention of large trees and defective trees, rehabilitation of roads and firelines, and planting of native species (Beschta et al. 2004, Hutto 2006, Peterson et al. 2009). We anticipate many cases where the best approach to retain these features involves few or no management activities. … Many researchers supported the need to maintain habitat for spotted owl prey. For example, Lemkuhl et al. (2006) confirmed the importance of maintaining snags, downed wood, canopy cover, and mistletoe to support populations of spotted owl prey species. Gomez et al. (2005) noted the importance of fungal sporocarps which were positively associated with large downed wood retained on site post-harvest. Carey et al. (1991) and Carey(1995) noted the importance of at least 10 to 15 percent cover of downed wood to benefit prey. The costs and benefits of post-fire harvest to the development of habitat for spotted owls and their prey should be evaluated by interagency teams (e.g., Level 1 teams) during the consultation process.

> · Recovery Action 12: In lands where management is focused on development of spotted owl habitat, post-fire silvicultural activities should concentrate on conserving and restoring habitat elements that take a long time to develop (e.g., large trees, medium and large snags, downed wood). Examples of areas where we

> believe this recovery action would greatly benefit future spotted owl habitat development include such fire-affected areas as the Biscuit fire, the Davis fire and the B&B complex.

USFWS 2011. Final Revised Recovery Plan for the Northern Spotted Owl. pp III-20, III-32 – III-34, III-48 – III-49. Note also, the 1994 Northwest Forest Plan ROD (page C-11, and 1994 FSEIS page F-146) says that " ... activities required by recovery plans for listed threatened and endangered species take precedence over Late-Successional Reserve standards and guidelines."

Also, keep in mind the FWS' June 28, 2011 Response-to-Comments on the Revised Recovery Plan says "Whether a burned area could support nesting spotted owls is not relevant to our recommending focusing on spotted owl habitat restoration and conservation of legacy habitat elements in areas where pre-fire management focused on developing spotted owl habitat. This recovery action is designed to provide for legacy habitat elements remaining after high-intensity fires which will contribute to future habitat development." http://web.archive.org/web/20130315193800/http://www.fws.gov/oregonfwo/Species/Data/NorthernSpottedOwl/Recovery/Library/Documents/Comments.Responses.pdf And, keep in mind "where pre-fire management focused on developing spotted owl habitat" includes all dry forests, e.g. "[O]ur intent in this Revised Recovery Plan is to embed spotted owl conservation and recovery within broader dry forest ecosystem restoration efforts"

The 2008 FRP (p 116) also says "Large and old trees, either living or dead, are important wherever they occur." The FWS response-to-comments on the draft recovery plan says "post-fire harvest recommendations stress the need to conserve large trees, both living and dead, as they are important components to the restoration of owl habitat after wildfire events." And recommends that after fire or other disturbance the agencies should "conserve the remaining large trees and snags." http://www.fws.gov/pacific/ecoservices/endangered/recovery/pdf/NSO_RPApp_F_Response_to_Comments_5_7_08.pdf. Since large snags take a very long time to grow and recruit, salvage logging should retain all large snags. Any salvage logging proposal must also carefully disclose and balance all detrimental effects and alleged beneficial effects of salvage logging and connected actions like road building.

Clark (2007) looked at post-fire habitat selection by spotted owls after several wildfires in southern Oregon and determined that low severity fire in nesting, roosting, foraging habitat appears to benefit spotted owl occupancy and colonization.

> Initial occupancy was positively influenced by the amount of roosting and foraging habitat with low severity burn within the core ($\beta = 0.08$, 95% C.I. = -0.02 – 0.17) … Colonization rates were positively influenced by the amount of nesting, roosting and foraging habitat that received a low severity burn within the core ($\beta = 0.08$, 95% C.I. = 0.02 – 0.15).

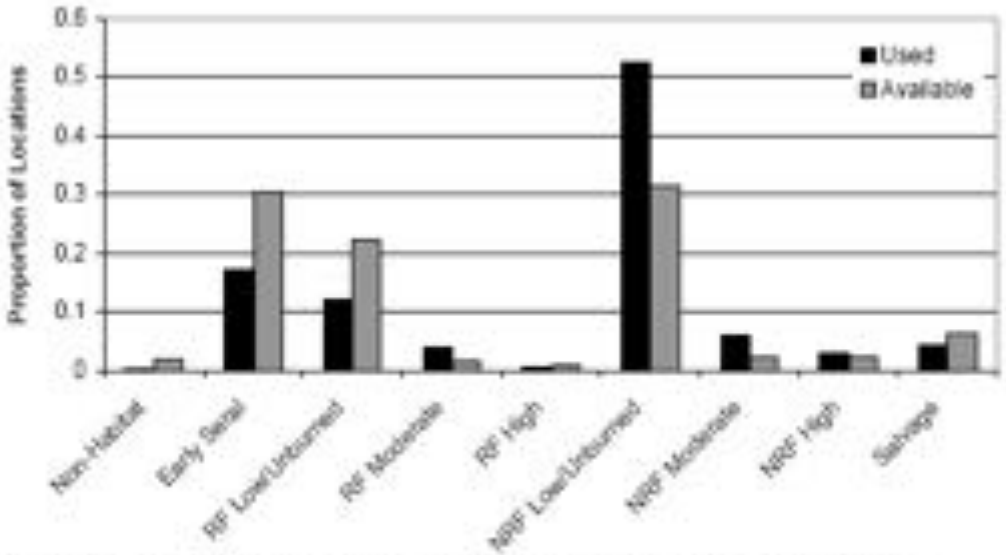


Figure 6.1. Proportions of used and available habitats for northern spotted owls monitored at the Timbered Rock Fire and surrounding areas from September, 2004 to August, 2006.

Darren A. Clark. 2007. Demography and Habitat Selection of Northern Spotted Owls in Post-Fire Landscapes of Southwestern Oregon. M.S. Thesis. Oregon State University. Robert Anthony, Advisor. Figure 6.1 shows that nesting, roosting, foraging habitat is used more frequently than random sites even after it has experienced moderate or high severity fire, while areas that were salvage logged were used less frequently than random sites.

See also, Clark, Anthony & Andrews 2013. Relationship Between Wildfire, Salvage Logging, and Occupancy of Nesting Territories by Northern Spotted Owls. The Journal of Wildlife Management 77(4):672–688; 2013; DOI: 10.1002/jwmg.523 ("Timbered Rock had a 64% reduction in site occupancy following wildfire (2003–2006) in contrast to a 25% reduction in site occupancy at South Cascades during the same time period. This suggested that the combined effects of habitat disturbances due to wildfire and subsequent salvage logging on private lands negatively affected site occupancy by spotted owls. In our second analysis, we investigated the relationship between wildfire, salvage logging, and occupancy of spotted owl territories at the Biscuit, Quartz, and Timbered Rock burns from 2003 to 2006. Extinction probabilities increased as the combined area of early seral forests, high severity burn, and salvage logging increased within the core nesting areas.")

VII. SALVAGE LOGGING WILL INCREASE FIRE HAZARD AND IS INCOMPATIBLE WITH FUEL MANAGEMENT OBJECTIVES

BLM should avoid salvage logging and replanting because it increases fire hazard by moving small hazardous fuels from the canopy to the ground where they are more available for combustion and replanting creates a dense continuous fuel profile that is conducive to fire severity and fire spread.

The DEIS needs to disclose that salvage logging will increase fire hazard, e.g.:

> "The slash created by the harvest and fuels treatments that is left on the ground for site protection and future site productivity, would create a short term (zero - eight years) fire hazard. The fuel-bed created by these treatments would be, in large part, comprised of material in the smaller size classes. These fuels would contribute to the flammability and continuity of fuels on a local level, as well as across the landscape. Under good burning conditions, fires burning in these slash fuel types have the potential to spread rapidly and extensively."

Bitterroot NF Burned Area Recovery DEIS, p. 3-12.

> "There's no science that demonstrates re-burn potential in areas where there is downed wood or decayed wood."

Craig Bobzien, Bitterroot NF Acting Supervisor (Missoula Independent, July 19, 2001)

> "We found no studies documenting a reduction in fire intensity in a stand that had previously burned and then been logged."

Environmental Effects of Postfire Logging (USDA Forest Service, 2000)

> "[We] are aware of no evidence supporting the contention that leaving large dead wood material significantly increases the probability of reburn."

Wildfire and Salvage Logging (Beschta, et al., Oregon State University, 1995)

> "The removal of large, merchantable trees from forests does not reduce fire risk and may, in fact, increase such risk."

Dept. of Agriculture and Interior, Report to the President (September 2000)

The best available science indicates that salvage logging increases small fuels that are most hazardous, and reduces large wood which is most valuable to wildlife.

> Our study examined fuel succession patterns by surveying downed woody fuels across a chronosequence of dry coniferous forest stands that burned with high fire severity (95–100% overstory tree mortality) within mixed- and high-severity wildfires in eastern Washington and Oregon, USA, between 1970 and 2007. We sampled forests in which ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga menziesii*) are the dominant early-seral tree species … Relative to unlogged stands, post-fire logging initially increased surface woody fuel loads, increasing small diameter fuel loads by up to 2.1 Mg/ha during the first 5 years after fire and increasing medium diameter fuel loads by up to 5.8 Mg/ha during the first 7 years after fire. Logging subsequently reduced surface woody fuel loads, reducing large diameter fuel loads by up

> to 53 Mg/ha between 6 and 39 years after wildfire … The initial pulse of elevated surface fuels in logged stands was expected under our first hypothesis. Post-fire logging transfers woody debris in tree branches and tops from the canopies of fire-killed trees to the forest floor, producing well-documented conditions of higher surface woody fuels in logged stands than in unlogged stands in the first 1–4 years following logging (Donato et al., 2006, 2013; McIver and Ottmar, 2007; Monsanto and Agee, 2008; Keyser et al., 2009). Higher amounts of surface woody fuels – especially small and medium diameter woody fuels – can increase short-term fire hazards in logged stands by increasing potential rate of spread and fire-line intensity … Post-fire logging was most effective for reducing large diameter surface fuels, consistent with our second hypothesis. By removing tree boles, post-fire logging reduced maximum large diameter fuel loadings and produced a long period of reduced large diameter fuels, including both sound and rotten fuels. Although large diameter fuels may contribute little to fire spread rates (Hyde et al., 2011) and are typically disregarded in fire behavior modeling ….

David W. Peterson, Erich K. Dodson, Richy J. Harrod 2015. Post-fire logging reduces surface woody fuels up to four decades following wildfire. Forest Ecology and Management 338 (2015) 84–91.
http://www.firescience.gov/projects/06-3-4-16/project/06-3-4-16_Peterson_et_al_-_2015_-_FEM_-_post-fire_logging_and_fuels.pdf. This study showed that salvage logging is most effective at reducing large fuels, which contribute least to fire hazard, but the study strangely failed to consider the effect on habitat. Reducing large wood for 40 years or more will have a significant adverse effect on wildlife habitat. It s also notable that this study focuses on fuels, but failed to note whether any of the numerous fire areas they looked at across Oregon and Washington had actually reburned. Studies that have looked at this issue, show that the risk of reburn (with or without salvage logging) is small, while the risk to wildlife from salvage logging is great.

Similar results were found in a "NecroDynamics" model that looked at 7 fires in the eastern slopes of the Oregon Cascades.

> Salvage logging immediately increased surface fine woody fuel loadings by 160–237% above maximum loadings observed in unmanipulated stands, and were higher during the initial 18–22 years post-fire … [O]ur modeling results suggest salvage logging has mixed effects on reducing hazardous fuel conditions since it increases fine woody fuel loadings and decreases coarse woody fuel loadings. … [P]rescriptions can be altered. For example, [to] retain a higher abundance of snags which would reduce the magnitude of difference in fine woody fuels between salvaged and unmanipulated stands during early in post-fire succession …. Although salvage logging reduces coarse woody fuel loadings, alone it does not mitigate re-burn hazard because it increases fine woody fuel loadings …. Additionally, intensive reforestation typically substitutes conifer biomass for shrub biomass, limiting hazardous fuels reduction unless additional efforts are employed … Understory woody vegetation reestablishes rapidly in these dry-mixed conifer forests (Dunn and Bailey, in press) and can be a highly-flammable fuel layer (Weatherspoon and Skinner, 1995), as well as a source of post-fire fine woody fuels when shrub crowns die (Table 4). This suggests salvage logging alone will not mitigate contributions to re-burn hazard from dead biological legacies when the temporal dynamics of multiple fuelbeds

> (e.g. fine woody fuels, coarse woody fuels, and regenerating vegetation) are evaluated. R … Salvage logging to enhance ecosystem resilience may not be appropriate if multiple ecosystem functions and resources are considered, including; coarse wood use by wildlife (Cahall and Hayes, 2009; Hutto, 1995; Fontaine et al., 2009; Saab et al., 2005), functional attributes of early seral vegetation (Swanson et al., 2010), compounding effects on soil and nutrient pools (Brais et al., 2000; Triska and Cromack, 1980) and reduced water and carbon storage (Harmon et al., 1986).

Christopher J. Dunn, John D. Bailey 2015. Modeling the direct effects of salvage logging on long-term temporal fuel dynamics in dry-mixed conifer forests. Forest Ecology and Management 341 (2015) 93–109. http://www.sierraforestlegacy.org/Resources/Conservation/FireForestEcology/SalvageLoggingScience/Dunn&Bailey2015.pdf The authors suggested modifying salvage logging prescriptions to retain more snags, which would help retain fine fuels in the canopy longer and reduce the amount of fine fuels that are moved from the canopy to the ground.

A study of the portions of the Biscuit fire that were previously burned by wildfire, reveals that salvage logging did not reduce the severity of subsequent fires, and in fact salvage logging appeared to increase the severity of subsequent wildfires. See Jonathan R. Thompson, Thomas A. Spies, and Lisa M. Ganio. 2007. **Reburn severity in managed and unmanaged vegetation in a large wildfire.** Proceedings of the National Academy of Sciences. *PNAS* published online Jun 11, 2007. http://www.fs.fed.us/pnw/pubs/journals/pnw_2007_thompson001.pdf ("In places that burned with high severity in the Silver Fire, areas that were salvage-logged and planted burned with even higher severity than comparable unmanaged areas.") http://www.fs.fed.us/pnw/research/PNAS_Biscuit_Author_Comments_PNW.doc. This represents significant new information about salvage logging. ("Some, including forest scientists, would have expected fire severity to be lower in the logged and planted sites, where large wood was removed, broadcast burning done to reduce fine surface fuels, and some vegetation management conducted possibly reducing the cover of flammable shrubs. That our findings were the opposite of this expectation indicates that the large diameter wood is not a major factor in flammability …").

A recent scientific study scientific study of post-fire logging (McIver and Ottmar 2007) showed that salvage logging causes a four-fold increase in fine fuels and that increase can last for 15 years. Fine fuels tend to cause wildfires to rapidly spread which is more likely to kill young trees and set back forest recovery. Unlogged fire areas (the controls) had lower levels of fine fuels but had higher levels of large fuels. Large fuels do not tend to exacerbate the spread of fire but they can heat the soil. However, soil heating is a patchy phenomena that forests have evolved with and can tolerate. Retaining the large wood is also important for wildlife habitat and soil conservation. The scientific consensus in the fuel management literature is that it is more important to control small fuels. J.D. McIver, and R. Ottmar. 2007. Fuel mass and stand structure after post-fire logging of a severely burned ponderosa pine forest in northeastern Oregon. Forest Ecology and Management. Volume 238, Issues 1-3 , 30 January 2007, Pages 268-279. http://www.sierraforestlegacy.org/Resources/Conservation/FireForestEcology/SalvageLoggingScience/Salvage-McIver07.pdf

Donato looked at the effects of salvage logging after the Biscuit fire and found that—

> Postfire logging significantly increased both fine and coarse downed woody fuel loads (Fig. 1B). This pulse was comprised of unmerchantable material (e.g., branches), and far exceeded expectations for postfire logging-generated fuel loads (5, 6). In terms of short-term fire risk, a reburn in logged stands would likely exhibit elevated rates of fire spread, fireline intensity and soil heating impacts (7). Postfire logging alone was notably incongruent with fuel reduction goals. Fuel reduction treatments (prescribed burning or mechanical removal) are frequently intended following postfire logging, including in the Biscuit plan, but resources are often not allocated to complete them (8). Our study underscores that, after logging, mitigation of short-term fire risk is not possible without subsequent fuel reduction treatments.

D. C. Donato, J. B. Fontaine, J. L. Campbell, W. D. Robinson, J. B. Kauffman, B. E. Law. Post-Wildfire Logging Hinders Regeneration and Increases Fire Risk. www.sciencexpress.org. 5 January 2006.

The 1987 Bland Mountain fire burned east of Canyonville and was heavily salvage logged. The same area then reburned in 2004 with high fire intensity. Salvage logging did not appear to save these plantations from intense fire, in fact, the removal of large logs and dense replanting may have made the fire more intense. One fact is unquestionable, that is that fire hazard is high in young plantations even when they are salvaged. Salvage logging does nothing to address this fact, and may in fact lead to increased density of conifer vegetation types that are more flammable than the mixed conifer-broadleaf vegetation types that may be less flammable.

The NEPA analysis asserts that leaving large numbers of snags is unsafe and the NEPA document describes an undesirable scenario with respect to the no action and action alternatives, but the NEPA document must acknowledge the fire risks associated with salvage logging including: (a) salvage logging will remove most of the largest logs that least prone to burn (because large logs hold the most water the longest and they have relatively high ratios of volume to surface area), (b) salvage logging leave behind almost all of the smallest material which is most prone to drying and burning (e.g., relatively low ratio of volume to surface area), (c) the proposed action may lop and scatter the tops of large trees that are too big for the ground-based harvest machinery, (d) salvage logging equipment and workers could start fires, (e) increased human access increases the risk of human caused ignition, (f) the replanting will create a fuel load that is dense, uniform, extensive, volatile, and close to the ground (During an extreme weather conditions this is one of the most extreme fire hazards in the forest).

There is little empirical support for the idea that salvage logging reduces the intensity or severity of subsequent fire. Recent data show an actual increase in fire severity where post-fire logging had occurred. McIver, James D.; Starr, Lynn; [Technical Editors] 2000. Environmental effects of postfire logging: literature review and annotated bibliography Gen. Tech. Rep. PNW-GTR-486. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 72 p. http://www.fs.fed.us/pnw/pubs/gtr486.pdf. Harma K., and P. Morrison. 2002. Analysis of Vegetation Mortality and Prior Landscape Condition, 2002 Biscuit Fire

Complex. Pacific Biodiversity Institute. http://web.archive.org/web/20060518211529/http://www.siskiyou.org/issues/pbivegetative.pdf Dennis C. Odion, Evan J. Frost, James R. Strittholt, Hong Jiang, Dominick A. Dellasala§, And Max A. Moritz. 2004. Patterns of Fire Severity and Forest Conditions in the Western Klamath Mountains, California. Conservation Biology. Volume 18 Issue 4 Page 927 - August 2004. http://www.blackwell-synergy.com/links/doi/10.1111/j.1523-1739.2004.00493.x.

Salvage typically removes the largest logs that act as water "reservoirs" and are least prone to drying. *See* Amaranthus, M.P.; Parrish, D.S.; and D.A. Perry. 1989. Decaying Logs as Moisture Reservoirs After Drought and Wildfire. In: Alexander, E.B. (ed.) Proceedings of Watershed '89: Conference on the Stewardship of Soil, Air, and Water Resources. USDA-FS Alaska Region. RIO-MB-77. p. 191-194. This study found that large down logs in a post-fire landscape contain 25 times more moisture than the surrounding soil. While the authors recommended preventing large accumulations of "woody residue" (which the author described as very small diameter material--branches, twigs, etc.), they also recommended leaving down logs after fires to PREVENT future fire severity. They concluded that, "When forest managers are analyzing for fire risk, they should take into account the high water content of fallen logs during the period in which wildfire potential is greatest... Fallen trees, in a range of decay classes, therefore provide a long-term reservoir of moisture. A continuous supply of woody material left on the forest floor, not only protects the productive potential of the forest soil, but also provides a sanctuary for ectomycorrhizae and a significant source of moisture in the event of prolonged drought or wildfire." The study was conducted in the Klamath region in an area with roughly 40 inches of annual rainfall. It was published in 1989 in Proceedings of Watershed '89: a conference on the stewardship of soil, air and water resources. USDA Forest Service, Alaska Region: pp. 191-194 (1989).

VIII. SALVAGE LOGGING IS INCOMPATIBLE WITH COMMUNITY STABILITY

The DEIS admits that the timber industry is inherently volatile and timber production causes community instability. Salvage logging amplifies these adverse effects by creating unpredictable temporary pulses in log supply.

The DEIS (p 277) assumed that salvage logging would occur at the rate of 359 acres per year. This is misleading because fires do not occur in a steady rate over time. This are highly episodic, with some years producing few wildfires and other years producing many thousands of acres of wildfires. Salvage logging would likely following this episodic, boom-bust pattern. The DEIS did not disclose this disruptive effect on community stability.

ROADS, TRANSPORTATION, AND TRAVEL MANAGEMENT

Approximately 30 percent of the [BLM] road mileage is in fair to poor condition, primarily due to depleted surfacing aggregate and worn-out minor culverts. Currently the deferred maintenance backlog exceeds $300 million.

All of the BLM developed action alternatives call for increasing the size of the transportation network[233] despite the fact that the BLM already has a $317 million-dollar deferred road maintenance backlog of which $127 million is within the Medford District. DEIS at 646. Hence the range of action alternatives is arbitrarily narrow and excludes consideration of a reasonable action alternative that would avoid new road construction.

Additionally, the proposed new road construction is likely to have disproportionately large impacts on watershed and wildlife values. As stated on page 317 of the DEIS, "within the sediment delivery distance (200 feet), newly constructed roads would primarily be constructed to provide access for forest thinning within the riparian reserves" thereby harming water quality and terrestrial wildlife habitat connectivity. Already 36% of the 14,330 miles of inventoried BLM logging roads (that the agency cannot afford to maintain to standard) are located within 200' feet of streams. DEIS page 314. Every action alternative will contribute to the road maintenance backlog to the detriment of aquatic and wildlife objectives and values.

As indicated on page 650 of the DEIS, the Medford District will be disproportionately impacted by the BLM's proposal to increase the size of the existing transportation system. The Medford District has be far the most projected new road construction to access timber harvest with the lowest comparative volume per acre. This strategy undercuts the sustainable harvest mandate of the O&C Act and the stated purpose of sustainable forest production for the RMP Revisions.

Please note that the BLM is deferring transportation management planning and analysis of environmental and social effects to a hypothetical future NEPA planning process[234] while preparing to authorize a significant increase in the size and impacts of its road system in this planning process. NEPA does not permit such an approach.

I. BLM MUST PROVIDE ADDITIONAL INFORMATION WHEN DEFERRING TRAVEL PLANNING DECISIONS

We are concerned that the Draft RMP does not go far enough to set the legal existing footprint of travel routes and curtail additional route proliferation while the travel planning process is in deferment. BLM's Travel and Transportation Manual (Manual 1626) requires BLM to complete certain tasks through the RMP if it is deferring travel planning, as it is here. Among these required tasks include producing a map of the known network of transportation linear features and defining interim management objectives for areas where route designations were not completed concurrent with the RMP.[235] According to both the TMP Manual and Handbook, delineating travel networks can be deferred for up to 5 years after signing the Record of Decision for the RMP.[236] However, BLM must also come up with an action plan and planning schedule to indicate areas that will have travel planning completed concurrently with the RMP process and which areas will be deferred.[237]

[233] DEIS at 648.
[234] DEIS at 636.
[235] BLM Manual 1626.06(B)(2).
[236] BLM Manual 1626.06(B)(3); BLM Handbook 8342(I)(C)(ii).
[237] BLM Handbook 8342(IV)(B).

We appreciate the work that has been completed in Appendix P of the Draft RMP entitled "Off-highway Vehicle Management Guidelines." The Draft RMP explicitly states that BLM developed these guidelines consistent with BLM Handbook H-8342. We acknowledge that several of the guidelines of Handbook H-8342 have been met for a deferred travel plan, there are some outstanding measures that have yet to be taken. We urge BLM to incorporate the following documentation and information in the RMP:

II. BLM SHOULD MAP THE CURRENT SYSTEM OF AUTHORIZED EXISTING TRAVEL ROUTES.

BLM Handbook 8342 states that BLM must assess the current ground transportation linear feature database during the pre-planning stage for the RMP since it is essential that that a credible baseline inventory is available for eventual TMP efforts and to decide which areas are higher priority for designating routes.[238] Thus, even though BLM can defer designation of a travel network, it still must document the current system of existing authorized routes now, during the RMP stage. Appendix P of the Draft RMP states that BLM is "*currently working on an inventory of all user-created motorized and non-motorized routes within the decision area . . . as a baseline to guide future implementation-level route designations within the areas that are designated "Limited to Existing Routes."* [239](emphasis added). The Draft RMP goes on to state that *"[r]ecreation routes (authorized and unauthorized) have been created in response to demand for trail-based recreation*."[240]

We encourage gathering inventory data on all routes, including user-created and unauthorized, for the purposes of knowing what exists on the ground. However, BLM should not be adding user-created or unauthorized routes to its baseline inventory maps of the existing travel network as these routes were not authorized by the agency. The baseline route inventory should only include those that were legally created or authorized by the agency and all other routes should be slated for closure and rehabilitation.

III. BLM SHOULD SET CRITERIA FOR PRIORITIZING AREAS FOR TRAVEL PLANNING AND PROVIDE A CLEAR PLANNING SCHEDULE.

Handbook 8342 mentions that BLM should consider completing certain units for travel planning during the RMP process, such as smaller areas or sub-units that have sufficient travel and transportation information, areas that are most heavily used, or areas that have existing social conflicts, resource concerns, or a defined need for route definition or development for administrative, public access or other needs first.[241] The Handbook also states that RMPs should "provide a clear planning sequence, including public process (focusing on user groups and stakeholders), initial route selection criteria, and constraints for subsequent road and trail selection and identification." [242]

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[238] BLM Handbook 8342(IV)(A).
[239] DEIS at 1377.
[240] Id.
[241] BLM Handbook 8342(IV)(B).
[242] BLM Handbook 8342(IV)(H)(iv)(2).

While the Draft RMP describes the process for selecting a final road and trail network, it does not set areas that should be prioritized for travel planning after the ROD is signed. The Draft RMP also does not provide a clear planning sequence or schedule for completing travel planning for the planning area within 5 years of signing the ROD. Setting criteria, priority areas and a schedule for completion will provide both the agency and the public with the expectations that travel planning will occur in a reasonable and timely fashion, in addition to following the policy guidance of BLM Handbook 8342.

One good example of setting a schedule for deferred travel planning at the RMP level is in the Proposed RMP for the Lander Field Office. In the Lander Proposed RMP, Appendix W, Table W.1 sets forth priority ranking, timeframes for completion and interim and final restrictions for each travel management planning zone. This is an appropriate approach to deferred travel planning that BLM should adopt in this RMP.

BLM also has broad authority to close areas in the interim to protect public lands and resources.[243] In addition, BLM must immediately close any areas where the agency finds that off-road vehicles are or will cause considerable adverse effects upon natural or cultural resources.[244] BLM has policy guidance (IM 2013-035) that describes how RMPs and TMPs should address temporary closures including defining thresholds for when ORV related closures will take place. BLM should issue temporary closures for any area where ORVs are currently harming or may harm natural or cultural resources in the interim period before BLM can designate the appropriate travel network.

IV. BLM SHOULD GATHER INVENTORY DATA FROM THE PUBLIC RELATED TO NON-MOTORIZED TRAVEL ROUTES.

Handbook 8342 provides that the RMP should *"[o]utline additional data needs and a strategy for collection."*[245] *In addition, the Handbook states that "[i]t is essential that the BLM identify all existing routes to the extent feasible*." [246]

Historically, non-motorized trails have been an underrepresented linear feature through BLM travel planning. The same is true with considering non-motorized recreational experiences. However, BLM must ensure that it is incorporating all non-motorized trail data from the public. In order to do so, BLM should gather as much data from the public on non-motorized trails as possible including trail location, use, time of use and compatibility with other uses. BLM should make clear in its data calls that data should be submitted in line with the step-by-step process outlined in *BLM Technical Reference 9113-1, Planning and Conducting Route Inventories.*

The following guidance set out in BLM Handbook 8342 provides additional considerations for gathering data from non-motorized users of the public lands in the decision area:

[243] 43 C.F.R. § 8364.1.
[244] 43 C.F.R. § 8341.2.
[245] BLM Handbook 8342(IV)(H)(iv)(1).
[246] BLM Handbook 8342(V)(D).

While the BLM should collect as much relevant information as possible during the RMP planning process, the data collection should be informed and guided by the issues and concerns identified by the ID team and through public scoping. Transportation data at the RMP level may tend to overlook the most recently created routes and fail to identify trails to a greater degree than roads. Input and collaboration with trail user groups, research through guidebooks and online trail information sources may be helpful in identifying areas where additional field data collection is important. Areas that are important local or regional destinations for trail use, or where dispersed recreation activities are highly popular (e.g., rockhounding) may require an interactive approach to data collection and public review of the transportation inventory.

The importance of making effective use of GIS technology cannot be overemphasized. For example, GIS can be utilized in the public involvement process to allow the public to have an interactive interface with the route data being presented. This can greatly facilitate the public's ability to understand and comment on the accuracy of the data that will be evaluated for possible inclusion in the designated route network (see Appendix 9 for examples of how GIS can facilitate the TTM process.)

Recommendations: BLM must map and document the existing authorized route system as of the date of this RMP and clarify that user-created or unauthorized routes will not be considered as part of the baseline inventory. BLM should prioritize areas for comprehensive travel planning with interim closures and restrictions and specific timeframes for completion, no later than 5 years from the signing of the ROD. BLM should gather inventory data from the public related to non-motorized travel routes to inform the travel planning process.

V. BLM HAS A DUTY TO MINIMIZE IMPACTS OF ROUTE DESIGNATIONS.

In response to the growing use of ORVs and corresponding environmental damage, Presidents Nixon and Carter issued executive orders mandating that BLM only allow ORV use on the public lands if certain conditions were met.[247] Pursuant to those orders, BLM regulations require that designated ORV "areas and trails shall be located:

(1) "to minimize damage to soil, watershed, vegetation, air, or other resources of the public lands, and to prevent impairment of wilderness suitability;"
(2) "to minimize harassment of wildlife or significant disruption of wildlife habitats;" and
(3) "to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors."[248]

[247] Exec. Order No. 11,646, 37 Fed. Reg. 2877 (Feb. 9, 1972); Exec. Order No. 11,989, 42 Fed. Reg. 26,959. May 25, 1977.
[248] 43 C.F.R. § 8342.1(a)-(c); *see also* Exec. Order 11,644, § 3(a) (similar language).

BLM's Travel Management Manual 1626 states that BLM must pay particular attention to thoroughly documenting how the minimization criteria was considered in making both ORV designations (Manual 1626.06(A)(2)(a)) and route designations (Manual 1626.06(B)).

Together these mandates impose a rigorous process and high threshold for BLM to designate OHV areas and travel routes in the planning area. BLM must carefully assess and document how *each* designated area or route will: (1) minimize impacts to the soil, watershed, vegetation, air, wilderness or other resources, and (2) minimize conflicts between motorized users and the visitors engaging in quiet, non-motorized forms of recreation. BLM must be sure to address those and other impacts through careful application of the minimization criteria on a route-by-route basis.[249]

The Draft RMP provides that *"[t]he BLM applied designation criteria in 43CFR 8342 when designating lands as open, limited, or closed to off-road vehicles. All designations are based on the protection of the resources of the public lands, the promotion of the safety of all the users of the public lands, and the minimization of conflicts among various uses of the public lands.*" [250] However, the Draft RMP provides no information on how the criteria were applied.

A number of federal courts have held that BLM and other federal land management agencies must *apply* these so-called "minimization criteria" to area and trail designations and *articulate* a reasonable basis for concluding that the designation minimizes impacts to important resources. For example, in addressing a BLM planning process, one federal court held that *"[a]cknowledging the minimization standards is not the same as applying them.*" [251] Further, BLM must provide sufficient information "*for someone other than the BLM to know why or how the routes were chosen.*" [252] "[*r]ecord does not demonstrate whether or how [the agency] implemented and incorporated the minimization criteria*" (under analogous Forest Service regulations);[253] (detailed survey and inventory of routes inadequate where "there is nothing in the record to show that the minimization criteria were in fact applied when OHV routes were designated").

The Ninth Circuit Court of Appeals recently struck down a plan for failing to properly apply the minimization criteria. [254] In *WildEarth Guardians*, the Ninth Circuit held that, *"[w]hat is required is that the Forest Service document how it evaluated and applied the data on an area-by-area basis with the objective of minimizing impacts*." [255] "Moreover, as various district courts have held, "*mere consideration of the minimization criteria is not sufficient to comply with the regulation."*[256]

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[249] *See, e.g.*, *SUWA*, 981 F. Supp. 2d at 1105 (BLM must apply minimization criteria "at the route specific level" to assess "the effects of route designations," and must provide sufficient information "for someone other than the BLM to know why or how the routes were chosen").
[250] DEIS at 638.
[251] *S. Utah Wilderness Alliance v. Burke*, 981 F. Supp. 2d 1099, 1104-06 (D. Utah 2013).
[252] *Id.* at 1105. *See also, Idaho Conservation League v. Guzman*, 766 F. Supp. 2d 1056, 1071-74 (D. Idaho 2011)
[253] *Ctr. for Biological Diversity v. BLM*, 746 F. Supp. 2d 1055, 1071-81 (N.D. Cal. 2009)
[254] *WildEarth Guardians v. USFS*, No. 12-35434 (9th Cir. June 22, 2015).
[255] *Id*., slip op. at 24.
[256] *Id*., slip op. at 25.

Thus, it is unequivocally clear that BLM cannot designate OHV areas or routes without applying the minimization criteria and documenting how it was applied for individual designations. The draft has nothing to show how the criteria was applied to the decision area.

***Requested Remedy*:** BLM must design OHV areas in the plan that minimizes conflicts among users and damage to natural resources. Areas must be evaluated to ensure that they are located and bounded to meet the minimization criteria for purposes of BLM management and enforcement. We request that BLM apply the minimization criteria by showing how it is specifically minimizing impacts to resources and conflicts to other uses for each route as required by law.

VI. BLM MUST PROVIDE A RANGE OF ALTERNATIVES FOR OHV AREA DESIGNATIONS.

The range of alternatives is "*the heart of the environmental impact statement*."[257] NEPA requires BLM to "*rigorously explore and objectively evaluate*" a range of alternatives to proposed federal actions.[258] "*An agency must look at every reasonable alternative, with the range dictated by the nature and scope of the proposed action.*" [259]An agency violates NEPA by failing to "*rigorously explore and objectively evaluate all reasonable alternatives*" to the proposed action.[260] This evaluation extends to considering more environmentally protective alternatives and mitigation measures.[261]

In regards to OHV area designations, BLM has not met its obligation to consider a reasonable range of alternatives. As stated in the Draft RMP, *"[e]ven under the most restrictive alternative for OHV use (Alternative C), the BLM would close less than 1 percent of BLM-administered lands in the decision area to OHV use.*"[262] This is the same analysis that was overturned by the district court and upheld by the 9th Circuit Court of Appeals five years ago for the BLM RMP for Southeastern Oregon. The 9th Circuit held:

The ORV analysis is also flawed . . . It considered no alternative that proposed closing more than a fraction of the planning area to ORV use, as opposed to merely designating areas for "limited" use. As ONDA observes, the BLM did not consider any alternative that would have closed more than 0.77% of the planning area to ORVs. Indeed, every alternative would have reduced the extent of closed areas from that in effect previously. It is precisely this sort of "uncritical[ ]" privileging of one form of use over another that we have held violates NEPA. Closures, not just "limited" designations, must be considered to comply with NEPA.

Or. Natural Desert Ass'n. v. BLM, 625 F.3d 1092, 1123-1124 (9th Cir. Or. 2010) (citations omitted).

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[257] 40 C.F.R. § 1502.14.
[258] *See* 40 C.F.R. §§ 1502.14(a), 1508.25(c).
[259] *Nw. Envtl. Defense Center v. Bonneville Power Admin*., 117 F.3d 1520, 1538 (9th Cir. 1997).
[260] *City of Tenakee Springs v. Clough*, 915 F.2d 1308, 1310 (9th Cir. 1990) (quoting 40 C.F.R. § 1502.14).
[261] *See, e.g., Kootenai Tribe of Idaho v. Veneman*, 313 F.3d 1094, 1122–23 (9th Cir. 2002) (and cases cited therein).
[262] DEIS at 640.

The BLM nonetheless maintains that its analysis of ORV designations is adequate because it considered a wide range of use allocations between open and limited ORV designations, and because it could implement emergency closures if necessary. We disagree. Limited ORV use is simply not identical to no ORV use. A limited designation, even with the possibility of closure, does not provide protection equivalent to a straightforward closure.[263]

Here, as in the RMP for Southeastern Oregon, the BLM has not considered closing more than 0.7% of the planning area to OHV use.[264] This does not meet BLM's legal obligation to consider a reasonable range of alternatives as discussed by the 9th Circuit in the case cited above.

Recommendation: BLM must consider alternatives that consider closing more than a very small fraction of the planning area to OHV use.

SOCIOECONOMICS

The draft RMP and DEIS are based on flawed economic reasoning and analysis that attempt to justify an expanded timber sale program that creates more economic harm than good.

The most significant economic and social effects of the preferred RMP alternative (Alternative B) will be associated with a 60% increase in timber harvests over current levels at a time when markets are severely distorted by negative externalities and logging subsidies and affected communities are evolving away from an unhealthy dependence on the timber industry.[265] The DEIS fails to provide an explanation of why the increase in logging proposed under alternatives A, B, and C is economically justified and why the no harvest and natural selection alternatives were rejected when they represent the only alternatives that can fulfill statutory sideboards that specify under what conditions BLM timber should be offered for sale.

I. BLM'S NEEDS AN ECONOMICALLY RATIONAL TIMBER SALE PROGRAM.

The BLM has misconstrued its legal mandate as one that requires an increase in logging. While there are dozens of statutes, regulations, and executive orders that have bearing on management of western Oregon BLM lands the controlling authority with respect to timber supply is the Oregon and California Railroad and Coos Bay Wagon Road Grant Lands Act (O&C Act; 43 U.S.C. 1181a et seq.).

In pertinent part, the O&C Act requires that western Oregon O&C lands be managed "for permanent forest production, and the timber thereon shall be sold, cut, and removed in conformity with the princip[le] of sustained yield for the purpose of providing a permanent source of timber supply, protecting watersheds, regulating stream flow, and contributing to the economic stability of local communities and industries, and providing recreational facilities."[266] The O&C Act also provides that "timber from said lands in an amount not less than . . . the

[263] *Or. Natural Desert Ass'n. v. BLM*, 625 F.3d 1092, 1123-1124 (9th Cir. Or. 2010) (citations omitted).
[264] Draft RMP, Table 3-220, p. 639
[265] The timber harvest baseline in the DEIS is 144.3 million board feet (mmbf) in 2012. Alternative B, the preferred alternative, would increase this cut to 230.2 mmbf.
[266] 43 U.S.C. § 1181a.

annual sustained yield capacity . . . shall be sold annually, or so much thereof as can be sold at reasonable prices on a normal market."[267]

BLM has invoked this legal mandate as the primary purpose and need for the RMP revision process. In particular, the driving force behind the RMP revision and the proposed increase in timber harvest is to respond to what the agency has determined to be a "substantial, long-term departure from the timber management outcomes predicted under the 1995 RMPs." The 1995 RMP estimated a sustained yield allowable sale quantity, and current harvest levels are roughly 1/3 of that. However, there is nothing in the O&C Act that requires the BLM to actually sell that amount of timber each year. Indeed, the O&C Act puts significant conditions on BLM's timber sale program: (1) it must be offered at reasonable prices; (2) under normal market conditions, and (3) to achieve a variety of purposes, including community stability. If none of these conditions can be met, then no timber sale program much less an expanded one need be implemented. Against this backdrop, it is clear that the proposed increase in logging cannot be justified.

II. REASONABLE PRICES PRECLUDE ANY ADDITIONAL TIMBER SALES DURING THIS PLANNING CYCLE

In developing the RMP and DEIS, the BLM has not discussed the process the agency intends to use to ensure that when offered for sale, its timber receives reasonable prices. While current practice is to offer timber for sale at or below a fair market value based on current market prices for comparable timber,[268] there is nothing to suggest that this price setting method is reasonable, especially when the agency has at its disposal other methods for determining fair market value that are designed to cover all costs of production from the seller's (BLM) perspective. The issue of sales below fair market value from the seller's perspective is an issue that has plagued the agency for decades, and one that could be remedied in this planning cycle. As stated succinctly in 1997 in a PEER white paper on the subject, "[b]ecause no seller would perpetually sell a product for less than its cost, this suggests that Congress intended that BLM appraisals insure cost-recovery when the fair market value of timber is estimated."[269]

For a private entity a reasonable price that covers the costs of production includes direct material costs, labor costs, sale and administration costs, and provisions for markup to achieve a desired internal rate of return on investment plus markup for profits. This is simply known as full cost pricing. But the BLM is not a private firm. It also bears responsibility for the economic, social and environmental costs it may pass on to society – negative externalities. OMB Circular A-94 ("General Principles" Section 5) is explicit in this requirement for federal programs:

> Analyses should include comprehensive estimates of the expected benefits and costs to *society* based on established definitions and practices for program and policy evaluation. Social net benefits, and not the benefits and costs to the Federal Government, should be the basis for evaluating government programs or policies that have effects on private citizens or other levels of government. Social benefits and costs can differ from private

[267] Id.
[268] DEIS at 479.
[269] Public Employees for Environmental Responsibility (PEER). 1997. Land of No Return$. Bankruptcy of the BLM Public Domain Forestry Program. White Paper Number 13. Hood River, OR: PEER.

> benefits and costs as measured in the marketplace because of imperfections arising from: (i) *external economies or diseconomies* where actions by one party impose benefits or costs on other groups that are not compensated in the market place; (ii) monopoly power that distorts the relationship between marginal costs and market prices; and (iii) taxes or subsidies (emphasis in original).[270]

The Department of Interior (DOI) has fully embraced OMB's mandate to consider negative externalities in planning decisions:

> *In many cases the benefits provided by the raw materials and products that flow from DOI managed lands, as well as the production, distribution and use of these products, also may cause adverse effects on the environment, economy, or society. Economists typically characterize these adverse effects as* negative externalities…. *The ability to evaluate these negative externalities is an important component to strengthening the set of information available to decision makers" (emphasis in original).*[271]

To correct for the presence of negative externalities, the DOI has stated its commitment to full cost accounting to "help promote more cost-effective investments on public lands."[272] The BLM has further reinforced this mandate through an agency-wide directive to account for all of the market and non-market values affected by management activities with a strong preference for quantitative methods when certain criteria are met: (a) when significant non-market values are at risk; (b) when alternatives present a strong contrast between extractive and non-extractive uses of the land, and; (c) when the magnitude of the proposed change in management is large.[273] The draft RMP meets each of these.

In the draft RMP, there are no provisions for or even discussion of how the BLM intends to go about offsetting both the federal financial costs and negative externalities of an increased timber sale program. The range of negative externalities associated with BLM timber sales includes a wide array of costs associated with diminished recreational and commercial fish landings, sediment removal, increased flooding, loss of water quality, increased habitat restoration costs, loss of tourism revenues, and social costs of carbon emissions, to name a few.[274] The most logical way to account for these and one most consistent with market principles, DOI commitments, and BLM guidance is to incorporate these costs into minimum bid prices. The methods and sources of information needed to meet the reasonable price standard and set minimum bid prices that reflect all agency and social costs are well established, and have been

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[270] The full text of Circular A-94 is available online at: https://www.whitehouse.gov/omb/circulars_a094#6.
[271] US Department of Interior (DOI). 2012. The Department of The Interior's Economic Contributions. Fiscal Year 2011, Chapter 7 – The Externalities of DOI Activities: Moving Towards Full Cost Accounting. Washington, DC: US DOI.
[272] Id.
[273] Bureau of Land Management. 2013. Instruction Memorandum 2013-131, Change 1, attachment 1, "Economic Methods for Estimating Nonmarket Environmental Values. Accessible online at: http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2013/IM_2013-131__Ch1.print.html.
[274] *See, e.g.* Niemi, Ernie and Ed Whitelaw. 1999. Assessing Tradeoffs in Forest Management. General Technical Report PNW-GTR-403. Portland, OR: USDA Forest Service, Pacific Northwest Research Station; Talberth, John and Karyn Moskowitz. The Economic Case Against National Forest Logging. Santa Fe, NM: Forest Conservation Council and Forest Guardians.

for decades. To illustrate, consider the negative externalities associated with lost recreation value and carbon emissions and what they imply for reasonable prices of BLM timber.

The value of recreation on BLM and other public lands is typically expressed in terms of consumer surplus – or the amount people are willing to pay over and above the costs of travel, supplies, lodging, fees, and other financial outlays they make in association with particular recreation experiences. For all BLM administered lands in western Oregon, the DEIS estimates consumer surplus associated with outdoor recreation to be $222,872,000 per year ($232,676,040 in 2015 dollars).[275] Although a significant portion of this value is generated on lands allocated to Recreation Management Areas (RMA), recreation use is widely dispersed because many of those who participate in recreation activities seek access to the secluded sites and old growth forests provided by even small and isolated patches of BLM lands in an otherwise heavily logged landscape for uses such as wildlife viewing, camping, hunting, and nature study.[276] So recreation value is spread out on all BLM lands, included those allocated to timber management.

The BLM administers roughly 2.5 million acres of land. This implies that an average acre yields $93.07 in recreation related consumer surplus benefits each year. Even aged management as planned under all action alternatives destroys this recreation value since such stands are in abundance while mature and old growth forests are increasingly scarce and so substitute sites are already in short order. This is especially true because the greatest scarcities in the western Oregon region are for camping, trails, and other recreation opportunities that bring people closest to nature and provide solitude.[277] The most suitable sites for expansion of camping opportunities and trail use are in these unmanaged forests. Assuming this value is destroyed for all future years (50) in the analysis period yields an average present value cost to recreation of $2,395 per acre at a 3% discount rate. This is a cost of providing federal timber that must be factored into the BLM's determination of reasonable price, or minimum bid.

Historically, minimum bids are set close to current appraised values – roughly $300 per thousand board feet (mbf) anticipated under this RMP. An average acre of mature forest in the suitable timberland base on BLM lands in western Oregon yields roughly 46.2 mbf and so minimum bids will probably be close to $13,860 per acre.[278] Adding the recreation externality to this would boost the minimum bid needed to cover costs to $16,255 per acre or $351/mbf – an increase of 17.3%.

As another example, consider the social costs of carbon dioxide emissions (SCC) associated with logging activities. A typical acre of mature or old growth forest in the Pacific Northwest stores roughly 500 metric tons of carbon per acre.[279] The DEIS estimates 150 metric tons per acre on

[275] DEIS at 494, Table 3-150.
[276] DS Consulting. 2013. Summary and Key Findings for the Bureau of Land Management Recreation Outreach and Public Participation of the Resource Management Plans for Western Oregon. Portland, OR: DS Consulting, Prepared for the Oregon BLM.
[277] ECONorthwest. 2015. Outdoor Recreation Scarcity and Abundance in Western Oregon: A Spatial Analysis. Portland, OR: ECONorthwest.
[278] Department of Interior. 1992. Report of the Secretary of the Interior to the Endangered Species Committee. Related to the Application by the Bureau of Land Management for Exemption from the Requirements of Section 7(a)2 of the Endangered Species Act.
[279] DellaSala, Dominick. 2015. Comments on Revised Draft CEQ Guidelines on Greenhouse Gas (GHGs) Emissions and Climate Change NEPA analysis. Ashland, OR: Geos Institute.

western Oregon BLM lands – a figure that includes clearcuts, plantations, and natural forests.[280] When logged, about half of this is released as a carbon dioxide CO^2 pollutant after accounting for the amount temporarily stored in wood products before they decay.[281] The emissions associated with a typical mature or old growth logging unit thus generates 917.5 metric tons of carbon dioxide equivalent (CO^2-e) per acre.[282] The social cost of these carbon dioxide emissions (SCC) have been well studied, and incorporated into federal agency decision making as the BLM notes in the DEIS.[283] At a SCC price of $42.77 per metric ton CO^2-e[284], this means $39,241 per acre in social costs. If the BLM minimum bid price is adjusted to offset both the social costs of carbon dioxide and the cost to recreation values it would thus have to be set at $55,496 per acre or $1,201/mbf – an increase of 400% over present minimum bid levels.

Another approach for internalizing negative externalities of logging into minimum bid requirements would be to incorporate the growing body of literature on ecosystem service values and studies on how logging affects them. This is the "lost services" approach and may present a more tractable alternative to estimating negative externalities on a case-by-case basis. For example Niemi (2015) quantified the annual ecosystem service benefits associated with provision of biological diversity (northern spotted owl habitat), water quantity, water quality, and carbon storage and then estimated the effects of an increase in industrial logging activities proposed on western Oregon BLM lands. He found that "[t]he value of these lost services likely would average at least $50,000 per acre and perhaps more than $100,000 per acre, especially on lands with large trees."[285] By the same methods used above, this would translate into minimum bid prices between 1,382/mbf and $2,465/mbf needed to offset these negative externalities.

Regardless of which approach is used – lost services or case-by-case estimation of the negative externalities associated with logging – the BLM has an obligation to incorporate this information into the design of its timber sale program so that minimum bids received reflect the true social cost of providing timber from federal land and thus reflect a reasonable price. But offering BLM timber sales at minimum bid prices of $1,200/mbf or more would be prohibitive for buyers now purchasing logs on the open market at roughly half this amount, at best. But this is a reasonable outcome, by law, since the O&C Act sets conditions on whether or not (reasonable prices and normal markets) BLM timber must be offered for sale at all. Thus, by the reasonable price standard alone, the BLM should adopt the no-harvest alternative. The DEIS and draft RMP must be revised to consider this outcome.

[280] Calculated by multiplying the teragrams carbon figure from DEIS Table 3-23 (373.02) x 1,000,000 (metric tons per teragram) divided by the 2.5 million acres of western Oregon BLM lands.
[281] DellaSala. 2015. Note 6.
[282] Converting carbon to carbon dioxide equivalent (CO2-e) units requires multiplication by an adjustment factor of 3.67. The 500 metric tons carbon thus represents 1,835 metric tons of CO2-e. If half of this is lost to logging it thus represents a per acre emission factor of 917.5.
[283] DEIS at 483.
[284] This is the 2007 average social cost of carbon figure of $37 per metric ton CO2-e (DEIS at xx) converted into current (2015) dollars.
[285] Niemi, Ernie. 2013. Economic Value of Goods and Services Produced by the O&C Lands With and Without Industrial Logging. Eugene, OR: Natural Resource Economics.

III. NORMAL TIMBER MARKET CONDITIONS DO NOT EXIST

The second condition Congress set on the offering of timber from O&C lands is the condition that BLM only participate in "normal" markets. The concept of normal markets is a precise term for economists. It means markets that are not distorted by one or more market failures that take the form of externalities, public goods, missing markets, subsidies, monopoly power, barriers to competition, and asymmetrical information.[286] Markets for BLM timber are severely distorted by many of these market failures. The presence of negative externalities has been discussed above. In particular, each acre of BLM timber offered for sale may generate negative externalities of up to $100,000.[287]

Timber subsidies also abound. These subsidies take the form of numerous federal, state, and local government programs and policies that result in more timber being cut than would be in the absence of such programs and policies. The BLM and US Forest Service, for example, help supply timber from private lands through right of way and log haul permits that grant private logging companies unlimited use of federal roads to bring their logs to markets. The State of Oregon offers tremendous tax breaks to logging companies. In 1999, former Governor Kitzhaber rescinded the timber harvest privilege tax, which has now led to a $60 million a year shortfall in school funding. Timber companies do not have to pay property taxes at the rate most landowners pay. Instead, they pay based on what is known as "current use valuation" that translates into property taxes of just 10% of what other private landowners pay.

Another major subsidy takes the form of unemployment insurance paid by other businesses to compensate for the timber industry's failure to maintain community stability by overcutting its lands, exporting wood, and engaging in other practices harmful to labor. As noted by Niemi and Whitelaw (1999):

> *The amount of benefits paid to workers in the lumber and wood products industry often has exceeded the industry's premiums. Between 1980 and 1991, for example, the unemployment-insurance benefits paid to workers laid off from Oregon's lumber and wood products industry exceeded the total premiums paid by more than $221 million (1992 dollars).*[288] *Business owners in other industries, and their workers, bore the burden of making up this difference.*

The problem of missing markets is, perhaps, the greatest market failure in play with respect to BLM timber sales. While clean water, carbon storage, recreation, pollination, scenery, and biological diversity are public goods with vastly more value than timber they are not paid for because they are non-exclusive and non-rivalrous.[289] The typical results are:

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[286] Various forms of market failure are discussed in depth in most intermediate level macroeconomics courses. But a more accessible list has been compiled by Economics Online at: http://www.economicsonline.co.uk/Market_failures/Types_of_market_failure.html.

[287] Niemi, 2013, Note 21.

[288] ECONorthwest with data provided by the Oregon Employment Division. Data on file with: ECONorthwest, 99 W. Tenth, Suite 400, Eugene, OR 97401.

[289] This is also known as the public goods market failure. Public goods are goods that are non-exclusive (meaning no one can be excluded from enjoying them) and non-rivalrous (meaning one person's use does not diminish the next). Because of these characteristics, private markets cannot supply them. The outcome is that they are under-provided. For a useful synopsis, see: http://www.pitt.edu/~upjecon/MCG/MICRO/GOVT/Pubgood.html.

> *...underprovision of a good, service, or amenity relative to the efficient level of provision; excessive levels of discommodities and disamentities, relative to the efficient level; overexploitation of a resource, relative to the efficient level of exploitation; and underinvestment in the management, conservation, and productive capacity of a resource.*[290]

This is an accurate portrayal of what is occurring on Oregon's federal, state, and private timberlands. While development of missing markets in the form of payments for ecosystem services (PES) is forthcoming, the lack of PES markets at this time is one of the key explanatory factors in the dramatic overcutting of Oregon's state and private timberlands (see below) and use of techniques such as short rotation clearcutting that are so damaging to soils, watersheds, long term forest productivity, wildlife, scenery, biological diversity.[291] Adding more BLM timber to the mix in this context of missing markets is unjustified. Despite Congress's unambiguous language, the draft RMP and DEIS are silent on the entire concept of normal markets, these market failures, and how the proposed increase in logging is justified in the presence of them.

Additional timber sales will not meet the purpose of protecting watersheds, regulating stream flow, and contributing to economic stability. Congress also put constraints on BLM's timber sale program in the form of a set of purposes that a sustained yield supply of timber is supposed to serve alongside the purpose of a permanent source of timber supply. These include "protecting watersheds, regulating stream flow, and contributing to the economic stability of local communities and industries, and providing recreational facilities."[292] But the proposed increase in logging of 60% and 688 new miles of road[293] (Alternative B) runs counter to these purposes.

As demonstrated elsewhere in these comments, all remaining tracts of mature and old growth forest need protection because they are key landscape components for regulating stream flow, water quality, and water temperature and for responding to increasing scarcities of campsites, trails, and other recreation needs that depend on unlogged forests. Putting more of these stands on the chopping block is thus inconsistent with O&C Act requirements. So is the plan to build new logging roads. It is remarkable that the BLM is proposing new road construction when, in fact, forest roads in western Oregon already represent an extreme disruption of healthy watershed function.[294] The dominant effects of these high road densities on stream and riparian networks are well known and involve "alteration of routing of water, water-born chemicals, sediment, and mass movements to and through native stream networks."[295]

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[290] Randall, Alan. 1981. Resource Economics: An Economic Approach to Natural Resource and Environmental Policy. Columbus, OH: Grid Publishing.
[291] Zwick, Steve. 2010. Oregon Company Taps California Protocol to Earn More by Logging Less. Published online at Ecosystem Marketplace: http://www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page_id=7520&section=home
[292] 43 U.S.C. § 1181a.
[293] DEIS at 648.
[294] *See, e.g.*, Oregon Department of Forestry (ODF). 2000. Report of the Ad Hoc Forest Practices Advisory Committee on Salmon and Watersheds to the Oregon Board of Forestry. Section B: Forest Roads. Salem, OR: ODF.
[295] Swanson, Fred, Julia Jones, Beverly Wemple and Kai Snyder. 1999. "Roads in Forest Watersheds – Assessing Effect from a Landscape Perspective." Published in Proceedings of the Seventh Biennial Watershed Management Conference, Charles W Slaughter, editor. Water Resources Center Report No. 98. Davis, CA: University of California.

With respect to community stability, even the DEIS concedes that additional BLM timber supplies make no sense: "[b]ecause the timber industry has a long, national history of high volatility, alternatives with harvest volumes that exceed current levels are likely to introduce greater instability into local economies, based on past business cycles."[296] Thus, not a single one of the criteria Congress cited as purposes of a timber sale program on lands managed under the proposed RMP can be met through an increase in logging over current levels.

IV. OVERCUTTING ON PRIVATE LANDS DEMANDS A REDUCTION IN BLM TIMBER SALES

To the extent that BLM timber sales are offered during this planning cycle, Congress requires the timber sale program to be consistent with permanent forest production and the principle of sustained yield. In making this consistency determination, it is essential for the BLM to account for logging on non-BLM ownerships and consider how the pattern of logging on those lands relates to the demand and supply of goods and services provided by BLM lands. This duty is amplified by NEPA's requirement to take connected actions and cumulative effects into account.[297] Moreover, there is nothing in the O&C Act that limits the concepts of forest production and sustained yield to timber only. Indeed, as noted by DellaSala et al. (2005) "the O&C term 'forest production' interpreted in today's climate means more than timber volume and includes multiple natural resource objectives related to watershed health, carbon sequestration, fish and wildlife habitat, recreation, endangered species, and other values inherent to BLM lands that also contribute to community stability."[298]

In light of this, if the rate of harvest on private timberlands is unsustainable then BLM must adjust its allowable sale quantities (ASQ) calculations downward to ensure that the overall supply of timber and other goods and services from all Oregon's forestlands comes closer to a level that is commensurate with maintaining permanent forest production and the principle of sustained yield. If BLM fails to do this, then it will be exacerbating rather than countering the effects of overharvesting on lands outside its jurisdiction.

Unsustainable logging is indeed the situation in Oregon on state and private forestlands within the western Oregon BLM ownership matrix. Using a GIS dataset provided through World Resources Institute's Global Forest Watch Program[299] CSE conducted a watershed-by-watershed analysis of the rate of forest cover loss versus forest cover gain during 2000-2013.[300] Net forest cover change is a more important indicator of sustainability than volume-based measures such as growth versus removal since it is forest cover that determines the overall ability to provide a suite of ecosystem goods and services. The results indicate a significant overcutting on state and private forestlands. In particular, as compared with 2000, there are 452,364 fewer acres that meet minimum definitions (30% canopy closure of trees 5 meters in height). This is a result of forest

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[296] DEIS at 568.

[297] Connected actions include private timber harvests facilitated by BLM's programs such as road right of way and log haul permits (40 CFR § 1508.25(a)1) Cumulative impacts analysis requires consideration of non-federal actions affecting the planning area (40 CFR § 1508.7).

[298] DellaSala, Dominick, Nancy Staus and Erik Fernandez. 2005. Importance of Western Oregon BLM Lands and Reserves to Fish and Wildlife Conservation. Ashland, OR: World Wildlife Fund.

[299] Available online at www.globalforestwatch.org.

[300] Talberth, John and Erik Fernandez. 2015. Deforestation, Oregon Style. Lake Oswego, OR: Center for Sustainable Economy. Available online at:

loss (1,476,209 acres) exceeding acres of forest cover gain (1,023,845 acres). If sustained yield is measured by sustained forest cover (forest gain = forest loss) than this implies an overall rate of overcutting of 42%. In some watersheds the rate overcutting is much worse. In the McKenzie River's Quartz Creek drainage, since 2001, nearly 7,200 acres (2,913 ha) of forest cover have been lost to extensive clearcutting while only 2,576 acres (1,043 ha) have been gained through natural afforestation or reforestation – an overcutting rate of 279%.[301]

Federal timber sale planners have often adjusted ASQ to compensate for overcutting on private lands, as they should. For example, in 1991 the Lolo National Forest had to adjust its ASQ downward to compensate for "higher than anticipated" rates of logging on private industrial timberlands within its checkerboard ownership pattern.[302] The BLM should follow suit and revise the ASQ during this planning cycle to compensate for dramatic overcutting on Oregon's state and private forestlands. To compensate adequately, the ASQ should be set close to zero.

The BLM arbitrarily rejected analysis of the no-harvest and natural selection alternatives when they represent the only economically rationale choices. As the foregoing suggests, neither a continuation of nor an increase in BLM's timber sale program can be economically justified during this planning cycle. A reasonable price for BLM timber that offsets agency costs and internalizes the negative externalities of logging would too high at current market prices to attract timber sale purchasers. But the law, DOI policy, and BLM guidance all require such a reasonable price. Nor can the BLM justify its timber sale program in the face of markets that are not normal but severely distorted by negative externalities, subsidies, missing markets, and other well-known sources of market failure. Nor can the BLM demonstrate that its timber sale program meets Congressionally imposed sideboards designed to ensure that the timber sale program protects watersheds, water flow, economic stability, and recreation. Because of this, BLM's decision to reject the no harvest and natural selection alternatives is groundless.[303] Overcutting on adjacent state and private lands underscores not only the need to consider in detail, but need to select one of these reasonable alternatives.

V. REMEDIES THAT MUST APPEAR IN THE FINAL RESOURCE MANAGEMENT PLAN

To remedy these deficiencies in the DEIS's socioeconomic analysis, we request that the following:

1. A detailed explanation of the process the agency intends to use to ensure that when offered for sale, its timber receives reasonable prices that compensate for all agency costs and negative externalities.
2. A detailed assessment of the negative externalities generated by timber sales under each action alternative. As discussed above, the methods and sources of information are readily available.

[301] Talberth, John and Catherine Koehn. 2015. The Liquidation of Forests in McKenzie's Quartz Creek, Oregon. Lake Oswego, OR: Center for Sustainable Economy. Available online at: http://sustainable-economy.org/forest-liquidation-in-quartz-creek/.
[302] Hirt, Paul W. 1994. A Conspiracy of Optimism. Management of the National Forests Since World War Two. Omaha, NE: University of Nebraska Press.
[303] DEIS at 77, 79.

3. A detailed assessment of the ecosystem service values generated by BLM forestlands in their natural state. Again, the agency has at its disposal both the methods and sources of information to do so.
4. A detailed assessment of externalities, subsidies, missing markets and other timber market failures in the planning area that distort normal market conditions. In light of these market failures, the FEIS should discuss how the final RMP offers corrections.
5. A detailed assessment of the rate of harvest on adjacent state and private forestlands and the implications this has for the relative value of goods and services from BLM lands. As part of this analysis, the BLM should discuss adjustments needed to its long term allowable sale quantity estimates (ASQ) needed to compensate for unsustainable timber harvesting on these lands and meet the goal of sustainable forest cover.
6. A detailed consideration of both the no-harvest and natural selection alternatives.

VI. TIMBER SUPPLY AND DEMAND

> *[An] upward shift in the [BLM] timber supply curve would lead to lower stumpage prices (between 1 and 9 percent) and reductions in private harvests as timberland owners adjust their harvest downwards as prices fall." -DEIS page 516.*

Downward market pressure on timber prices from increased harvesting on public lands negatively impacting private timberland owners is an inappropriate outcome from this planning process.

VII. ECONOMIC STABILITY

> *Because the timber industry has a long, national history of high volatility, alternatives with harvest volumes that exceed current levels are likely to introduce greater instability to local economies, based on past business cycles." –DEIS page 568.*

Introducing greater instability to local economies is an inappropriate outcome for BLM land management. The O&C Act specifically mandates that BLM forest management must have the objective of "contributing to the stability of local communities and industries."[304] Selecting an alternative that will increase instability in local communities will violate the O&C Act.

VIII. THE TIMBER YIELD PROJECTIONS

BLM must have a reduction factor determined to reduce to reduce modeled timber volume on lands that are at high risk for erosion and subsequent sediment pollution into streams. Similarly, timber yield must exclude salvage from riparian reserves, critical spotted owl habitat, and black-backed woodpecker breeding range located generally east of I-5.

[304] 43 USC 1181(a).

Many BLM timber stands have not been logged because the areas have low standing volume and are too steep and erosion prone for building roads. Timber yield projections need to make a large reduction in timber harvest on the Medford District due to high erosion risk lands, economics of building long risky roads for low timber volumes, and ecological risks to coho salmon. The analysis needs to be explicit (quantitative) when it creates sediment risks to coho salmon critical habitat while providing certainty for timber volumes. We believe this unanalyzed trade-off is illegal because of the ESA. Many medium and large scale mass erosion incidents will deliver sediment to streams because they are "in-channel" events and not likely to be effectively buffered by proposed riparian reserves (e.g. debris flows, stream-side slides) thus the need for full one tree protection buffers on headwater channels, erosion prone swales, unchanelled valleys and unstable erosion prone headwalls. Analysis needs to take a hard look at choosing for the outcome of reduced mass erosion with wider no cut riparian buffers since many if not most smaller streamside slides occur within a few hundred feet of the stream. Models exist for predicting mass erosion due to geology, slope and morphology (Lee Benda attachment) but these features are best determined during site specific project analysis. Nevertheless, timber yield needs to be reduced using these mass erosion models. Economics of road construction to low volume and very steep areas on the Medford District is also a limiting factor. Timber yield cannot assume all trees can be equally accessed with roads.

IX. INCREASED LOGGING ON BLM LAND WILL UNDERMINE COMMUNITY STABILITY.

The O&C Act provides that O&C lands:

> *shall be managed . . . for permanent forest production, ... for the purpose of ... contributing to the economic stability of local communities and industries ...*

The Oregon Department of Forestry recognizes that conservation of federal lands helps provide regulatory stability for non-federal lands

> [T]he Northwest Forest Plan … serves as the conservation *anchor for the Oregon Plan for Salmon and Watersheds. The Northwest Forest Plan in turn took pressure off of private lands to provide for recovery of spotted owls, murrelets, and salmonids listed under the ESA. Our fear is that a leaner forest plan would no longer provide adjacent non-federal forest lands protection from added land use restrictions to comply with federal environmental laws.*- Roy Woo, Oregon Department of Forestry letter to Forest Service regarding new forest planning rules, 4-7-03.

BLM should not threaten regulatory stability on non-federal lands by increasing timber harvest in older forests or using controversial regeneration harvest methods.

"Because the timber industry has a long, national history of high volatility, alternatives with harvest volumes that exceed current levels are likely to introduce greater instability into local economies, based on past business cycles." DEIS (p 568).

DEIS at 472 concludes:

> *Over the long-term (1969-2007), timber-based industries nationally exhibited low or negative growth rates with high volatility compared with the United States economy as a*

whole, indicating that these industries tend to be inherently volatile. Increases in timber industry activity in the planning area could bring additional exposure to greater economic instability.

The DEIS acknowledges that the timber industry is far more volatile than other industries so boosting timber jobs does not necessarily translate to community stability. This new information requires a fundamental shift in thinking and must be a significant factor in making a final decision on this Plan revision.

DEIS at 568-569 states "*The expansion of existing timber-based firms or the addition of new ones would bring additional jobs and earnings to the planning area, but could make the whole planning area more vulnerable to large fluctuations inherent in domestic and international timber markets."* This statement seems to imply that volatility may adversely affect the region but benefit local communities. This is exactly backwards. The EIS needs to look at the adverse effects of volatility at the local level. Volatility would have its greatest effect in local communities that have the lowest levels of economic diversity, the greatest dependence on commodity production, and would therefore see the greatest fluctuations in jobs and income. The gain and loss of jobs caused by timber industry volatility would cause a variety of social problems related to job insecurity, depression, substance abuse, health care insecurity, domestic abuse, etc. which would in turn cause an increase in the demand for social services that are not adequately funded. If BLM would emphasize development of less volatile economic sectors through provision of amenities instead of commodities, the social problems described above would be diminished and the demand for social services would be reduced.

Proponents of more logging on federal land still subscribe to the outdated view that logging is good for communities. The evidence does not bear this out.

NWFP monitoring results found that -

> *Assumptions were challenged regarding both socioeconomic and ecological relationships, with implications for both. One of the more important set of findings concerns the role of the federal lands. From a socioeconomic perspective, it was assumed that timber flow from federal lands was a key determinant of community well-being. This turns out to be true in some communities, but not in most.*[305]

> *Historically, employment in solid-wood products manufacturing (SIC 24) has been volatile. ... Over the entire period of 1965 through 2000, employment positively or negatively changed more than 5 percent 13 times between successive years. Since 1991, changes in employment between years have generally varied between 1 and 2 percent, with a high of a 4-percent decline in 1996.* [306]

The DEIS needs to disclose that increasing federal timber supply will not prevent the overall declining trend of employment in the timber industry. Only "[*a]bout 400 of the 11,000 jobs lost in the timber industry since 1994 were based on reductions in timber harvesting on federal*

[305] Draft synthesis of the NWFP 10-year monitoring reports. 4-15-05. Pps 13-14.

[306] USDA/USDI. 5-volume Northwest Forest Plan, 10-Year Socioeconomic Monitoring Report, http://www.fs.fed.us/pnw/publications/gtr649/pnw-gtr649_vol3_pt5.pdf pp 40-41

lands. The remaining 10,600 job losses occurred during a period of an increased log supply and were the result of less efficient mills closing and mills continuing to invest in labor-saving technologies. ... The FS and BLM no longer play significant roles in the supply of timber in the Plan area as a whole."[307]

All things being equal, a more diversified economy is a more stable economy. Oregon will always have a timber industry based on non-federal forest lands. The highest and best use of BLM lands, in terms of community stability, is to conserve the resources on those lands to provide a stable flow of ecosystem services such as clean water, carbon storage and recreation opportunities, that will help diversify the economy, and mitigate the economic instability caused by logging on non-federal lands.

Increased logging threatens the economic stability of local communities by: recoupling counties to the boom-bust timber industry, by increasing local communities dependence on a volatile and declining industry, and by reducing the quality of life that helps sustain and grow a more healthy and diverse economy. Logging is a boom-bust industry that undermines community stability rather than enhancing it. The final decision should uphold the O&C Act (43 USC 1181a) mandate to foster community stability through increased forest conservation which helps stabilize communities by enhancing quality of life and helping to diversify the economy so communities are less dependent on the inherently volatile timber industry.

The Sonoran Institute has conducted a study of rural economies in the west and identified some insightful correlations. "*It turns out there is an inverse relationship between resource dependence and economic growth; the more dependent a state's economy is on personal income earned from people who work in the resource extractive industries, the slower the growth rate of the economy as a whole."* When one looks at resource dependence, Douglas County looks a lot like Wyoming whose economic performance is at the bottom of the pack. Given BLM's mandate for community stability, they should be trying to steer the economy *away* from commodities and toward a more diverse economic base. [308]

The Sonoran Institute's Report also found that proximity to "protected public lands" is positively correlated with economic growth. Other growth factors include access to education, transportation, airports, entertainment, and mountains. Western Oregon's economic assets are notable: proximity to Interstate 5, numerous airports and sea ports, diverse cities with lots of high wage jobs in "producer services," good educational infrastructure, high rates of in-migration, proximity to public lands, ready public access to both mountains and the Pacific coast, etc. All these factors reinforce the idea that the highest and best economic use of BLM lands is to help diversify the economy, not turn the clock back toward commodity dependence. The best way to do this is to protect the best (mature & old-growth) and restore the rest (thin the plantations).

Ray Rasker makes a compelling case for an economic stability strategy based on non-consumptive uses of public lands -

[307] 10-Year Socio-Economic Report. pp 46-47. http://www.fs.fed.us/pnw/publications/gtr649/pnw-gtr649_vol3_pt5.pdf
[308] Ray Rasker. Prosperity in the 21st Century West. Sonoran Institute. 2004. http://www.sonoran.org/pdfs/Prosperity%20Report.pdf

The fallacy of the community stability policy can be exposed at two levels. First, as learned from lessons of the former Soviet Union, centrally planned economies do not work. Even if it were possible to manipulate natural ecosystems- of which we know very little-to produce a steady and predictable flow of grazing, mineral, energy, and timber resources, it is unlikely that the economy of nearby communities would remain stable. Factors such as price, the application of labor-saving technologies, international competition, the availability of capital, and the changing preferences of consumers all play as much a role in determining the health of local resource dependent industries as does the supply of raw materials from public lands.

Second, the premise that public resources such as forage, timber, minerals, and energy can stimulate local economic stability presumes that the local economy is indeed dependent on federally-owned resources. All too often the role public land managers play in community development is based on an antiquated, mythical view of the economy.

Three forces are at work in shaping the world economy. First, the industrial economy is becoming uncoupled from the primary products economy (i.e., raw materials). Many of the most valuable "products" in today's economy, like computer software and medical technology, require few raw materials. Second, within the industrial economy itself, employment has become uncoupled from production. Manufacturing efficiency has decreased the demand for physical labor. Instead, human resources are increasingly applied in research, design, engineering, finance, marketing, and other "knowledge-based" or "value-added" applications. Third, capital has become "footloose"-money follows good ideas, no matter where they occur on the globe.

Today, where the final product rolls off the assembly line is less important than who adds the most value to production. And, if most of a finished product's value lies in the amount of human ingenuity and modern technology that is applied, then those countries with the best-trained and educated work force will command the largest piece of the economic pie.

Lester Thurow points out that the seven key industries of the next few decades are all "brainpower" industries: microelectronics, biotechnology, new materials industries, civilian aviation, telecommunications, robots and machine tools, and computers and software. An important aspect of these industries is that they are "footloose"-they can locate anywhere in the world. According to Thurow:

Where they will be located depends upon who can organize the brainpower to capture them. In the century ahead comparative advantage will be man-made."

[T]he common mythology of the region is that the extraction and export of raw materials are what matter. A commonly heard phrase is that "true wealth comes from the ground." [I]t is clear that a "rear-view mirror" approach to economic development will not suffice. Communities in the West must shift their focus from what worked in the past, and ask

instead what will work in the future. Economic wealth consists of much more than raw materials. There is also wealth in the quality of the environment for non-consumptive uses.

... For many rural communities, the economic benefit of living adjacent to public lands has historically been access to vast repositories of raw material. Because of this economic history there has been a tremendous bias on the part of public agencies to equate quantitative expansion in commercial activities with social and economic well-being. Lacking is a perspective on economic development that measures the role of quality of life as provided to community residents living next to public lands: the mountains, scenery, wildlife, clean water, wilderness, and other non-commercial amenities.

Community stability can best be assured by economic diversity.

The cornerstone of an economic diversity strategy is the creation of a favorable business climate and the protection of the cultural, social, and environmental qualities that make a community a pleasant place to live and do business. In addition, the strategy should include investment in the infrastructure, such as education and telecommunications facilities, in order to promote entrepreneurial activity. In many instances, the most economically productive role of public lands is not in resource extraction or tourism, but in protecting the landscape, the wildlife, the rivers and streams, and the scenery-all those things that collectively enhance the quality of life for local residents.

In the 1800's the challenge for the West was to promote growth-to make the most use of the natural resource endowments of the region. In the 1990's, the challenge is to use this endowment intelligently, without despoiling the quality of life for the region's residents, and without foreclosing opportunities for economic diversification. Simply put, if scenery is part of what attracts and retains modern business activity, beyond tourism, then an unsightly clearcut will have more than ecological costs; it will be bad for the economy.

[A] community stability strategy which emphasizes commodity extraction has been shown to be counter-productive, particularly when those activities threaten the amenity-based foundation of the new economy.[309]

A study in Finland showed that the employment effects of forest conservation are not adverse, and this study did not even consider the long-term stabilizing effect from the quality of life provided by healthy forests.[310]

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[309] Raymond Rasker. A New Look at Old Vistas: The Economic Role of Environmental Quality in Western Public Lands. Colorado Univeristy Law Review. 1994. http://www.sonoran.org/programs/pubs/Rasker%20-%20CU%20Law%20Review%201994.pdf

[310] Kniivilä, M. & Saastamoinen, O. 2002. The opportunity costs of forest conservation in a local economy. Silva Fennica 36(4): 853–865. http://www.metla.fi/silvafennica/full/sf36/sf364853.pdf

BLM should emphasize forest conservation and restoration as the best way to ensure community stability. BLM can meet the social and economic objectives by focusing their efforts on forest restoration, including thinning dense young tree farms that were established following clearcutting. This will help meet the restoration objectives of the Northwest Forest Plan, while also creating jobs and producing some woods projects.

The FEIS needs to consider the economic impacts of shifting the regulatory burden to non-federal lands, and the economic costs of increasing communities' dependence on the inherently boom-bust timber industry. The Northwest Forest Plan and ESA protections allow private timber owners to continue logging with fewer environmental restrictions. If BLM disengages from the Northwest Forest Plan, then private logging may have to be restricted. This could cause uncertainty and instability for local communities and industries. BLM's NEPA analysis must explicitly address this cause-effect relationship on community stability.

Global warming and ocean acidification caused by more logging will also cause community instability, as reflected in part by the Social Cost of Carbon (SCC). To meet the O&C Act mandate for community stability, BLM should adopt the alternative that emits the least greenhouse gases and stores the most carbon in the forest.

Intact forests provide a wide variety of ecosystem services that contribute to community stability. These include: clear drinking water, carbon sequestration & climate stability, recreation opportunities, scenic beauty, viable populations of a wide variety of wildlife functional groups such as pollinators, nitrogen fixers, non-timber commodities such as salmon, mushrooms, & greenery, habitat for socially valued imperiled species, hunting and fishing opportunities.

REGENERATION HARVEST IS NOT NEEDED

BLM should not be managing forests in a way that makes rare old forests even more rare, and makes over abundant young forests even more common. Logging proponents say that regeneration harvest of mature forest is needed to enhance early seral forest, which is in short supply, but this assertion is not well supported.

> *The amount of early-successional forest on the landscape within the range of the northern spotted owl is probably greater now than at any time in the past. ... Any species that find optimum habitat in burned forests must have had the dispersal and reproductive capabilities to find and reproduce in these dispersed and infrequent patches of habitat. In general, species associated with early-successional conditions are good dispersers, have high reproductive rates, and are able to persist in small patches of habitat that result from small-scale disturbance* (Hunter 1990, Smith 1966)....

Compared to their historic populations, species associated with these early-successional conditions have increased in abundance. For example, Raphael et al. (1988) estimated that populations of 11 species of birds have probably tripled over historic numbers, and another 4 species have more than doubled. Raphael et al. (1988) and Raphael (1988) compared the estimated abundance of amphibians, reptiles, birds, and mammals from historic times to their present abundance and concluded that the early-successional associates that have increased over

time were associated with more open, drier conditions; were widely distributed (larger total geographic ranges than species associated with late-successional conditions); and, had wider ecological tolerances (i.e., they occupy a greater variety of habitat types). As noted by Harris (1984), birds associated with early-successional forest are more often migrants whereas late-successional associates are generally permanent residents. These studies also show that whereas some species associated with early-successional conditions reach their maximum abundance in early-successional forest, none of the species were restricted to that successional stage.

The creation of early-successional conditions as a result of logging has produced a different pattern on the landscape than the pattern that likely would have resulted solely from natural disturbance. Patches of early-successional forest are now more evenly distributed across the landscape, and sizes of patches are smaller. This pattern may have resulted in a more widespread distribution of early-successional species than in the past.

[T]here is currently additional acreage of early-successional forest intermixed in a fragmented pattern within all of the Late-Successional Reserves and Riparian Reserves on federal lands within the range of the northern spotted owl. As well, natural disturbances will continue to create early-successional conditions. The federal forest lands occur within a broader landscape of nonfederal lands where additional early-successional forest will be created through logging and other management activity. These lands will contribute to the maintenance of early-successional forest over time.[311]

Also, there is no shortage of early seral forest. In fact, thre's already too much early seral in the Oregon Coast Range.[312]

BLM's analysis for the 2015 RMP Revisions DEIS (Vol 1, p 183) indicates that the "current condition" shows no shortage of "early seral forest" across 1.3 million acres of dry Douglas fir forests.

[311] 1994 NWFP FSEIS, pp 3&4-203 – 204.
[312] . Janet Ohmann. Trends in Early Seral Forest at the Stand and Landscape Scale. http://www.slideshare.net/ecoshare/janet-l-ohmann-trends-in-early-seral-forest-at-the-stand-and-landscape-scale. (Slides 12, 29 show there is "no shortage of early seral" in Coastal Oregon, and early seral "exceeds the HRV" [historic range of variability].)

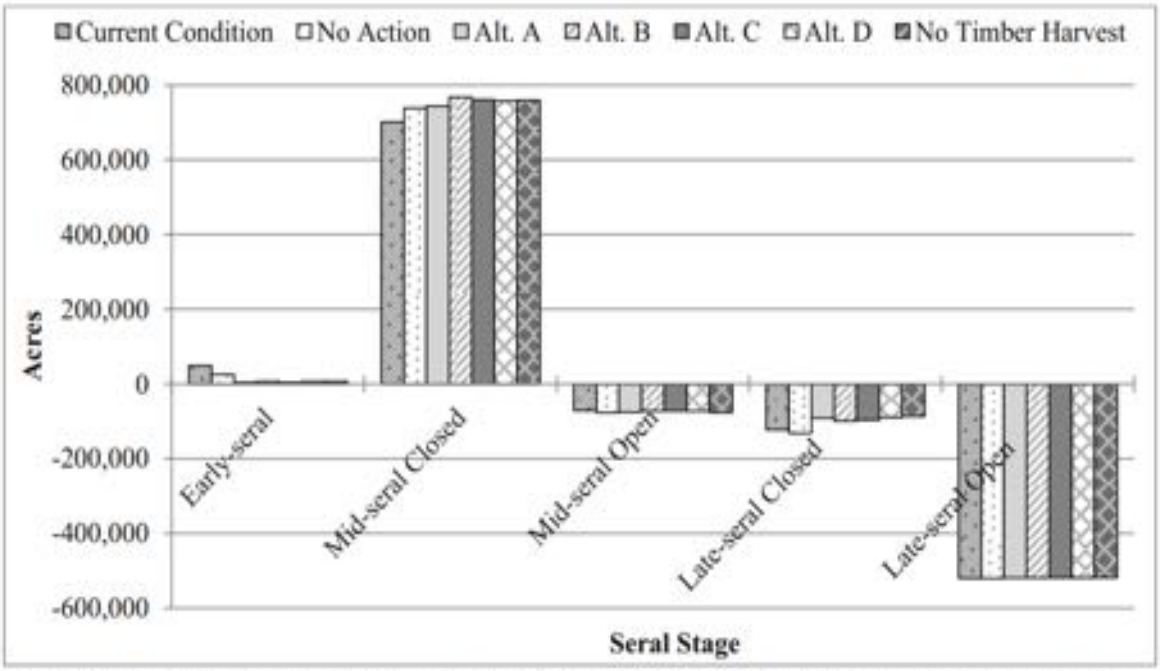

Figure 3-32. Departure from reference conditions in the Douglas-fir/dry vegetation type by seral stage; current conditions and by alternative and the No Timber Harvest Reference Analysis in 2063.

[313] This figures shows that the biggest shortage is late seral and BLM's main focus should remain transitioning over-abundant mid-seral stands to help mitigate the persistent deficit of late-seral stands.

There are many ways of enhancing early-seral habitat without sacrificing mature forests, for instance, we could:

- Modify the way we fight fire and how we react after fire, e.g., leave areas to recover naturally after fire instead of salvage logging and replanting which more closely resembled industrial clearcutting;
- Modify practices on non-federal lands to encourage greater retention of live and dead trees during harvest, tolerate slower conifer re-establishment and greater diverse of native vegetation, e.g., discourage herbicide spraying to control competing native vegetation;
- Embed structure-rich "gaps" (e.g. patches of very heavy thinning) in young stand thinning projects. See Miller, Randall. 2014. Practitioners Approach to Early Seral Habitats on Lands Managed Primarily for Older Forest, or There is More to Healthy Forests than Conifer Trees. Siuslaw NF.[314]
- Extend the early seral character of existing very young stands that are starting to become dominated by conifers.

[313] http://www.blm.gov/or/plans/rmpswesternoregon/files/draft/RMP_EIS_Volume1_pg_173-235.pdf

[314] http://www.slideshare.net/ecoshare/09-practitionersapproachtoearlyseralhabitatsonlandsmanagedprimarilyforolderforestorthereismoretohealthyforeststhanconifertreesmiller; Cheryl Friesen and Norm Michaels 2010. Effects of Incorporating Gaps into Commercial Thinning Prescriptions: Best Available Science, 3-30-2010, Central Cascades Adaptive Management Partnership (CCAMP). http://ecoshare.info/projects/central-cascade-adaptive-management-partnership/synthesis-papers-tools/

Oregon Wild's scoping 2011 comments on the Coos Bay Wagon Road and Roseburg BLM Secretarial Pilot Projects shed further light on this issue.

I. COMPLEX EARLY SERAL FOREST

One of the primary restoration objectives we keep hearing for these projects is the need to restore complex early seral forest. This may well be an important goal. However, this goal needs to be validated and if valid, alternative means of meeting the goal must be explored. With a little thought and creativity one can see that many ways to increase rare early seral habitat without sacrificing rare mature & old-growth forests.

Validation of the early seral habitat objective requires, among other things, asking if the current and projected amount of early seral habitat might be adequate to meet the needs of the opportunistic and generalist species that tend to occur in those areas. Only the interior valleys (and a few ridgetops) of western Oregon likely had persistent early seral conditions, while most of the federal forest landscape had transient early seral conditions associated with disturbances. Early seral wildlife species likely evolved to take advantage of early seral conditions when and where it could be found in the shifting mosaic of seral conditions.

Natural disturbance processes continue to operate across the landscape, including fire, wind, ice storms, landslides, floods, volcanoes, native insects, native disease, etc. Each of these helps create various sized patches of early seral forests every year. Many predict that climate change will increase the frequency of these natural events, suggesting that any shortage of early seral conditions might just take care of itself. "Ecologically, increased distribution and frequency of disturbances may result in increased distribution and dominance of early successional ecosystems dominated by fire adapted species..." [315] Conversely, it may become harder to maintain existing late-seral ecosystems and species, so existing late-successional old-growth forests should be retained in order to avoid making the shortage of late seral forest worse.

There is widespread recognition that early seral forest is produced in abundance on non-federal lands (through industrial clearcutting). Current industrial forest practices do not produce *high quality* or *long-lasting* early seral forest. It is also true, but not widely recognized that the *absolute abundance* of early seral forest on non-federal lands might partially mitigate for its lack of quality.

Early seral vegetation also exists along many streams, rock outcrops, meadows, as well as roadsides, landings, and other disturbed sites throughout the forest. An honest assessment of the early seral shortage must account for the quantity, quality and functionality of all these early seral forest elements.

If there is indeed a shortage of complex early seral forest, we must evaluate a full range of alternative ways of increasing either the quantity and/or quality of such features. Alternatives that have been suggested include:

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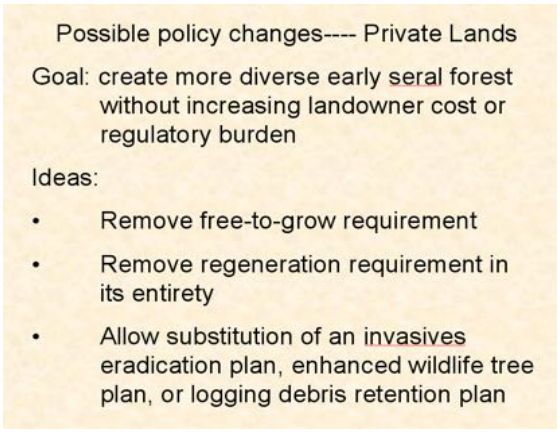
[315] Lemieux, Christopher J., Daniel J. Scott, Rob G. Davis and Paul A. Gray. 2008. Changing Climate, Challenging Choices: Ontario Parks and Climate Change Adaptation. University of Waterloo, Department of Geography: Waterloo, Ontario http://web.archive.org/web/20101023221023/http://www.fes.uwaterloo.ca/geography/faculty/danielscott/PDFFiles/NRCAN-Report-FINAL.pdf



(a) Reform forest practices on non-federal lands to retain more legacy structures and allow a longer period of conifer establishment and more vegetation diversity after harvest, as suggested by Norm and Debora Johnson in 2007. [316]

(b) Rely on natural processes such as fire, wind, insects, etc. Since the public has been misinformed that natural forest mortality processes are undesirable, this approach would work best if we increase public tolerance for natural processes. This approach may also require reform of fire suppression policies and post-fire salvage logging and replanting, as suggested by Norm Johnson, Jerry Franklin, and others in 2007 Early Seral Forest Symposium. [317]

(c) Aggressive pre-commercial thinning in existing very young stands or failed plantations to extend the early seral stage, as suggested in the Chalk Parker Project on the Middle Fork District of the Willamette NF;

(d) Create patches of heavily-thinned, structure-rich "gaps" in variable density thinning projects in dense planted stands <80 years old, as suggested by numerous projects around the region.

All these alternative methods would allow meaningful restoration of early seral forest conditions without unnecessarily sacrificing mature forests.[318]

Another reason that regeneration logging is not needed is because climate change may increase early seral. Efforts to artificially enhance early seral should recognize that climate change might take care of this for us, and in fact might make it much harder to hang on to the mature forests we have. "Ecologically, increased distribution and frequency of disturbances may result in increased distribution and dominance of early successional ecosystems dominated by fire

[316] K. Norm Johnson, Debora L. Johnson. 2007. Policies to Encourage Diverse, Early Seral Forest in Oregon: What Might We Do?
http://www.reo.gov/ecoshare/ccamp/good_forest_opening/powerpoints/Early%20seral%20talkrevfinal.ppt

[317] http://www.reo.gov/ecoshare/ccamp/Good_Forest_Opening.shtml.

[318] Oregon Wild 2011. Scoping Comments on the Wagon Road and Roseburg BLM Secretarial Pilots.
http://www.oregonwild.org/oregon_forests/forest-management/in-your-forests/files-for-eyes-on-the-agencies/Wagon_Road_and_Roseburg_Pilots_scoping_6-29-2011_BLM.pdf

adapted species..."[319] Conversely, it may become harder to maintain existing late-seral ecosystems and species, so existing late-successional old-growth forests should be retained in order to avoid making the LSOG shortage worse.

II. CURRENT RESTORATION THINNING PROGRAMS ARE MEETING OBJECTIVES

There is a pervasive misconception circulating among many people including local, state, and federal politicians and journalists that environmental restrictions have shut-down logging on our federal forests. It has become popular to repeat this misinformation and it has become nearly a full-time job refuting it. The facts speak for themselves.

The most recent data from the Forest Service and BLM on timber offered for sale under the Northwest Forest Plan between 1995 and 2010 reveal that the agencies have offered for sale 8.7 billion board feet of timber. This is equivalent to 1.74 million log truckloads. If parked end-to-end, these trucks would stretch along Interstate 5 from Seattle to San Diego more than 14 times. This is not gridlock – far from it.

Furthermore, any suggestion that a "promise" of timber was made and not kept is highly misleading. The timber industry likes to say that the NWFP promised them 1 billion board feet per year. However, the timber volumes described in the NW Forest Plan are clearly presented as "estimates," not hard targets. "*The PSQ [probable sale quantities] levels shown are estimates. ... They represent our best assessment of the average amount of timber likely to be awarded annually in the planning area over the next decade, following a start-up period."*[320] *"PSQ levels are presented as an effect, not a goal, of the standards and guidelines. Therefore, harvests within areas specified for habitat protection will be greatly curtailed."*[321]

The real timber targets are set each year by Congress. Data provided by the FS and BLM show that since 1995 the agencies have met 82% of the cumulative timber targets established by Congress. The small short-fall is primarily the result of two major legal blunders that agencies brought upon themselves (i.e., failure to comply with Survey and Manage and the Aquatic Conservation Strategy requirements). It is unfair to blame conservationists when the agencies simply failed to protect streams and wildlife as promised in the plan.

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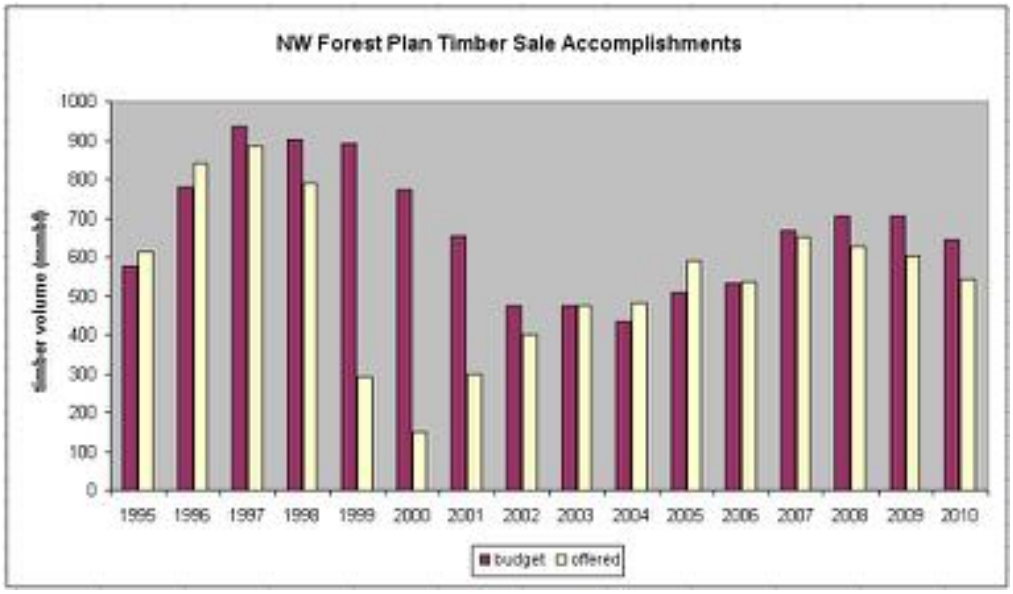
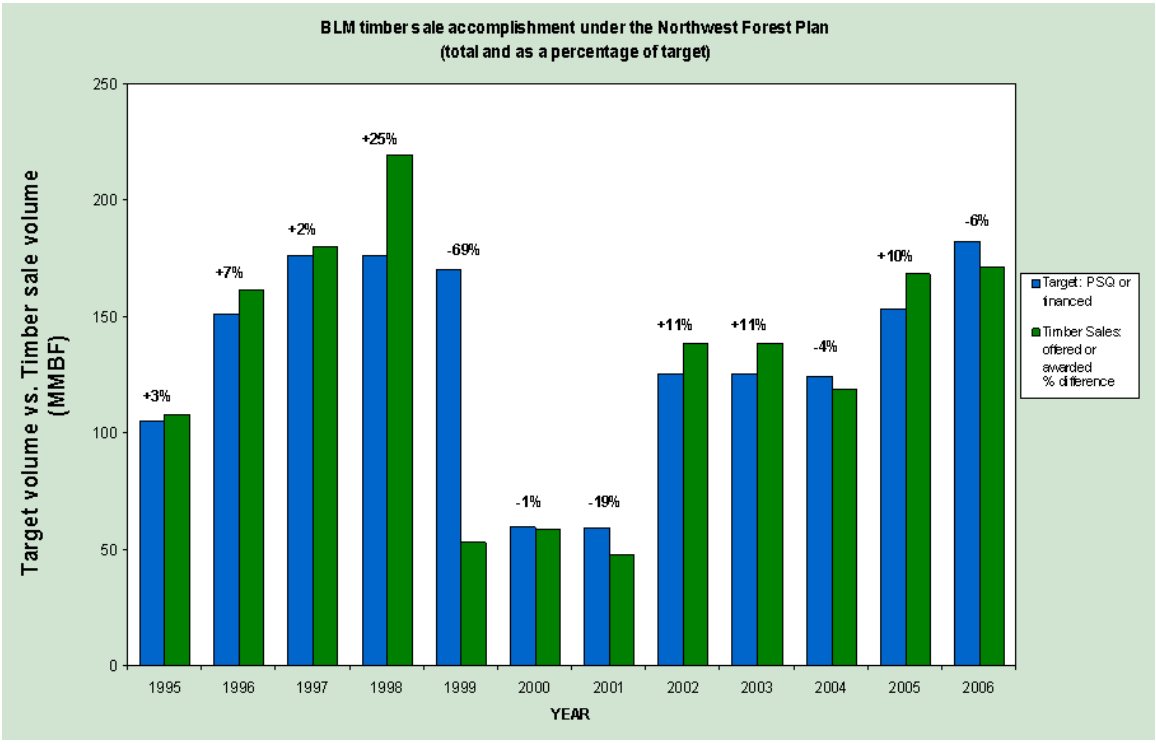
[319] Lemieux, Christopher J., Daniel J. Scott, Rob G. Davis and Paul A. Gray. 2008. Changing Climate, Challenging Choices: Ontario Parks and Climate Change Adaptation. University of Waterloo, Department of Geography: Waterloo, Ontario.http://web.archive.org/web/20101023221023/http://www.fes.uwaterloo.ca/geography/faculty/danielscott/PDFFiles/NRCAN-Report-FINAL.pdf

[320] 1994 NWFP ROD, p 19.

[321] 1994 NWFP ROD, p 66.

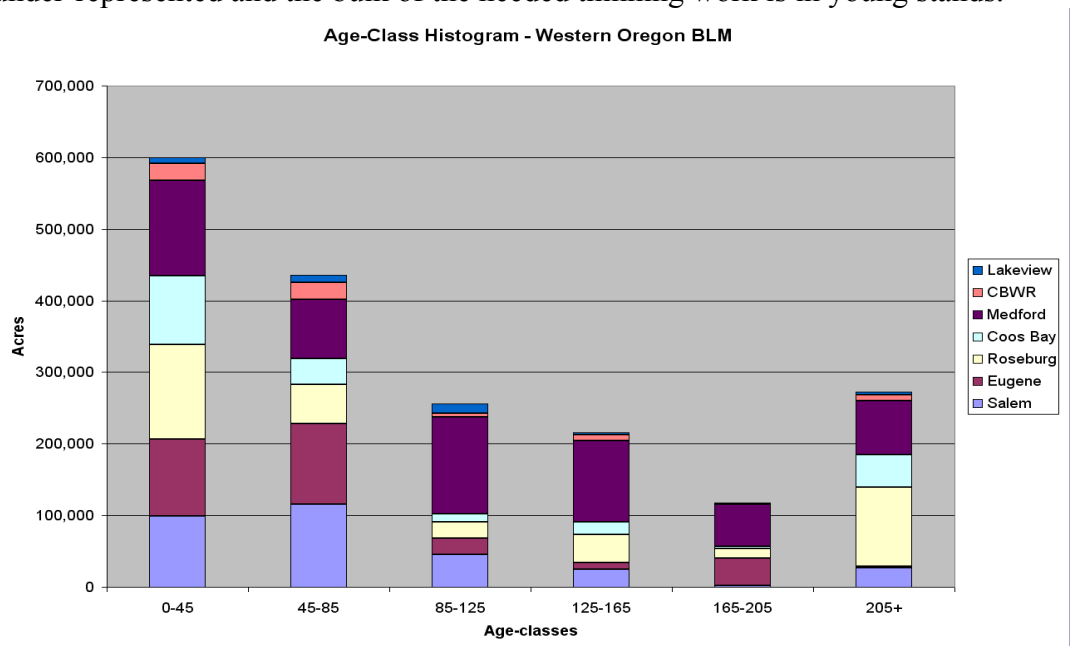


Timber Sale Accomplishments of USFS And BLM (Regionwide) Under The Northwest Forest Plan

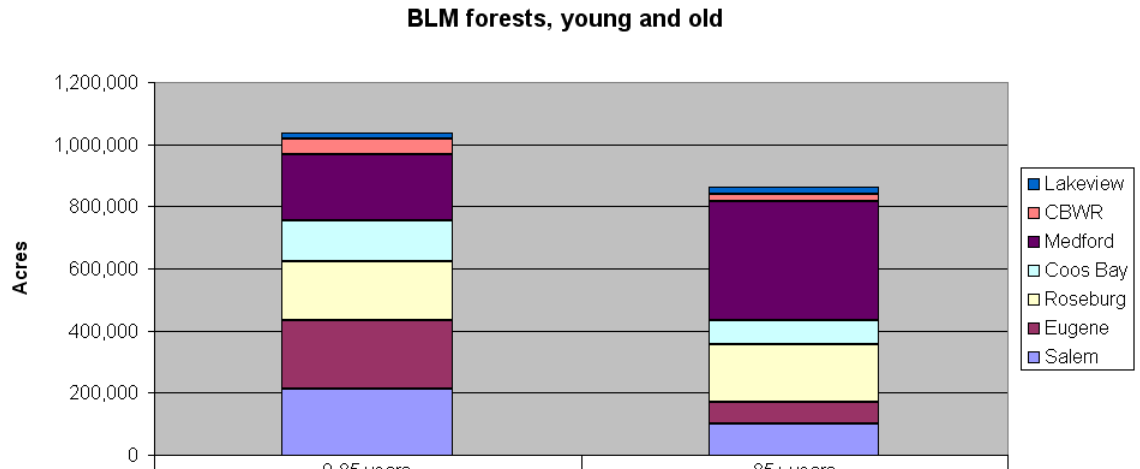


Timber Sale Accomplishments For Western Oregon BLM Districts Under The Northwest Forest Plan

The following age-class histogram created using BLM data shows that older forests are relatively under-represented and the bulk of the needed thinning work is in young stands.



This is the same data showing young versus old forests, split at 85 years.



	0-85 years	85+ years
Lakeview	18,660	22,519
CBWR	47,263	23,981
Medford	215,659	382,826
Coos Bay	132,714	76,680
Roseburg	186,901	185,587
Eugene	219,917	71,618
Salem	214,483	99,795

FIRE AND FUELS

The DEIS at page 10 indicates that restoring fire-adapted ecosystems to increase fire resiliency is part of the purpose of the RMP revisions. Page 10 additionally acknowledges that the "owl recovery plan recommends active management within the dry forest landscape to restore ecosystem resiliency," and that "under the O&C Act, BLM management must account for potential loss of this timber to fire." Hence "the purpose of this action includes restoring fire-adapted ecosystems to increase fire resiliency."

The fire resiliency purpose of the RMP revisions is directly thwarted by the BLM proposal to conduct:

> *"management such as thinning and regeneration harvest with no retention and rapid reforestation on a relatively short rotation. This management approach would result in continuous horizontal and vertical fuel profiles and conditions more closely aligned with high severity fire." DEIS page 194.*

It appears that every action alternative developed by the BLM will include logging techniques known by the agency to increase fire hazard. This directly inhibits the alleged purpose and need of increasing fire resiliency stated on page 10 of the DEIS. "The purpose of the action includes restoring fire-adapted ecosystems in increase fire resiliency." DEIS page 10.

The BLM's proposal to utilize logging techniques to known to increase fire resiliency in some instances while concurrently utilizing logging techniques to decrease fire hazard in other instances is arbitrary and capricious.

The DEIS fails to analyze or disclose an action alternative that would codify the dry forest restoration developed by Franklin and Johnson and successfully implemented in the BLM "pilot projects."

I. INCREASE FIRE RESISTANCE BY MAXIMIZING THE EXTENT OF LATE SUCCESSIONAL RESERVES

One of the purposes of this EIS is to restore fire-adapted ecosystems to increase fire resiliency. Recognizing that all forests in western Oregon are "fire-adapted," this purpose should be clarified to maintain fire resistance in mature and old growth forests, and to avoid regeneration harvest that creates dense young plantations that represent a very hazard fuel condition. BLM should pursue this important purpose across all forest types.

In the final decision on this RMP revision, BLM should avoid both high- and moderate-intensity timber harvest because DEIS (p 194) admits that:

The High Intensity Timber Area includes management such as thinning and regeneration harvest with no retention and rapid reforestation on a relatively short rotation. This management approach would result in continuous horizontal and vertical fuel profiles and conditions more closely aligned with high severity fire. … [T]here currently exists an overabundance of young and closed conditions and the likelihood of large, high severity fire has increased. Large areas of no retention are not representative of the prevailing

vegetative patterns and structure associated with frequent fire, low-severity or mixed-severity fire regimes.[322]

Moderate Intensity Timber Area includes thinning and regeneration harvest with 5-15 percent basal area retention, and longer rotations and rapid reforestation. This management approach would result in more continuous horizontal and vertical fuel profiles and conditions more closely aligned with high severity fire. Additionally, contiguous fuel profiles have reduced stand-level fire resistance.

Adopting high- or moderate-intensity timber harvest is therefore inconsistent with the purpose and need for this EIS to *"restore fire-adapted ecosystems to increase fire resiliency."*

Figures 3-40 and 3-41 clearly show that areas with less logging (i.e. the reserves) create conditions that are much more fire resistant, while areas with more logging (i.e., the harvest land base) creates conditions that present much greater fire hazard.

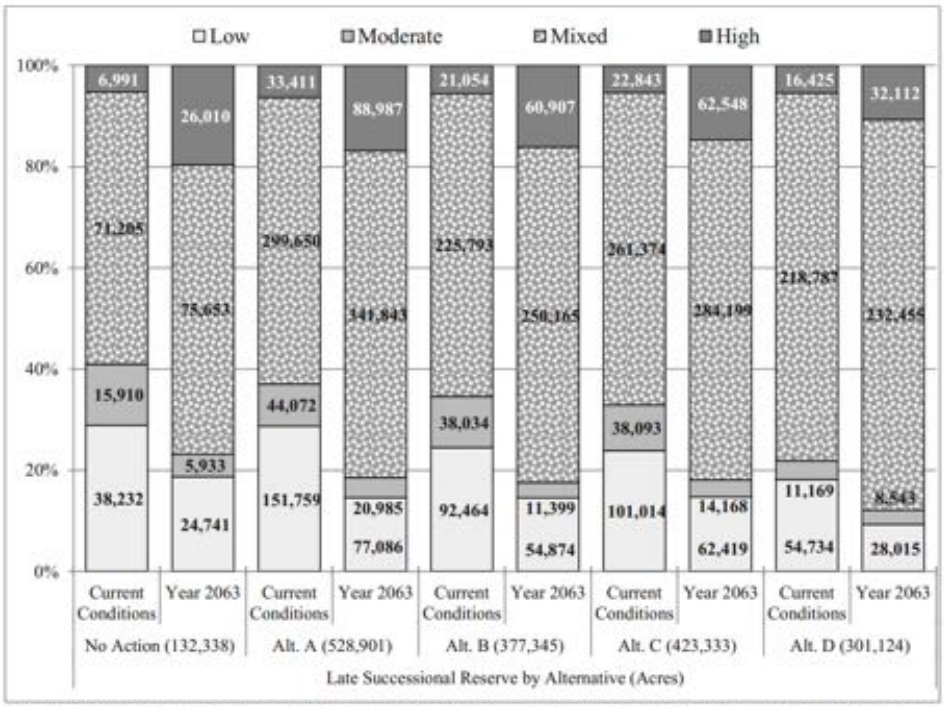


Figure 3-40. Stand-level fire resistance categories in the Late-Successional Reserves in the dry forest in the interior/south for the current condition and each alternative in 50 years.

[322] Taylor and Skinner 2003, Larson and Churchill 2012.

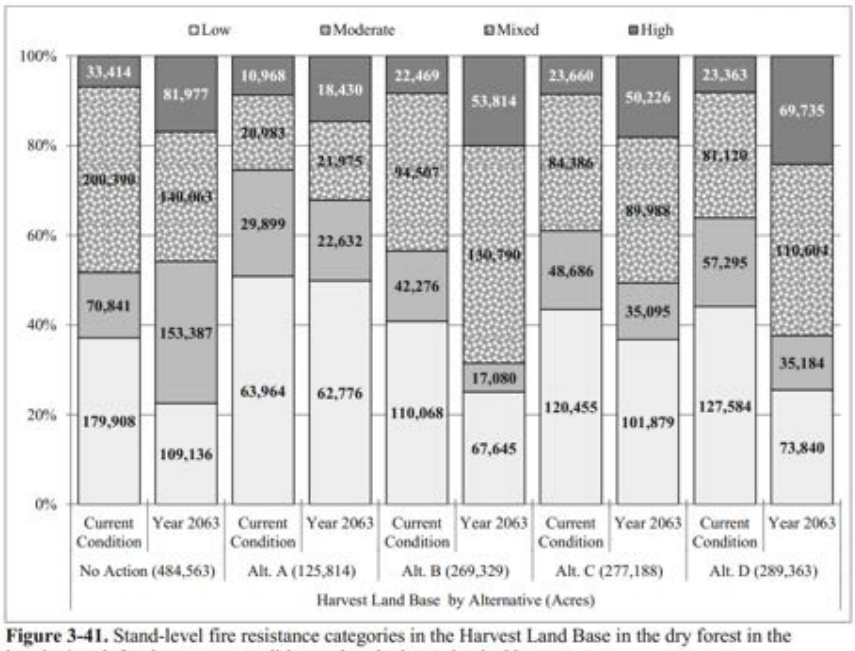


Figure 3-41. Stand-level fire resistance categories in the Harvest Land Base in the dry forest in the interior/south for the current condition and each alternative in 50 years.

Furthermore, the harvest land base probably has a greater fire hazard than this analysis recognizes given the fact that the EIS relies on some faulty assumptions about the effects of thinning on forest structure and fire hazard (explained below).

II. FOREST CONSERVATION HELPS MODERATE FIRE BEHAVIOR

DEIS 187 says that lower density stands tend to have higher fire resistance. The DEIS also adopts the notion that fire exclusion increases fire hazard. DEIS (p 194) says:

Uneven-Aged Timber Area [and] the Owl Habitat Timber Area … Both of these management scenarios would result in the greatest reduction of low and moderate stand-level resistance and the largest increase in the mixed- and high-resistance acres.

However, these DEIS assertions are not supported by the evidence from SW Oregon. The EIS needs to reflect the best available science which indicates that open stands (such as those resulting from thinning) tend to have more surface and ladder fuels (over time), as well as greater wind penetration, lower humidity, dryer fuels, longer flame lengths, and higher fire intensity at the flame front. Forests with a dense canopy tend to have a more cool, moist, and less windy fire microclimate, and the canopy helps suppress the growth of surface and ladder fuels.

Table 3-41 (DEIS p 187) needs to reflect the fact that complex older forests tend to be more fire resistant and resilient compared to young forests and logged forests. “Mixed” resistance is not described or defined. It would be useful for the public and the decision-maker to understand the complex old forests have several characteristics making them more fire resistant (e.g., thick bark, high canopies, hardwood understory that acts as a heat sink, canopy that suppresses ladder fuels and helps maintain cool-moist-les-windy microclimate) and know that this mixed-resistance old forest is the condition that historically dominated the forest landscape, and this is the condition

that results in the mixed severity fires that wildlife evolved with. Logging complex old forests is likely to reduce fire resistance and increase fire hazard.

The DEIS (p 187) says that only single-storied mature forests have HIGH resistance to wildfire. The EIS needs to disclose that open canopy forests tend to have more severe fire effects and that logging to create open forest conditions on large areas of BLM land (such as by logging to simplify complex forests) will have significant trade-offs for wildlife that need more complex forests. Forests lacking complex dead wood and complex understory do not provide high quality habitat for spotted owls and numerous other species.

The EIS needs to reflect the best available information (provided below) indicating that greater time-since-fire actually increases fire resistance. That is, fires are likely burn more severely in forests that have been more recently logged or burned, and are likely to burn less severely in closed-canopy forests that have not been recently logged or burned. This may be related to the fact that closed canopy forests maintain a cool-moist microclimate that helps retain higher fuel moisture and more favorable fire behavior. Canopy cover also helps suppress the growth of ladder fuels. The significance of this is that it may make sense to variably retain more canopy cover while thinning and don't focus on treatment of canopy fuels except to provide some well-spaced "escape hatches" for hot gases generated by surface fires.

Odion et al (2004) studies fire in the Klamath Mountains region and found -

> *Long absence of fire predicts low severity fire effects. Absence of fire enables closed canopy forest vegetation to replace shrub and open forest vegetation through succession. Shade reduces available fuel below the canopy as well as its potential surface heat output during fire events, making canopy fires less likely to occur. Therefore, severe fire effects are not correlated with the age of woody fuels. Instead, weather and climate dictate canopy fire behavior in closed canopy forests.*
>
> *Tree plantations, which typically follow high-severity fires under traditional forestry practices, exhibited "twice the burn severity" of closed canopy forests (20 percent), even though they accounted for only four (4) percent of the study area. The relative combustibility of structurally homogeneous tree plantations supports a self-reinforcing "feedback" dynamic of high-severity fires, and the authors anticipate continued high-severity fires in roaded and planted portions of the landscape.*

IMPLICATIONS- The central conclusion of the paper is that long absence of fire predicts low-severity fire effects in Klamath mixed evergreen forests. This conclusion has four management implications:

1. The fuel build-up model formulated for southwestern ponderosa pine forests does not apply to Klamath mixed evergreen forests, and fuel treatments intended to prevent crown fires based on this model are misdirected.

2. Fuel treatments designed to impose a low-severity fire regime may be ecologically detrimental because highly severe fire effects, to some degree, support diverse vegetation community structures and habitats for which the Klamath region is globally unique. Some fuel treatments also may adversely affect soils, water quality, wildlife habitat, and spread noxious weeds.

3. Fuel treatments may be ecologically beneficial in tree plantations where past logging left behind unnatural fuel profiles.

4. Naturally ignited wildland fires may be beneficial to a variety of conservation objectives in Klamath forests. Home ignitability mitigation in the wildland-urban interface may increase options for backcountry wildland fire use.

Fuel reduction projects in SW Oregon must consider the implications of Odion, D.C., E.J. Frost, J.R. Strittholt, H. Jiang, D.A. DellaSala and M.A. Moritz. 2004. Patterns of fire severity and forest conditions in the western Klamath Mountains, California. Conservation Biology 18(4): 927-936. [323]

In a mixed-conifer, mixed-severity fire regime study area in SW Oregon, Crystal Raymond found that,

> *Fire severity was greater in thinned treatments than untreated. … The additional fine wood left from the thinning operation (despite whole-tree yarding) most likely caused higher fire intensity and severity in the thinned treatments*."
>
> *… [T]he presence of activity fuels increased potential surface fire intensity, so increases in canopy base height did not decrease the potential for crown fire initiation. … [C]rown fire is not a prerequisite for high fire severity; damage and mortality of overstory trees in the wildfire was extensive despite the absence of crown fire, and the low predicted crown fire potential before and after the fuel treatment. Damage to and mortality of overstory trees were most severe in thinned treatments (80 – 100% mortality), least severe in the thinned and under-burned treatment (5% mortality), and moderate in untreated stands (53-54% mortality) following a wildfire in 2002. Fine fuel loading was the only fuel structure variable significantly correlated with crown scorch of overstory trees. Percentage crown scorch was the best predictor of mortality 2 years post-fire. Efforts to reduce canopy fuels through thinning treatments may be rendered ineffective if not accompanied by adequate reduction in surface fuels*. [324]
>
> *A greater percentage of pre-fire fine wood was consumed in the thinned plots than in the unthinned plots during the Biscuit fire suggesting that fine fuel moisture may have been lower in the thinned plots*." And "*the Biscuit Fire was observed to have more moderate fire behavior in stands with a sub-canopy tree layer compared to more open stands, suggesting that the sub-canopy trees did not function as ladder fuels. … Higher foliar moisture of broad-leaved species could have dampened fire behavior, inhibiting rather than aiding crown fire initiation."*

Similarly, Hanson and Odion (2006) compared wildfire behavior in seven previously thinned mixed-conifer forests vs. adjacent unthinned forest in the Sierra Nevada and found —

[323] http://nature.berkeley.edu/moritzlab/docs/Odion_etal_2004.pdf.
[324] Crystal L. Raymond. 2004. The Effects of Fuel Treatments on Fire Severity in a Mixed-Evergreen Forest of Southwestern Oregon. MS Thesis. http://depts.washington.edu/nwfire/publication/Raymond_2004.pdf.

> *Contrary to our hypothesis, the mechanically thinned areas had significantly higher fire-induced mortality (p =.016, df = 6) and combined mortality (p =.008, df = 6) than the adjacent unthinned areas. Thinned areas predominantly burned at high severity, while unthinned areas burned predominantly at low and moderate severity … Possible explanations for the increased severity in thinned areas include persistence of activity fuels, enhanced growth of combustible brush post-logging, desiccation and heating of surface fuels from increased insolation, and increased mid-flame windspeeds. Given that sampling transects in thinned versus unthinned areas were only 100 m apart in each experimental unit, fire weather should have been the same for the thinned and unthinned areas sampled in each site. Thus, mechanical thinning on these sites appears to have effectively lowered the fire weather threshold necessary for high severity fire occurrence.*[325]

A study in mixed-conifer forests in California showed that forest reserves were more effective than logging in terms of reducing fire hazard.

> *[T]he efficacy of seven traditional silvicultural systems and two types of reserves used in the Sierra Nevada mixed conifer forests is evaluated in terms of vegetation structure, fuel bed characteristics, modeled fire behavior, and potential wildfire related mortality. The systems include old-growth reserve, young-growth reserve, thinning from below, individual tree selection, overstory removal, and four types of plantations. These are the most commonly used silvicultural systems and reserves on federal, state, and private lands in the western United States. Each silvicultural system or reserve had three replicates and varied in size from 15 to 25 ha; a systematic design of plots was used to collect tree and fuel information. The majority of the traditional silvicultural systems examined in this work (all plantation treatments, overstory removal, individual tree selection) did not effectively reduce potential fire behavior and effects, especially wildfire induced tree mortality at high and extreme fire weather conditions. Overall, thinning from below, and old-growth and young-growth reserves were more effective at reducing predicted tree mortality.*[326]

[325] Hanson and Odion. 2006. Fire Severity In Mechanically Thinned Versus Unthinned Forests of the Sierra Nevada, California 2006 Fire Congress Proceedings. ftp://ftp2.fs.fed.us/incoming/r5/VMS/reference_library/Fire%20and%20Fuels%20References/Hanson%20and%20Odion%20%202006%20Fire%20severity%20in%20thinned%20vs%20unthinned%20forests%20.pdf

[326] Scott L. Stephens and Jason J. Moghaddas. 2005. Silvicultural and reserve impacts on potential fire behavior and forest conservation: Twenty-five years of experience from Sierra Nevada mixed conifer forests. Biological Conservation 125 (2005) 369–379. See also Morris Johnson, David L. Peterson, and Crystal Raymond 2009. Fuel treatment guidebook: illustrating treatment effects on Fire hazard. Fire Management Today 69(2) http://www.fs.fed.us/fire/fmt/fmt_pdfs/FMT69-2.pdf p 32-33

III. BLM NEEDS TO REFLECT THAT WILDFIRE MAY BE MORE CONTROLLED BY WEATHER THAN FUELS

DEIS p 175 discusses the effects of fire exclusion in dry forests. This analysis over-emphasizes the effects of fuel and under-emphasizes the effects of weather on fire. Forests throughout BLM lands in western Oregon almost always have enough fuel to carry fire. Weather conditions are a large determinant of the extent and severity of fire. Protecting homes and communities require treatments in the "structure ignition zone" immediately around structures, not across the forest landscape.

The agencies must recognize that most large fires are climate driven, not fuel driven.

> *Within forests, annual burned area correlated at least as strongly with spring–summer vapour pressure deficit (VPD) as with 14 other drought-related metrics, including more complex metrics that explicitly represent fuel moisture. Particularly strong correlations with VPD arise partly because this term dictates the atmospheric moisture demand."* [327]

Littell et al (2009) looked at a large number of fires that occurred in the western U.S. during the 20th Century and found -

> *Our analyses indicate that year-of-fire climate is the strongest influence on area burned in forested ecosystems, but fire size may be limited secondarily by fuel continuity between or within forest stands (Rollins et al. 2002). For example, continuity may be less limiting for fire regimes in which crown fires are the dominant mechanism than in lower-elevation forests characterized by surface fires…*
>
> *[R]elationships described in Westerling et al. (2006) hold for more of the 20th century than previously shown.... These relationships all support our claim that drying of fuels is the primary mechanism for large WFAB [Wild fire area burned] in the higher-elevation and northern mountainous ecoprovinces. Wild fire area burned in these ecoprovinces thus appears to be limited by climate rather than fuel availability, ...*
>
> *Our analyses indicate that year-of-fire climate is the strongest influence on area burned in forested ecosystems, but fire size may be limited secondarily by fuel continuity between or within forest stands (Rollins et al. 2002). For example, continuity may be less limiting for fire regimes in which crown fires are the dominant mechanism than in lower-elevation forests characterized by surface fires, ...*
>
> *Climate controls on the area burned by wildfire in the western United States are strong, even during the dominant period of fire suppression and exclusion in the last two-thirds of the 20th century. Roughly 39% (1916–2003) to 64% (1977–2003) of the fire area burned can be related directly to climate. The variance explained by climate implies that fuel treatments, for example, might be tailored to specific ecosystems and climate–fire relationships. Recognizing that most ecoprovinces have significant ecological variability,*

[327] A. Park Williams, Richard Seager al 2014. Correlations between components of the water balance and burned area reveal new insights for predicting forest fire area in the southwest United States. International Journal of Wildland Fire 24(1) 14-26 http://dx.doi.org/10.1071/WF14023 http://www.publish.csiro.au/?paper=WF14023

climate-limited ecoprovinces may be less influenced by fuel treatment than fuellimited ecoprovinces (at least for area burned, if not fire severity).[328]

The fire and fuels analysis does disclose trade-offs associated with logging. The DEIS says that forest management is a surrogate for fire, but wildfire creates complex forest structures that wildlife evolved with, while logging causes far different effects than fire. Logging requires roads and removes forest structure. The EIS needs to disclose the many ways in which logging is not a surrogate for fire.

IV. LOGGING HABITAT TO "SAVE" IT FROM FIRE COULD DEGRADE HABITAT

The DEIS (p 195) says "*BLM assumed that the restoration approach taken in the Late Successional Reserve in the dry forest would include stand density reductions, cultivation of large trees with old-growth characteristics, and introductions of heterogeneity into increasingly uniform stands, and treatments to reduce fire risk adjacent to high-value habitat."* The DEIS does not adequately disclose the adverse effects of these habitat-modifying treatments that will likely be conducted with commercial logging that removes primary constituent elements of spotted owl habitat.

DEIS (p 158) describes for thinning as a "no regrets" approach to climate adaptation. This is misleading. No regrets describes strategies that are beneficial whether or not climate driven disturbance occurs. This is not the case here. Forest thinning involves complex trade-offs that could help or harm the forest and its inhabitants, and the alleged benefits often accrue only if treated areas subsequently burn during the brief window that fuel reduction treatments may be effective. This is not a no regrets strategy.

A more specific example is the spotted owls that prefers to live in fuel-rich forests with high canopy cover. Thinning to reduce climate stress will likely result in adverse effects on spotted owls. Thinning is therefore NOT a "no regrets" strategy for spotted owls. In fact, leaving suitable spotted owl habitat unmanaged is probably the closest thing to a no regrets climate strategy for the spotted owl. The EIS fails to make this important point clear. Even when logging is conducted with an intention to reduce fire effects, such logging will still cause net negative effects on spotted owls and other wildlife that prefer to live in forests with dense canopy cover and complex structure. The DEIS failed to adequately disclose trade-offs between the needs of wildlife and the adverse effects of logging for fire resiliency. The net effects of logging plus wildfire are far worse for wildlife than the effects of fire alone.

Logging intended to benefit dense forest habitat will also reduce the quality of habitat by removing various constituent elements of their preferred habitat, and the NEPA analysis must therefore include some evaluation of ecological costs and benefits — e.g., the high probability that logging will degrade habitat vs. the low probability that fuel reduction logging will interact favorably with fire and thus benefit habitat. This evaluation requires an estimate of the probability of future wildfire. To assume, as many analyses do, a 100% chance of future wildfire

[328] Jeremy S. Littell, Donald McKenzie, David L. Peterson, Anthony L. Westerling (2009) Climate and wildfire area burned in western U.S. ecoprovinces, 1916–2003. Ecological Applications: Vol. 19, No. 4, pp. 1003-1021. http://naldc.nal.usda.gov/download/34676/PDF.

over-estimates the likelihood of treatments will interact with fire, thus over-estimating the ecological value of fuel treatments, and under-estimating the ecological effects of logging on habitat.[329]

There is a strong interest among the federal land management agencies to conduct widespread logging in suitable spotted owl habitat in order to reduce the effect of fire. The agencies view fuel reduction logging as beneficial to owl habitat because modeling shows that fire behavior is moderated by fuel reduction, but proponents never seem to conduct a careful evaluation of the relative probability, and the relative harms, of logging versus wildfire. Strangely, the probabilistic aspects of this issue have been largely ignored in the owl science literature, but recently explored in the forest-carbon literature which recently showed that although thinning can modify fire behavior, logging to reduce fire effects is likely to remove more carbon by logging than will be saved by modifying fire.[330] The reason for this seemingly counterintuitive outcome is a result of the "law of averages." As explained by Cathcart et al 2009 —

> *The question is—if the implementation of fuels treatments within the Drews Creek watershed had the beneficial effect of reducing the likelihood of wildfire intensity and extent as simulated in this study, why is the expected carbon offset from fuels treatment so negative? The answer lies in the probabilistic nature of wildfire. Fuels treatment comes with a carbon loss from biomass removal and prescribed fire with a probability of 1. In contrast, the benefit of avoided wildfire emissions is probabilistic. The law of averages is heavily influenced that given a wildfire ignition somewhere within the watershed, the probability that a stand is not burned by the corresponding wildfire is 0.98 (1 minus the average overall conditional burn probability …*
>
> *Thus, the expected benefit of avoided wildfire emissions is an average that includes the predominant scenario that no wildfire reaches the stand. And if the predominate scenario for each stand is that the fire never reaches it, there is no avoided CO2 emissions benefit to be had from treatment. So even though severe wildfire can be a significant CO2 emissions event, its chance of occurring and reaching a given stand relative to where the wildfire started is still very low, with or without fuel treatments on the landscape.*[331]

Both carbon and spotted owl habitat tend to accumulate in relatively dense forests with intermediate or longer fire return intervals. Thus, we can likely read these studies and replace the word "carbon" with the word "spotted owl habitat" and the results will likely hold.

DEIS pp 773-774 identifies "Issue 3" whether the alternatives will help reduce the loss of habitat due to wildfire, but the DEIS says no additional analysis is required, and the reasons given are

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[329] See Heiken, D. 2010. Log it to save it? The search for an ecological rationale for fuel reduction logging in Spotted Owl habitat. Oregon Wild. v 1.0. May 2010. http://dl.dropbox.com/u/47741/Heiken_Log_it_to_Save_it_v.1.0.pdf.

[330] Mitchell, Harmon, O'Connell. 2009. Forest fuel reduction alters fire severity and long-term carbon storage in three Pacific Northwest ecosystems. Ecological Applications. 19(3), 2009, pp. 643–655 http://www.fs.fed.us/pnw/pubs/journals/pnw_2009_mitchell001.pdf.

[331] Jim Cathcart, Alan A. Ager, Andrew McMahan, Mark Finney, and Brian Watt 2009. Carbon Benefits from Fuel Treatments. USDA Forest Service Proceedings RMRS-P-61. 2010. http://www.fs.fed.us/rm/pubs/rmrs_p061/rmrs_p061_061_079.pdf.

confusing: "As explained in **Appendix S**, the relative habitat suitability surfaces the BLM developed to address Conservation Needs 1, 2 and 4 include forecasts of habitat change from wildfire. Thus, the evaluations of Conservation Needs 1, 2 and 4 also address Conservation Need 3. The BLM needed no additional analysis." We could find no analysis in Appendix S or elsewhere in the EIS explaining that alternatives with more logging will create hazardous fuel condition and expose spotted owls to greater risk from wildfire.

In an effort to advance the discussion and help the agencies conduct better risk assessments in the NEPA context we have prepared a white paper in an attempt to clarify the critical considerations in a probabilistic risk assessment that compares the risk of logging versus wildfire.[332] Log it to save it? The search for an ecological rationale for fuel reduction logging in Spotted Owl habitat.[333] This report is most relevant in SW Oregon but the proposed evaluative framework is applicable in the east Cascades, northern California, and elsewhere. This report focuses on carbon and spotted owl habitat, but the analysis is relevant for any species or forest value that requires relatively dense forest cover, such as American marten, Pacific fisher, pileated woodpecker, northern goshawk, etc.[334]

To justify such fuel reduction logging in suitable owl habitat on ecological grounds requires several findings: (1) that wildfire is highly likely to occur at the site of the treatment, (2) that if fire does occur it is likely to be a severe stand-replacing event, and (3) that spotted owls are more likely to be harmed and imperiled by wildfire than by logging at a scale necessary to reduce fire hazard. Available evidence does not support any of these findings, which raises serious questions about the need for and efficacy of logging to reduce fuels in western Oregon and other forests lacking frequent fire return intervals.

The probabilistic element of the risk equation demands careful consideration. Both logging and fire have meaningful consequences, so the issue really boils down to a comparative probabilistic risk assessment where risk is characterized by two quantities: (1) the magnitude (severity) of the possible adverse consequence(s), and (2) the likelihood (probability) of occurrence of each consequence.

Framework for Assessing the Risk of Wildfire vs. Fuel Reduction Logging			
	Likelihood of event	Magnitude of harm	Net Benefit
Wildfire	LOW: Stand replacing wildfire is not common in western Oregon. Fire suppression policy prevails. The chance that any given acre of forest will experience wildfire is low.	LOW: The majority of wildfire effects are not stand replacing. Fire is a natural process to which native wildlife are adapted. There is still a deficit of natural fire processes on the landscape.	Fire is likely less harmful to habitat than fuel reduction logging.

[332] Heiken, D. 2010.
[333] Oregon Wild. v 1.0. May 2010. http://dl.dropbox.com/u/47741/Heiken_Log_it_to_Save_it_v.1.0.pdf.
[334] See for instance, Aubry et al 2013. Meta-Analyses of Habitat Selection by Fishers at Resting Sites in the Pacific Coastal Region. The Journal of Wildlife Management 77(5):965–974; 2013; DOI: 10.1002/jwmg.563.

Logging	HIGH: To be effective in controlling fire, logging must be very extensive, and sustained. Many more acres would need to be logged than would burn.	HIGH: Widespread logging will have significant impacts on canopy, microclimate, understory vegetation, down wood, and long-term effects on recruitment of large trees and snags.	Fuel reduction logging is likely more harmful to habitat than wildfire.

The white paper is organized around these risk evaluation parameters.

In spite of what we often hear, that federal forests are not at imminent risk of destruction by wildfire. Fire return intervals remain relatively long, due to both natural factors and active fire suppression policies. Wildfire severity also remains moderate. Most wildfires are NOT stand replacing. Most fires are in fact low and moderate severity.

The location, timing, and severity of future fire events cannot be predicted making it difficult to determine which forests will benefit from treatment - consequently fuel treatments must be extensive and many stands will be treated unnecessarily, thus incurring all the costs of fuel logging, but receiving none of the beneficial effects on fire behavior.

Furthermore, logging for purposes of fuel reduction has impacts on owl and prey habitat that remain under-appreciated, especially the reduction of complex woody structure, and the long-term reduction in recruitment of large snags and dead wood. Fuel reduction logging also has complex effects on fire hazard with potential to increase fire hazard, especially when fuel reduction efforts involve removal of canopy trees.

When all this evidence is put together, it becomes clear that "saving" the spotted owl by logging its habitat to reduce fuels often does not make any sense.

Similar conclusions were reached is several studies, reviews, and expert commentaries, such as:

Odion et al. 2014, who looked at the relative effects of fire versus thinning and fire on spotted owl habitat in two regions of interest: the Klamath and dry Cascades --

> *Using empirical data, we calculated the future amount of spotted owl habitat that may be maintained with these rates of high-severity fire and ongoing forest regrowth rates with and without commercial thinning. Over 40 years, habitat loss would be far greater than with no thinning because, under a "best case" scenario, thinning reduced 3.4 and 6.0 times more dense, late-successional forest than it prevented from burning in high-severity fire in the Klamath and dry Cascades, respectively. Even if rates of fire increase substantially, the requirement that the long-term benefits of commercial thinning clearly outweigh adverse impacts is not attainable with commercial thinning in spotted owl habitat. It is also becoming increasingly recognized that exclusion of high-severity fire may not benefit spotted owls in areas where owls evolved with reoccurring fires in the landscape.*

We found that the habitat recruitment rate exceeded the rate of severe fire by a factor of 4.5 in the Klamath and 10 in the dry Cascades, leading to a deterministic increase in dense forest habitat over time, assuming no other disturbance events. In contrast, previous published assessments of fire on spotted owls have not explicitly considered fire and forest regrowth rates (Wilson and Baker 1998, Lee and Irwin 2005, Roloff et al. 2005, 2012, Calkin et al. 2005, Hummel and Calkin 2005, Ager et al. 2007, Lehmkuhl et al. 2007). Not including the probability of high-severity fire, which is low, leads to highly inflated projections of the effects of thinning versus not thinning on high-severity fire (Rhodes and Baker 2008, Campbell et al. 2012).

Our calculations of thinning effects included rates of forest regrowth along with high-severity fire. The calculations illustrate how the requirement that the long-term benefits of thinning clearly outweigh adverse impacts (USFWS 2011) is not attainable as long as treatments have adverse impacts on spotted owl habitat. This is because the amount of dense, late-successional forest that might be prevented from burning severely would be a fraction of the area that would be thinned.

This would not be a concern if thinning effects were neutral, but the commercial thinning prescriptions being implemented call for forests with basal area reduced by nearly half to 13.5-27.5 m2/ha, which is mostly well below the minimum level known to function as nesting and roosting habitat (ca. 23 m2/ha) (Buchanan et al. 1995, 1998). … Even an immediate doubling of fire rates due to climate change or other factors would result in far less habitat affected by highseverity fire than thinning. In addition, much of the highseverity fire might occur regardless of thinning, especially if the efficacy of thinning in reducing high-severity fire is reduced as fire becomes more controlled by climate and weather (Cruz and Alexander 2010). Clearly, the strategy of trying to maintain more dense, late-successional forest habitat by reducing fire does not work if the method for reducing fire adversely affects far more of this forest habitat than would high-severity fire, and the high-severity fire might occur anyway because it is largely controlled by climate and weather.

While much of the concern about fire and thinning in dry forests of the Pacific Northwest has focused on spotted owls, it may also apply to other biota associated with dense, old forests, including species of conservation concern, such as Pacific fisher (Martes pennanti pacifica), which research indicates may benefit from mixed-severity fire (Hanson 2013), the Northern Goshawk (Accipiter gentilis), and, following fire, the Black-backed Woodpecker (Picoides arcticus), … Our findings highlight the need to be cautious about conclusions that thinning treatments are needed for species found in dense forest and that they will not have unintended consequences (e.g., Stephens et al.2012) until long-term, cumulative impacts are better understood. As we found with spotted owls, long-term and unintended consequences may be substantial for species that rely on dense, late-successional forests.[335]

[335] Dennis C. Odion, Chad T. Hanson, Dominick. A. DellaSala, William L. Baker, and Monica L. Bond. 2014. Effects of Fire and Commercial Thinning on Future Habitat of the Northern Spotted Owl. The Open Ecology Journal, 2014, 7, 37-51 37. http://benthamopen.com/toecolj/articles/V007/37TOECOLJ.pdf.

V. REGENERATION HARVEST REDUCES FIRE RESILIENCY

The DEIS did not adequately disclose the extent to which regeneration logging will convert naturally resistant and resilient mature forests into tree plantations which have a dense homogenous fuel structure close to the ground and represents a significant fire hazard.

Logging in many cases will actually increase fire hazard, but the EIS does not fully account for the impacts on wildlife. DEIS Figure 3-40 and 3-41 clearly show that timber management areas tend to have fuel conditions with greater fire hazard compared to the reserves where forests are better conserved. The DEIS does not carry this analysis forward into the analysis of effects on the northern spotted owl habitat (and numerous other wildlife that prefer to live in dense forests). Based on the fuel conditions created by logging, fires will likely be larger and more severe. There will likely be spill-over effects from the harvest areas to the reserves. The EIS needs to more fully disclose the adverse effects of logging on spotted owls

DEIS at 159 states,

> *In dry forests under all action alternatives, management would emphasize increasing fire resistance and resilience, which would often also increase resistance to drought, insects, and pathogens. The No Action alternative does not explicitly prohibit management to increase fire resistance and resilience, but does not have the same emphasis as in the action alternatives, especially within the Late-Successional Reserve and the Riparian Reserve*."

This is flawed for several reasons.

- First, BLM seems to assume that active management to reduce fire, insects, and drought will provide net benefits. In reality, fire and insects are natural processes that forests evolved with. Logging removes important features of wildlife habitat and is far more likely to cause adverse effects on wildlife compared to natural processes like fire and insects.
- Second, BLM seems to assume that active management (i.e. logging) will provide net ecological benefits. In reality, active management will interfere with these natural processes and cause more harm than good. For instance, beetle mortality is likely to kill the trees most susceptible to beetles, while sparing those trees that are best adapted to defend themselves from beetle attack. Logging removes trees without regard to their adaptive capacity. Logging will be removing adaptive genes from the forest, while natural processes recruit those individuals most likely to offer adaptive traits.
- Third, logging for resistance and resilience to fire and other natural disturbance agents will most often involve dramatic reduction in stand densities. This will imperil many species that prefer to live in dense forests, including spotted owls, and primary prey such as flying squirrels and red tree voles. In short, increasing resilience to fire, reduces resilience for spotted owls.
- Fourth, risk reduction logging is allowed in LSRs under the Northwest Forest Plan (as long as the benefits of action are clear and compelling) so BLM cannot cast aspersions on the no action alternative. In fact, BLM needs to give the action alternatives lower marks because they grant BLM more discretion to conduct active management In reserves that is not properly conditioned on ensuring net ecological benefits.

DEIS at 159 also says, "*Comparing recent satellite imagery of western Oregon with that collected in the mid-1990s, Reserves with minimal or no active management tended to become homogeneous with respect to stand density, age, and condition. Such landscapes appear to be increasingly vulnerable to large, stand-replacing fire*." This is highly speculative, misleading, and not supported by any evidence.

- First, reserves were intended to be spatially distributed and redundant, so that the system of reserves could absorb large disturbance events and still function. See Jerry Franklin's statements following the Biscuit Fire.
- Second, mature forests are less vulnerable to fire, while dense stands of young trees are more vulnerable to fire, so it's really the timber management areas with abundant areas of young reproduction that pose the greatest fire hazard. (See the science excerpts below.)
- Third, the assertion that large reserves are more vulnerable is contradicted in the DEIS. DEIS (p 194) admits that:

> *The High Intensity Timber Area includes management such as thinning and regeneration harvest with no retention and rapid reforestation on a relatively short rotation. This management approach would result in continuous horizontal and vertical fuel profiles and conditions more closely aligned with high severity fire. … [T]here currently exists an overabundance of young and closed conditions and the likelihood of large, high severity fire has increased. Large areas of no retention are not representative of the prevailing vegetative patterns and structure associated with frequent fire, low-severity or mixed-severity fire regimes*.[336]

Moderate Intensity Timber Area includes thinning and regeneration harvest with 5-15 percent basal area retention, and longer rotations and rapid reforestation. This management approach would result in more continuous horizontal and vertical fuel profiles and conditions more closely aligned with high severity fire. Additionally, contiguous fuel profiles have reduced stand-level fire resistance.

Contrary to popular belief, old forests present much less of a fire hazard compared to dense young plantations resulting from regenharvest. Older forests spend most of their lifecycle in a condition of tall trees where most of the fuels are held high above the ground and relatively unavailable for combustion by surface fires. Mature forest canopies also help maintain cool, moist conditions, reduce wind speeds, and suppress the growth of ladder fuels. Regeneration harvest results in young forests of short-stature where the fuels are densely packed and close to the ground where they are available for combustion and present more of a hazard.

> *Large blocks of old-growth forests – rather than large contiguous blocks of young growth or highly simplified forests – are the best scenario for reducing catastrophic wildfire.*[337]

Lindenmayer et al (2009) say –

[336] Taylor and Skinner 2003, Larson and Churchill 2012.
[337] Jerry Franklin, David Perry, Reed Noss, David Montgomery, Christopher Frissell. Simplified Forest Management To Achieve Watershed And Forest Health: A Critique. National Wildlife Federation. http://www.coastrange.org/documents/forestreport.pdf

> *Contrary to claims by some commentators (e.g., National Association of Forest Industries 2009a,b,c), industrial logging is likely to make some kinds of forests more, not less, prone to an increased probability of ignition (Krawchuk & Cumming 2009) and increased fire severity and/or fire frequency (Uhl & Kauffman 1990; Thompson et al. 2007; Bradshaw et al. 2009; Malhi et al. 2009).*[338]

The 1992 Draft Recovery Plan for the Northern Spotted Owl says, "*High surface fire potential during early succession in Douglas fir was identified by Isaac (1940) as a 'vicious cycle' of positive feedback...*"[339] while "Mature to old-growth forests [in the west Cascades subregion] have a low surface fire behavior potential (Agee and Huff (1992)."[340]

Cochrane et al (2012) recently showed that a patchwork of small clearcuts in areas of the Umpqua National Forest actually increased the size and spread of recent fires. *"[T]he simulated exacerbation of overall fire spread rates is still realistic owing to increased crown fire prevalence caused by the continuous, even-aged fuel complexes of the treated areas.*"[341]

The 2000 National Forest Roadless Area Conservation FEIS (p 3-92 -93) noted the fire hazard associated with regeneration logging:

> *[E]arly successional vegetative growth often forms into dense thickets that create a highly flammable situation. New tree growth, whether from natural regeneration or planted nursery stock, produces needles and twigs that become the fine fuel that contributes to wildland fire spread. ... Post-harvest fuel conditions commonly found in some managed forests prompt many scientists to conclude that harvested forests have a higher propensity for large, severe wildland fires than forests that have not been harvested. A recent report by the National Research Council (2000) speaks to the issue of post-harvest fuel management in Pacific Northwest forests.*
>
> *"Logging has been proposed as a possible surrogate for fire in reducing fuel accumulation with the added benefit of economic return (Agee 1993), but logging and clearcutting do not necessarily reduce flammable fuels…rapid regeneration of early-successional shrubs and trees can create highly flammable fuel conditions within a few years of cutting. Without adequate treatment of small woody residues, logging may exacerbate fire risk rather than lower it (Agee 1993)…"*

Two fires in 2002 on the Umpqua National Forest were evaluated for their effect on the forest. Excerpts from the March 2003 Wildfire Effects Evaluation Project by the Umpqua N.F. make clear the impact of creating more tree plantations:

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[338] David B. Lindenmayer, Malcolm L. Hunter, Philip J. Burton, & Philip Gibbons. 2009. Effects of logging on fire regimes in moist forests. Conservation Letters xx (2009) 1–7. http://soln.org/wp-content/uploads/2010/01/effects-of-logging-on-fire-regimes-in-moist-forests.pdf

[339] 1992 NSO Recovery Plan page 444

[340] 1992 NSO Recovery Plan page 452

[341] M. A. Cochrane, C. J. Moran, M. C. Wimberly, A. D. Baer, M. A. Finney, K. L. Beckendorf, J. Eidenshink, and Z. Zhu. 2012. Estimation of wildfire size and risk changes due to fuels treatments. International Journal of Wildland Fire. http://dx.doi.org/10.1071/WF11079. http://www.publish.csiro.au/?act=view_file&file_id=WF11079.pdf

"Plantations had a tendency to increase the rate of fire spread and increased the overall area of stand-replacement fire effects by spreading to neighboring stands." Page 4

"Fire burned most plantations with high intensity and spread rapidly through the canopy of these young stands." Page 20.

"Plantation mortality is disproportionately high compared to the total area that plantations occupied within the fire perimeter. Page 26-27.

"Crown fire spreads readily through these young stands: rates of fire spread can be high, and significant areas or mortality can occur in and adjacent to these stands." Page 32.

Finally, the report says that the fire behavior in forest that had not been converted to tree farms was normal. "*The pattern of mortality in the unmanaged forest resembles historic stand-replacement patch size and shape*."[342]

The 2013 BAER Report for the Douglas Complex Fires in SW Oregon said "While the severity varied throughout the fire area, young timber plantations carried the fire while older stands tended to be more resistant. This is mostly due young timber plantations having a high density of ground fuels."[343]

VI. FIRE AND FUEL IN THE WILDLAND URBAN INTERFACE

The EIS should provide a map showing the Wildland Developed Areas, including the one-mile buffer. Where BLM intends to protect people and property from fire, we urge BLM to focus fuel treatments on the structure ignition zone, which is generally within 100 feet of structures. Treatment beyond the structure ignition zone should focus on harmonious goals including ecological restoration, carbon storage and clean water.

We urge BLM to focus fuel treatments on dense young plantations that are the most hazardous rather than mature forests that tend to be much more fire resistant and resilient.

The DEIS (p 202) says –

The extent of the Harvest Land Base under each alternative and the associated changes in vegetation due to differing management direction would influence the overall patterns in stand-level fire hazard, rather than changes within the reserves. … all alternatives would have similar effects on fire resistance within the Late-Successional Reserve.

The EIS should do more to highlight the fact that alternatives with greater timber harvest, especially regeneration timber harvest and logging in mature forests, will result in greater fire hazard to homes and communities, while greater forest conservation in reserves would result in greater fire safety for communities.

[342] Page 64. Umpqua NF. Wildfire Effects Evaluation Project. March 2013. http://web.archive.org/web/20041118062947/http://www.fs.fed.us/r6/umpqua/publications/weep/weep.html.
[343] HSG9 – Douglas Complex Fire Burned Area Emergency Rehabilitation Plan. BLM Douglas Complex BAER Team. Sept 5, 2013. (p 12).

SOIL RESOURCES

I. DETRIMENTAL SOIL DISTURBANCE.

"Detrimental soil disturbance could result in some reduction in future tree growth."[344]
Detrimental soil disturbance directly inhibits the "sustained yield of timber" that forms part of the purpose and need for this planning process.

As stated on page 608 of the DEIS:

> *"The alternatives would increase the acreage of detrimental soil disturbance from timber harvest, road construction and fuels treatments by 13 to 30 percent of current amounts during the first decade."*

Further, on page 616 of the DEIS the BLM acknowledges that increased soil compaction and organic matter removal "*have the greatest potential to reduce forest productivity*."

Hence the BLM should have developed a reasonable action alternative that would have reduced, as opposed to increased the amount of detrimental soil disturbance associated with intensive harvest activities and road construction that are emphasized in the action alternatives. Such a reasonable action alternative would best meet the alleged planning purpose of sustained forest production in the long-term while avoiding significant harm to soil resources.

II. MACHINE SLASH PILING

On page 618 of the DEIS the BLM appears to indicate that machine piling may occur within logging units (and not just on log landings). This comes as a surprise to our organizations. The impacts of machine piling on soil resources, and hence on long-term forest productivity, are significant and avoidable.

Please note that the impacts of additional machine piling in logging units located in forest stands currently protected (under the NWFP) as Riparian Reserves or as known Survey and Manage sites is not disclosed or analyzed in the DEIS.

Machine piling increases the disturbance to groundcover and soil. Soil displacement results from the ground-based machine use when the heavy equipment turns and pushes the slash throughout logging units. This displacement has many impacts. First, it removes the organic debris and exposes the soil. This in turn can cause surface sealing and crusting. Erosion and decreased infiltration can also result from this. Second, displacement results in the loss of important soil biota, like mycorrhizal fungi, which assists plant nutrient uptake. It is not an unreasonable request to ask for the BLM to consider the other methods of slash treatment. Most project planners on public lands in the Klamath Siskiyous tend to avoid post-harvest machine piling because of the known impacts and availability of other slash reduction practices.

Please note that recently federal timber planners in the Six Rivers National Forest concluded:

[344] *DEIS at 615.*

"Machine piling/burn piles would increase ground disturbance and soil displacement when the machine turns."[345]

Please note how the Medford BLM recently responded to requests from the timber industry to authorize machine piling on federal lands:

> *Comment 4: We asked that BLM provide some flexibility in how fuels would be treated by focusing on the desired goals. The BLM has restricted fuels treatments to handpiling and burning. Contractors could use lightweight equipment to treat fuels without detrimentally compacting soils.*
>
> *Response: The commenter has not provided details on methodology or supporting science that would support the claim that machine piling could be done without detrimentally compacting soils in excess of RMP standards for percent area compacted by current activities.*
>
> *Resource management plans call for limiting compaction in harvested areas in order to minimize soil productivity losses. Therefore, no additional use of mechanical equipment for fuels reduction was proposed, as ground-based logging would compact up to 12 percent of the harvest units. This is particularly important in the Cottonwood planning area as the majority of soils contain high rock content. It was identified that ripping the soils in this area would bring rocks and cobbles to the surface. The priority was given to minimizing the soil area compacted instead of trying to mitigate the effects. Additionally, the harvest prescription resulting in relatively few trees per acre being cut minimizes the slash, and consequently, also reduces the need for mechanical fuel treatment.*[346]

Mechanical piling is universally recognized as an outdated practice that has disproportionately harmful significant impacts on watershed and soil resources.

Please see:

> *Evelyn Bull et al. Trees and Logs Important to Wildlife in the Interior Columbia River Basin PNW-GTR-391 (1977).*
>
> *BLM, USGS, Biological Soil Crusts: Ecology and Management (Technical Reference 1730-2 (2001) (Available from BLM Publication Management Distribution Service, Bldg 41, E-16 (BC-650B) Denver, CO 80255*

Please note that machine slash piling will condense soil and decrease its porosity. This leads to a decrease in the productivity of that soil which affects the plant life. This can reduce root growth, timber volume, and tree height.[347] These impacts can come as a result of as little as one pass by

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[345] *Little Doe and Low Gulch Timber Sale DEIS p 110.*

[346] Medford BLM Cottonwood Project EA Appendix A, Response to Comments Page 3-2: http://www.blm.gov/or/districts/medford/plans/files/Revised_EA_Final.pdf

[347] Greacen and Sands 1980; Froehlich and McNabb 1984.

the logging equipment across a site.[348] This loss in productivity can impact individual trees (Froehlich 1979,[349] Helms and Hipkin 1986)[350] or whole sites (West and Thomas 1981)[351]. Even the microbial population in the soil can be adversely impacted (Amaranthus et al. 1996)[352].

BLM should examine the monitoring reports on soil compaction from 1985 through 1997, on the Payette National Forest. The study area in that planning effort contains different soil and ecotypes than those covered by the BLM RMP, but the documented long-lasting effects are still relevant to the DEIS at hand.

We also encourage the agency to review the findings of Geppert, R.R., Lorenz, C.W., and Larson, A.G., 1984. Cumulative Effects of Forest Practices on the Environment: A State of the Knowledge. Wash. For. Practices Board Proj. No. 0130, Dept. of Natural Resources, Olympia, Wash.

Manual piling or underburning is far preferable to tractor piling. Manual piling and underburning have none of the negative impacts to soils associated with tractor piling, and they provide an increased opportunity for local employment while significantly reducing long-term damage to soil health and productivity. Hence manual piling or underburning would better achieve the stated purpose and need for the RMP revisions. Given that these practices can reduce fuels without the negative impacts associated with machine piling, they are reasonable to implement and reasonable to consider and analyze as an action alternative.

MODELING CONCERNS

Several recent scientific publications and government reports refute some of the important but controversial modeling assumptions in the DEIS. The BLM fails to identify existing scientific information that answer the stated questions. The BLM must use the best available science for managing fish and wildlife on public lands.

The BLM examined several existing models for analyzing timber growth and harvest and selected a proven model for use (Woodstock). But for most other ecologically important issues, simplistic and untested models (often lifted from failed 2008 WOPR) when sophisticated and tested peer reviewed models already exist. For example, the BLM identifies a novel and untested model for large wood recruitment to streams when a sophisticated wood recruitment model developed by regional government scientists already exists[353]. Similarly, the untested and simplistic model for analyzing fine sediment delivery to fish streams is not an appropriate

[348] Wronski 1984.
[349] Froehlich, HA. 1979. Soil compaction from logging equipment: effects on growth of young ponderosa pine. *Journal of Soil and Water Conservation* 34:276-278.
[350] Helms, JA, and C Hipkin. 1986. Effects of soil compaction on tree volume in California ponderosa pine plantation. *Western Journal of Applied Forestry.* 1:121-124.
[351] West, S and BR Thomas. 1981. Effects of skid roads on diameter, height, and volume growth in Douglas-fir. *Soil Science Society of America Journal* 45:629-632.
[352] Amaranthus, MP, and DA Perry. 1989. Rapid root tip and mycorrhizal formation and increased survival of Douglas-fir seedlings after soil transfer. *New Forests* 3:77-82.
[353]Spies et al. 2013.

starting point when many more sophisticated and tested models exist for modeling sediment delivery to streams[354].

In the RMP Planning Criteria at 76, the BLM reports that "[Northern spotted owl] Conservation Need 3 includes "a monitoring program to clarify whether these risk reduction methods are effective and to determine how owls use habitat treated to reduce fuels However, *the creation of such a monitoring program is not a BLM responsibility and will not be included in the BLM evaluation."* (emphasis added) It is not appropriate for BLM to ignore FLPMA, NEPA and Congress, which also call for the stated effectiveness monitoring. Why is BLM spending millions on reducing fire risk if it does not work or is harmful to spotted owl recovery? In the absence of monitoring, it would at least seem logical and prudent for BLM to employ modeling to determine the trade-offs between logging impacts to owl habitat, when reducing fuels, and loss of spotted owl habitat to fires. Two independent studies (i.e. new information) have found that the BLM's commonly asserted assumption (that logging to reduce fuels in fire prone spotted owl habitat is beneficial) have found that fuels reduction at a landscape scale is actually harmful to spotted owl habitat[355]. Each of these studies is relevant to dry forests in the Medford and Lakeview Districts. Thus, the science finds that thinning resulted in much larger losses to owl habitat over a 40 and 100 year period than living with more fire killed habitat. Several other studies soon to be published are also finding that the spotted owls are better off with fire and no pre-emptive fuels reduction logging. Add to this the need for large patches of fire killed snag forests for "status review" black-backed woodpeckers in these same districts and logging to reduce fires is not a win-win technique as once thought. Large scale fuels reduction projects have now been shown to be lose-lose for the wildlife on at least the Medford and Lakeview Districts.

SPECIAL DESIGNATIONS

We support the Illinois Valley as a "salmon and botanical area" because this unique area has extraordinary potential for wilderness recreation, Wild and Scenic River recreation, botanical recreation, unmatched steelhead fishing opportunities, and high value conservation of rare and endangered wildlife, rare plants, and native fishes. The free flowing Illinois River basin hosts one of the largest remaining Coho salmon populations of the SONCC. The BLM needs to initiate cooperative and coordinated management of the Eight Dollar Mt. complex with the Forest Service, Oregon parks and recreation and nature conservancy similar to management agreements in place at Table Rock complex.

The Illinois Valley is a large interior valley of the Rogue River basin in the Klamath-Siskiyou ecoregion of southwestern Oregon/northwestern California. The BLM managed lands have exceptional plant and animal diversity because of elevation gradients, a hierarchy of perennial streams, and complex serpentine geology. A large number of the endemic plant species of the Klamath Siskiyou ecoregion are found in the Illinois Valley. Some of these plants are found nowhere else in the world and two are federally listed due to limited range. Plant protection is the focus of three existing ACECs, two Research Natural Areas, and two proposed ACECs. ACEC's and RNA's often abut similar Forest Service botanical area designations and require

[354] See BLM Timber Rock Final EIS.
[355]See Hanson et al. 2009 and Raphael et al. 2013.

close coordination to prevent damage from off road vehicles, mining, and undesirable introductions of alien species such as Alyssum. The Eight Dollar Mountain Area is a complex of BLM ACEC, Forest Service Botanical Areas, Oregon State Parks Lands, and Nature Conservancy lands with numerous Darlingtonia fens, associated rare plants and recreational facilities. The BLM manages a boardwalk that provides handicapped access to a Darlingtonia fen at the base of Eight Dollar Mountain. Coordinated management is needed to protect fragile ecosystems and provide appropriate recreational opportunities for plant areas and the Wild and Scenic Illinois River. Additional recreational areas are identified along the West Fork Illinois and for the 80 acre BLM parcel within Forks State Park.

In addition to the exceptional plant diversity of the Serpentine Siskiyous, large areas of oak woodlands and mixed evergreen forests provide high tree and shrub diversity in the Oak Savanna Foothills and Inland Siskiyous ecoregions of the Illinois Valley. Neotropical and resident bird species diversity is high. The endemic Del Norte salamander occupies talus areas. Rare Pacific fishers and federally listed northern spotted owls inhabit these forested areas. Beaver create ponds for declining western pond turtles (e.g. a beaver dam occupied by pond turtles is at proposed Logan Cut recreation area)

Illinois Valley streams and rivers support robust runs of native winter steelhead, Chinook salmon, coho salmon, cutthroat trout, and Pacific lamprey. Anadromous fishes can access nearly all historical habitat because the mainstem Illinois River and its major tributaries have no high dams. All fish species sustain themselves with natural production and with no hatchery fish supplementation, thus assuring a high degree of genetic integrity. The Illinois Valley is a major stronghold for the federally listed coho salmon because several tributaries have viable populations. High elevation headwater areas have dependable snowpacks that provide cool perennial water through the long hot summers. Winter Steelhead that spawn and rear in BLM streams are caught in a recreational fishery as adults in the mainstem Illinois. Selmac Lake, an artificial impoundment, near Selma provides year round fishing for primarily non-native fishes such as bass and perch.

Timber harvest is primarily directed at upland forests that have been categorized as “dry” forests where thinning young trees is the principal silvicultural technique. High priority for harvest are densely stocked plantations and encroaching Douglas-fir trees that have invaded oak woodlands and are a threat to plant biodiversity because they shade out understory shade intolerant species. Fuels treatments to break up dense shrub patches and remove flammable small trees are augmented with controlled fires.

ACECS

We hereby incorporate by reference KS Wild et al. comments on ACECs submitted on the DEIS.

WILD AND SCENIC RIVERS

The BLM should identify streams being considered by congress for inclusion in the national wild and scenic rivers system and also seek out candidate streams with mixed BLM and Forest Service management.

The BLM cannot pre-empt the will of Congress by failing to protect streams currently being considered in federal legislation. Specifically the streams identified for Wild and Scenic designation in Senator Wyden's O&C Bill must be treated as candidate wild and scenic rivers. The O&C Bill identifies the Nestucca River, Walker Creek, North Fork Silver Creek, Jenny Creek, Spring Creek, Lobster Creek, Wasson Creek and Franklin Creek. These streams and adjacent ¼ mile must be reserved from timber harvest modeling and any management actions that would damage wild and scenic characteristics. These streams and adjacent lands would also need to be identified for mineral withdrawal in the RMP. Additionally the BLM must coordinate with the Forest Service to conduct a geospatially explicit analysis to identify potential BLM wild and scenic streams that are adjacent existing Forest Service candidate wild and scenic streams. Some examples are Rough and Ready Creek, West Fork Illinois River, Sucker Creek, and Althouse Creek in the Medford District.

CARBON AND CLIMATE CHANGE

Global climate change is a new and significant threat to humanity and forests. We have a moral and legal obligation to minimize and mitigate this threat.[356] Climate change is caused by excess CO_2 and other greenhouse gases transferred to the atmosphere from other pools. All temperate and tropical forests, including those in this project area, are an important part of the global carbon cycle. Since all forests are an important part of the global carbon cycle, the agency must do its part by managing forest to maintain and increase carbon storage. Global warming is caused by the *cumulative* build-up of greenhouse gases, especially carbon, in the atmosphere. Logging will add to the cumulative total carbon emissions so it is clearly part of the problem and must be minimized and mitigated. Logging will not only transfer carbon from storage to the atmosphere but future regrowth is unlikely to ever make up for the effects of logging, because carbon storage in logged forests will lag carbon storage unlogged forests for decades or centuries. Since the time the resource management plan was written, there is significant new information reinforcing the need to conserve all existing large stores of carbon in mature & old-growth forests in order to keep carbon in forests and out of the atmosphere in order to mitigate climate change. Please review the report on "Forests, Carbon & Global Warming" prepared by Oregon Wild. The report explains how climate change is likely to affect Pacific Northwest forests as well as how forest conservation and restoration (including sensible changes to this project) may help mitigate climate change.[357] And see this related slideshow that helps debunk some of the flawed arguments used by logging advocates: http://www.slideshare.net/dougoh/forest-carbon-climate-myths-presentation/.

[356] See 2015 Oslo Principles on Global Climate Change Obligations. http://www.osloprinciples.org/.
[357] https://dl.dropboxusercontent.com/u/47741/Oregon%20Wild%20Report%20on%20forests%2C%20carbon%2C%20and%20global%20warming%2C%20ver.%201.4.pdf.

On June 25, 2013, President Obama released his Climate Action Plan which includes forest conservation among the "first pillar"[358] of efforts to reduce emissions, saying: "**Preserving the Role of Forests in Mitigating Climate Change:** *America's forests play a critical role in addressing carbon pollution, removing nearly 12 percent of total U.S. greenhouse gas emissions each year. … Conservation and sustainable management can help to ensure our forests continue to remove carbon from the atmosphere …* " [359] "[A]dvancing efforts to protect our forests" is also mentioned in the 6th U.S. Climate Action Report under the United Nations Framework Convention on Climate Change (UNFCCC). The agency should advance this national climate goal by conserving public forests. Carbon emissions from logging public lands directly conflict with this important national goal and indicate potential significant impacts requiring an EIS.

The Copenhagen Accord recognizes the need to avoid dangerous climate change and the role of forests in climate mitigation. *"…To achieve the ultimate objective of the Convention to stabilize greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, we shall, recognizing the scientific view that the increase in global temperature should be below 2 degrees Celsius… We recognize the crucial role of reducing emission from deforestation and forest degradation and the need to enhance removals of greenhouse gas emission by forests and agree on the need to provide positive incentives to such actions*"[360] This likely requires reducing atmospheric CO_2 concentrations below 350 ppm[361] and avoiding logging that would increase atmospheric carbon emissions.

In the DEIS, "key points" described under "climate change" include: "*Carbon storage would increase under all alternatives. … Greenhouse gas emissions associated with BLM-administered lands would increase under all Alternatives…*" This is misleading. It is more useful to provide the public and the decision-maker with information on what distinguishes the alternatives. Which alternative would store the most carbon in the forest? Which alternatives would cause the most GHG emissions? How does carbon storage compare to the baseline of natural forests growing without being logged? These are the key points that need to be disclosed. We applaud BLM for preparing a "No Timber Harvest Reference Analysis" and this should have been reflected in the "key points" to highlight the fact that logging sacrifices carbon storage.

The DEIS (p 136) says "*harvesting removes carbon and shifts stand characteristics, such as mean diameters and heights, in more of the landscape to smaller trees and younger age classes that store less carbon*." This is good, but the EIS analysis needs to clearly disclose the carbon consequences of the various discrete policy choices that the decision-maker is facing. For instance, the EIS needs to disclose that:

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[358] U.S. Dept of State 2013. draft 6th Climate Action Report http://www.state.gov/e/oes/climate/ccreport2014/index.htm (page 12).
[359] http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf
[360] http://www.climatesciencewatch.org/file-uploads/Copenhagen_Accord.pdf.
[361] Rockström, J., W. Steffen, K. Noone, Å. Persson, F. S. Chapin, III, E. Lambin, T. M. Lenton, M. Scheffer, C. Folke, H. Schellnhuber, B. Nykvist, C. A. De Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sörlin, P. K. Snyder, R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R. W. Corell, V. J. Fabry, J. Hansen, B. Walker, D. Liverman, K. Richardson, P. Crutzen, and J. Foley. 2009. Planetary boundaries:exploring the safe operating space for humanity. *Ecology and Society* **14**(2): 32. [online] URL: http://www.ecologyandsociety.org/vol14/iss2/art32/. http://www.stockholmresilience.org/download/18.1fe8f33123572b59ab800012568/pb_longversion_170909.pdf. http://www.ecologyandsociety.org/vol14/iss2/art32/figure6.html.

- Wider stream buffers store more carbon than narrow stream buffers;
- Forest reserves store more carbon that timber management areas;
- Large reserves store more carbon than smaller reserves;
- Reserves with strict limits on logging store more carbon than reserves that allow logging;
- Thinning stores more carbon that regeneration harvest;
- Regeneration harvest with ≥30% retention stores more carbon than regeneration with little of no retention;
- Logging to try to limit carbon emissions from fire will likely emit more carbon from logging than will be prevented via fire control. Law, B. & M.E. Harmon 2011. Forest sector carbon management, measurement and verification, and discussion of policy related to mitigation and adaptation of forests to climate change. Carbon Management 2011 2(1). [362]
- Meeting RA 32 by protecting all forests over 80 years old will store more carbon than meeting RA 32 by conserving forests 150 years and older.

Similarly, wider stream buffers and large, well-protected reserves, will better prepare forests for the extremes of climate change. In most cases, logging will reduce forest resilience, not increase it. The DEIS (p 132) says "*Active management would provide opportunities to implement climate change adaptive strategies*." However, there is strong evidence that unmanaged forests have great capacity for self-correction and self-organization. BLM should look carefully at all the evidence, including competing experts viewpoints before concluding that logging is beneficial. Complex native forests are more resilient to climate change than logged forests and simplified plantations. The IPCC recognizes that –

> *... [R]educing emissions from deforestation and degradation may also yield co-benefits for adaptation by maintaining biodiversity and other ecosystem goods and services, while plantations, if they reduce biological diversity may diminish adaptive capacity to climate change (e.g., (Chum et al., 2011). Primary forests tend to be more resilient to climate change and other human-induced environmental changes than secondary forests and plantations (Thompson et al., 2009).*[363]

BLM should maintain the existing Aquatic Conservation Strategy and its wider riparian buffers because it will help make hydrologic systems and aquatic ecosystems more resilient to climate change by moderating cumulative watershed effects, reducing the extent of the road system, emphasizing maintenance of riparian areas, shade, floodplain processes, recruitment of large wood from both near stream areas and unstable slopes, and connectivity and fish passage.

DEIS (p 133) says "*the potential error in the estimate for any one alternative likely exceeds the amount of variance between the alternatives*." This should be clarified to say that in spite of these uncertainties, confidence the relative effects of alternatives remains strong, i.e., alternatives

[362] http://terraweb.forestry.oregonstate.edu/pubs/lawharmon2011.pdf;
[363] IPCC AR5, Working Group III, Mitigation of Climate Change, Chapter 11 Agriculture, Forestry and Other Land Use (AFOLU) (Final Draft 2014) pp 46-47.http://report.mitigation2014.org/drafts/final-draft-postplenary/ipcc_wg3_ar5_final-draft_postplenary_chapter11.pdf

with less logging and larger reserves will result in relatively greater carbon store, while alternatives with more logging and small reserves will result in greater GHG emissions.

The DEIS does not explain how BLM arrived at the conclusions presented in Figure 3-24, the pie chart showing that fire emits more carbon than "harvest operations." The DIES does not say what kinds of emissions are include in harvest operations. Is it just the fuel used for machinery and transport? Does it include carbon removed from the forest via logging and slash fires? Does it account of the decay of wood products removed from the forest in current and prior years? Etc.

The "affected environment section" of the climate change section of the DEIS needs to describe the forest carbon cycle (pools and flows), how carbon flows into and out of the forest, the fate of carbon removed via logging, processes that control the net gain/loss of carbon,

The effects analysis needs to disclose the different consequences of carbon emissions in different time periods (e.g., near-term emissions are not compensated by delayed carbon uptake because global climate change and ocean acidification were made worse during the timber that extra carbon was in the atmosphere and future uptake cannot effectively mitigate for that). BLM should incorporate the concept of "carbon debt" and lag time associated with logging related carbon emissions in the near terms, and carbon recapture via forest regrowth over the long-term.

DEIS Figure 3-26 shows that all alternatives will increase carbon emissions but Alt. D will emit much less than the other alternatives. This makes sense based on the fact that Alt D allows more forests to continue growing and storing carbon, but this result requires further explanation in light of the DEIS assertion that carbon emissions are dominated by by wildfire, rather than logging. Does this result imply that forest growth dominates the net carbon balance of BLM forests regardless of wildfire effects, or that Alt D is expected to maintain more forests that are resistant to wildfire and therefore cause less carbon emissions from both logging and fire? If so, this should be made more explicit.

DEIS (p 145) describes a pattern of increased tree mortality related to climate change. The EIS should explain that this is a beneficial system-level adaptation to increasing climate stress. Trees that die free up resources so that surviving trees have a better chance of survival. This is an example of forests' self-correcting, self-organizing behavior common to many complex systems that are far from equilibrium.

DEIS (p 149) says "*analysis of Oregon large fires using data from the Monitoring Trends in Burn Severity site (http://mtbs.gov/index.html) indicates that the proportion of high-severity fire in forests generally has increased by 11 percent since 1984, with much of the increase since 2000.*" This appears to be contradicted in DEIS Appendix D which

> *... examined the MTBS data for any obvious temporal trends in wildfire severity, but did not detect a strong signal (Figure D-6). Over the course of 25 years, there appears to be a slight increase in the percentage of area burned by low and moderate severity wildfire, and a slight decrease in the percent of area burned in high severity wildfire, although these trends are not statistically significant. ... While several studies have indicated that high severity fires are increasing across the western United States (Westerling et al.*

2006, Dillon et al. 2011a, Miller et al. 2012), no such trends were apparent in the observed record within the range of the northern spotted owl (Figure D-6).[364]

DEIS (pp 149-150) describes increasing stream temperatures as a result of climate change. The DEIS does not fully disclose the likely consequences on cold-water fish and other temperature-sensitive aquatic organism. For instance, stream temperatures are increasing most during summer when fish are most vulnerable. BLM should attempt to mitigate this by avoiding any shade loss caused by logging, and by reducing other anthropogenic stresses such as sediment from logging and roads and grazing.

DEIS Figure 3-28 shows that climate change seems to be causing an increase precipitation during spring. This is a significant concern for spotted owl nest success, which is inversely related to spring precipitation. DEIS (p 150) has a brief discussion of climate change and spotted owl declines, but the DEIS effects analysis (p 157) needs to consider alternative ways of mitigating the likely effects of climate change, such as by maintaining more suitable habitat which will support a larger owl population that is less vulnerable to stochastic variation and uncertainty caused by climate change and other factors.

DEIS (p 156) says "in the Northwest, warming air temperatures and declining summer base flows are strongly associated with warming stream temperatures" BLM needs to disclose how this trend intersects with the proposed reduction in stream protection and increases sin logging near streams. BLM should maintain wide stream buffers to maintain maximum shade and mitigate for global warming.

DEIS (p 157) says climate change will result in "*changes in disturbance regimes [that] could disfavor species associated with old-growth forests, by shifting more of the landscape into earlier seral stages, altering species compositions to ones less preferred, reducing the extent of large trees and structurally-complex forest, and decreasing patch sizes preferred for different life stages, such as nesting…*" The NWFP assumed that eventually 80% of the reserves would grow old and provide late successional habitat, while at any given time approximately 20% of the reserves might be affected by disturbance. As a result of climate change these proportions are likely to shift toward greater disturbance and more younger forests. BLM should mitigate for this by adopting a final alternative that protects all suitable owl habitat, not just a subset of high quality habitat, and by protecting larger LSRs and riparian reserves so that there is a larger part of the landscape given a chance to grow old and provide complex habitat.

To meet legal requirements including those under the O&C Act related to watersheds and community stability, BLM should adjust the purpose and need for this plan revision to include carbon storage and climate change adaptation. BLM should therefore strive to maintain and increase carbon storage and maintain biodiversity, not just focus on recovery of ESA-listed species. Maintaining biodiversity is an important way to prepare for global climate change, because the diversity of organisms and genes represent the complete range of evolutionary adaptations to past (and near future) climate change.

[364] Ray Davis et al 2015. RMP Revisions for Western Oregon BLM DEIS. Appendix D – Modeling Wildfires and Fire Severity. http://www.blm.gov/or/plans/rmpswesternoregon/files/draft/RMP_EIS_Volume3_appd.pdf

I. THE FEDERAL LAND POLICY & MANAGEMENT ACT REQUIRES BLM TO TAKE ACTION ON CLIMATE CHANGE

BLM has a duty to prepare a current and up-to-date inventory of public lands and their new and emerging resource values.[365] This requires BLM to carefully inventory all the carbon stored in forests and soils on western Oregon BLM lands and the value of BLM lands to store more carbon if managed appropriately to grow more mature & old-growth forest forests.

BLM must give priority to identifying ACECs where special management is needed to prevent irreparable damage and protect life and safety from safety from natural hazards. This requires BLM to identify all mature & old-growth forest forests as ACECs because they must be conserved in order to avoid and mitigate climate change which is a natural hazard predicted to cause irreparable harm to important natural systems that need protection.

BLM must consider "potential uses of public lands." [366] This requires BLM to consider an alternative that uses BLM lands for carbon storage and climate mitigation, arguably the highest and best use of the highly productive forest lands in western Oregon. The analysis will reveal significant complementary benefits for water quality, quality of life, fish & wildlife habitat, community stability, etc.

FLMPA requires BLM to consider scarcity of values and available alternatives.[367] This requires BLM to recognize that western Oregon BLM lands are capable of growing very high levels of biomass per acre and such places are relatively rare. This also requires BLM to consider and compare the carbon consequences of various alternative management schemes.

Some forests are far better at sequestering carbon than others. And BLM has some great ones — low elevation forests with long growing seasons and mild winters and disturbance regimes that allow longer periods of growth and carbon accumulation. Forests on the westside of the PNW (where BLM's western Oregon holding are located) are twice as productive as forests in other parts of the country. Western Oregon forests can grow 100 cubic feet of wood per acre per year, while forests of the NE, SE, and mid-west generally produce half or less than that.[368] In addition to prodigious growth, westside forests are able to store that carbon for long periods. The "carbon density" of Westside forests exceed that of any forests in North American[369], possibly the world. This means that BLM lands are uniquely suited for sequestering carbon.[370] These highly

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[365] 43 USC § 1711.
[366] 43 USC § 1712.
[367] Id.
[368] Powell, Douglas S.; Faulkner, Joanne L.; Darr, David R.; Zhu, Zhiliang; MacCleery,l Douglas W. 1993. Forest resources of the United States, 1992 Gen. Tech. Rep. RM-234. Fort Collins, CO: U.S. Department of Agriculture, Rocky Mountain Forest and Range Experiment Station. 132 p. + map. [Revised, June 1994]. http://www.fs.fed.us/rm/pubs_rm/rm_gtr234.html
[369] Carbon density is a measure of the carbon in live and dead vegetation plus soil carbon measured on a per-acre basis. The westside of the Pacific Northwest is uniquely suited to growing and storing carbon in forests. See Figure 6 in Ingerson, Ann L. 2007. U.S. Forest Carbon and Climate Change. Washington, D.C.:The Wilderness Society. http://www.wilderness.org/Library/Documents/upload/ForestCarbon-ClimateChange.pdf

[370] See Christine L. Goodale, Michael J. Apps, Richard A. Birdsey, Christopher B. Field, Linda S. Heath, Richard A. Houghton, Jennifer C. Jenkins, Gundolf H. Kohlmaier,

productive forests of the northwest are losing carbon due to short-rotation forestry. From 1990 to 2010 western Oregon and western Washington are expected to lose 97.4 million tons of carbon under business-as-usual forest management.[371] There is a great potential to adopt new forest practices to reverse this trend. In fact, the Northwest Forest Plan reserves are already recognized as a step toward wise management of forest carbon. "Federal forest management policies are already contributing significantly to this goal with the extensive series of forest reserves established in the Northwest Forest Plan. Tens of thousands of acres of cutover federal forest land are being managed for restoration of late-successional forest conditions and, coincidentally, much higher levels of carbon stocks." [372] If BLM reduces the extent of the reserves and reduces protection of the carbon in large trees, and reduces the goals for restoration of previously logged sites, then these recognized carbon storage values will be lost. The EIS must address the impacts of this on climate, ecology, and social systems.

Recent studies show that northern forests are experiencing "A trend toward hotter and drier conditions is likely to exacerbate the effects of fire by increasing the frequency, intensity, and size of burns."[373] Some northern forests are also facing unprecedented mortality from insects, which could cause large-scale changes in boreal forest systems. These changes point to the very real possibility that boreal forests may be entering a positive feedback that shifts the northern forests from net carbon sinks to net carbon sources. This highlights the "scarcity" of forest sites with high potential to store carbon and the dwindling alternatives to storing carbon on BLM lands.

Scientists and policy-makers recognize that forests can play a significant role in mitigating climate change by storing more carbon. The UN says that 35% of the global opportunity to store carbon in forests is outside the tropics. Scientists have estimated that compared to other forest types, temperate conifer forests are likely to be one of the most persistent forest types in the face of climate change.[374] This makes old-growth on BLM land a potentially very rare and valuable reserve in terms of carbon storage.

Compared to other sectors, the forestry sector has a high benefit/cost ratio for carbon mitigation actions. That means that carbon storage in forests is a relatively efficient way to mitigate climate change. BLM must consider this in the EIS.

Werner Kurz, Shirong Liu, Gert-Jan Nabuurs, Sten Nilsson, And Anatoly Z. Shvidenko. 2002. Forest Carbon Sinks In The Northern Hemisphere. Ecological Applications, 12(3), 2002, pp. 891–899q 2002. http://www.whrc.org/resources/published_literature/pdf/GoodaleEcolAppl.02.pdf ("Over 80% of the estimated sink occurred in one-third of the forest area …")

[371] Haynes, Richard W.; Adams, Darius M.; Mills, John R. 1995. The 1993 RPA timber assessment update General Technical Report RM-259. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 66 pp. http://www.treesearch.fs.fed.us/pubs/20058

[372] LAURIE A. WAYBURN, JERRY F. FRANKLIN, JOHN C. GORDON, CLARK S. BINKLEY, DAVID J. MLADENOFF, NORMAN L. CHRISTENSEN, JR. 2007. Forest Carbon in the United States: Opportunities & Options for Private Lands. Pacific Forest Trust. http://www.pacificforest.org/publications/pubpdfs/ForestCarbonReport-07Update.pdf

[373] Jill Sakai. 2007. Wildfire drives carbon levels in northern forests. University of Wisconsin News. Oct. 31, 2007. http://www.news.wisc.edu/14399 *citing* work by Dr. Tom Gower and others.

[374] Staley, TNC Climate Conference 2007.

BLM must consider long-term vs short-term benefits.[375] This requires BLM to recognize that the benefits of logging are very short-term, while the benefits of climate mitigation through conserving and restoring mature & old-growth forests are both short-and long-term.

II. BLM MUST MANAGE FOR COMPLEMENTARY MULTIPLE USES

The O&C Act's mandate to correct market failures and sell timber only at "reasonable prices on a normal market" is an implicit acknowledgement of the multiple use concepts in the Federal Land Policy and Management Act. The O&C Act does not conflict with multiple use or FLPMA because Congress sought to further the public interest by normalizing markets. FLPMA requires that BLM produce appropriate amounts of public goods like watersheds, fish & wildlife, scenery, and scientific values. FLPMA's multiple use mandates require consideration of future generations and harmonious management of the multiple values, without any one use impairing the others.[376] This is accomplished in part by correcting market failures so that appropriate amounts of public goods are produced and prices reflect the full costs of production (including the cost of mitigating climate change and impaired water quality, and the cost of replacing old growth habitat where it has been lost).

III. O&C ACT REQUIRES BLM TO TAKE ACTION ON CLIMATE CHANGE

BLM views the forest as just trees and they view the O&C Act as a simple mandate to cut them down as fast as they grow. This grossly over-simplified view of the forest is inconsistent with the current understanding of forests and inconsistent with the O&C Act itself.

The O&C Act of 1937 provides: *"[T]imberlands … shall be managed … for permanent forest production, and the timber thereon shall be sold, cut, and removed in conformity with the principal of sustained yield for the purpose of providing a permanent source of timber supply, protecting watersheds, regulating stream flow, and contributing to the economic stability of local communities and industries, and providing recreational facilities … [T]imber from said lands … shall be sold annually, or so much thereof as can be sold at reasonable prices on a normal market."* [377]

> *Forests are not just trees, but part of ecosystems that underpin life, economies and societies. …[A]ll forests provide a wide range of ecosystem services. These services include prevention of soil erosion, maintenance of soil fertility, and fixing carbon from the atmosphere as biomass and soil organic carbon. Forests host a large proportion of terrestrial biodiversity, protect water catchments and moderate climate change. Forests also support local livelihoods, provide fuel, traditional medicines and foods to local communities, and underpin many cultures. The harvesting of forest products is putting severe stress on the world's forests. … {Ecosystem] services have been reduced by the decline in total forest area and by continued forest degradation, especially in production and multipurpose forests … Greater emphasis on conservation of biodiversity may lead*

[375] 43 USC § 1712.
[376] 43 USC § 1702(c).
[377] http://www.blm.gov/or/plans/wopr/files/OCAct.pdf

to increased benefits in terms of resilience, social relations, health, and freedom of choice and action.[378]

The best way to safely store carbon and mitigate climate change to achieve permanent forest production, sustained yield, regular water flow, protect watersheds, and community economic stability is to protect all mature & old-growth forest forests and allow young forests to grow while increasing their diversity through variable density thinning, while maintaining forests that are prone to drought stress below their water-limited carrying capacity through thinning small trees and prescribed fire. This should have been considered as an alternative.

IV. BLM MUST HELP MITIGATE CLIMATE CHANGE TO REGULATE WATER FLOW AND TO PROTECT WATERSHEDS

"*Forest ecosystem services are threatened by increasing human demands. Exploitation of forests has been at the expense of biodiversity and natural regulation of water and climate…* "[379]

Logging mature & old-growth forests will exacerbate climate change and cause altered precipitation patterns, reduced snow pack, and increased evaporative demand which will violate the O&C Act's mandate to regulate water flow and protect watersheds. Logging mature and old-growth forest will tend to make water flow less regular and watersheds less protected from hydrologic extreme hydrologic events. If BLM protects mature & old-growth forest forests and grows more, water flow will be more regular and watersheds will be more protected.

Climate change is expected to increase winter precipitation and more of that precipitation will fall as rain instead of snow. This will increase peak flows in the winter and spring. Peak flows that exceed the natural pattern are harmful to watershed values. Peak flows cause erosion of stream banks and bottoms and cause landslides by undercutting slopes.

The forests and watersheds have had 2 million years to adapt to the climatic swings between glacial and interglacial periods, but now climate change threatens to push the pendulum beyond the normal interglacial into new territory that is warmer than the earth has experienced for millions of years. Both the rate and magnitude of climate change are unprecedented.

Warming will increase evaporative water demand and soil water deficit ,which will decrease late summer stream flow. Low stream flow harms not only fish but also agriculture, communities, and industries that rely on summer water supply.

There has been progressively more information highlighting the hydrologic consequences of climate change:

- The IPCC Second Assessment Report in 1995 predicted that "Warmer temperatures will lead to a more vigorous hydrological cycle; this translates into prospects for more severe

[378] Dent, David. Chapter 3 – Land *in* Global Environment Outlook (GEO4). http://www.unep.org/geo/geo4/report/03_Land.pdf
[379] Dent, David. Chapter 3 – Land *in* Global Environment Outlook (GEO4). http://www.unep.org/geo/geo4/report/03_Land.pdf

droughts and/or floods in some places and less severe droughts and/or floods in other places. … Potential North American climate change impacts include increased winter/spring runoff and decreased summer soil moisture and runoff."[380]

- IPCC's 2001 Third Assessment Report found "It is likely that summer continental drying and associated risk of drought will increase over most mid-latitude continental interiors [leading to] decreased crop yields, increase forest fire risk, decreased water quality/quantity."[381]
- An analysis of water run-off using the climate models in the IPCC Fourth Assessment Report projected a 10-30% decreases in runoff in western North America by the year 2050 "Such changes in sustainable water availability would have considerable regional-scale consequences for economies as well as ecosystems" C. Milly et al. 2005 Global pattern of trends in streamflow and water availability in a changing climate. Nature.
- In summary, "Air temperatures are virtually certain to warm further [and] Warmer air temperatures would probably severely reduce the quantity of water resources." Martin Hoerling and Jon Eischeid. Emerging Issues for Water in the West: 21st Century Drought. Climate Action Panel. 20 Nov 2006. [382]

"*[M]odel results indicate that severe droughts (5% frequency today) will occur about 50% of the time by the 2050…..due primarily to temperature increase".* [383]

Small changes in stream flow can have large impacts on water storage and power generation. *"A 20% reduction in natural runoff would cause mean annual reductions in storage of 60 to 70% reductions in power generation of 60%…"* [384]

V. BLM MUST HELP MITIGATE CLIMATE CHANGE TO STABILIZE COMMUNITIES AND INDUSTRIES

The economic and social impacts of climate change are widely recognized. "Global warming could have impacts right here in the Rogue Valley, boosting the number and size of wildfires, harming salmon and reducing the snowpack people rely on for drinking water and irrigation." [385]

The Oregon Legislature passed a bill in 2007 with the following findings[386]:

> *(3) Global warming poses a serious threat to the economic well-being, public health, natural resources and environment of Oregon.*
> *(4) Oregon relies on snowpack for summer stream flows to provide energy, municipal*

[380] IPCC. 1995. The Regional Impacts of Climate Change: An Assessment of Vulnerability.
[381] IPCC Third Assessment Report, Climate Change 2001
[382] http://www.resourcesaver.com/ewebeditpro/items/O14F10014.pdf
[383] David Rind, Jim Hansen et al. 1990. Potential Evapotranspiration and the Likelihood of Future Drought. Journal of Geophysical Research.
[384] L. Nash and P. Gleick. The Colorado River Basin and Climate Change: The sensitivity of streamflow & water supply to variations in temperature & precipitation. EPA Report, Policy, Planning and Evaluation 1993.

[385] Vickie Aldous. 2007. Global warming could alter Valley life. Ashland Daily Tidings. October 29, 2007. http://www.dailytidings.com/2007/1029/stories/1029_climate1.php.
[386] Oregon Legislature - House Bill 3543 http://www.leg.state.or.us/07reg/measpdf/hb3500.dir/hb3543.en.pdf

water, watershed health and irrigation. Also, a potential rise in sea levels threatens Oregon's coastal communities. Reduced snowpack, changes in the timing of stream flows, extreme or unusual weather events, rising sea levels, increased occurrences of vector-borne diseases and impacts on forest health could significantly impact the economy, environment and quality of life in Oregon.
(5) Oregon forests play a significant role in sequestering atmospheric carbon, and losing this potential to sequester carbon will have a significant negative effect on the reduction of carbon levels in the atmosphere.
(6) Global warming will have detrimental effects on many of Oregon's largest industries, including agriculture, wine making, tourism, skiing, recreational and commercial fishing, forestry and hydropower generation, and will therefore negatively impact the state's workers, consumers and residents.
(7) There is a need to ... take necessary action to begin reducing greenhouse gas emissions in order to prevent disruption of Oregon's economy and quality of life and to meet Oregon's responsibility to reduce the impacts and the pace of global warming.

Governor Kulongoski's Advisory Group On Global Warming says:

Absent decisive actions across the globe of the sort proposed in this report, the warming already underway is expected to lead to changes in the earth's physical and biological systems that would be extremely adverse to human beings, their communities, economies and cultures. ... The impacts of such changes on Oregon citizens, businesses and environmental values are likely to be extensive and destructive." The Governor of Oregon is being urged by a broad cross-section of advisors to think of the economic costs of addressing climate change as "investments" that result in net gains relative to the economic costs of failing to make those investments, or the costs of addressing climate change can be thought of as buying an insurance policy that reduces future expenses related to coping with climate change. Forest conservation is among the committee's recommendations for addressing the climate problem: "The Advisory Group recommends actions to increase the amount of carbon that can be captured and fixed in new or restored forest and field growth and in the soil beneath. ... While we will continue to work the lands that must feed, clothe and shelter us, there are still land management choices that will restore much of this natural sequestration capability.[387]

The West Coast Governors' Global Warming Initiative Report says:

The world's scientists are clear: Global warming is happening, and the world must act now to reduce greenhouse gas emissions. Global warming will have serious adverse consequences on the economy, health and environment of the West Coast states. While these consequences are not entirely predictable, the effects of global warming are already evident in the form of higher temperatures, reduced snow pack, insect infestation and increased fire danger in our forests, and rising sea levels on our ocean shores. These

[387] Oregon Strategy for Greenhouse Gas Reductions - Governor's Advisory Group On Global Warming. State of Oregon, December 2004. http://www.oregon.gov/ENERGY/GBLWRM/docs/GWReport-Final.pdf

impacts will grow significantly in coming years if we do nothing to reduce greenhouse gas emissions.

VI. THE COSTS AND IMPACTS OF INACTION

In addition to the direct economic benefits of investing in low-carbon energy sources, acting against global warming hedges against the risks posed by global warming itself. The economic costs of unchecked global warming are projected to be immense.

Sea level rise, coupled with more frequent and severe storm events, would threaten beaches, ports, low-lying towns and cities, and other coastal resources, causing severe disruption for people and ecosystems. The increased frequency and severity of storm surges may be more significant for low-lying areas than sea level rise alone. Increased storms and wave height could lead to saturated ground, increased erosion, and more slope failure in the coastal bluffs and hills.

A reduction in the mountain snowpack will exacerbate already tight water supplies, restrict agricultural production, and alter the pattern of power generation. For example, in California, the $30 billion agriculture industry is one of the sectors most vulnerable to changes in climate and water supply.

With an increased proportion of winter precipitation falling as rain, winter flooding is more likely. Ski areas at lower elevations will likely disappear. Scenarios of future climate change in the Northwest from the University of Washington Climate Impacts Group show a snow pack decline by 2090 that could reach 72 percent below the base period of 1960 to 1990.4

Energy generation, salmon recovery, and infrastructure operations, including roads, bridges, and dams, are likely to be directly affected by climate change impacts, according to the Climate Impacts Group. Many of these changes may be felt within 20 years. (See Appendix D.)

Forest fires, smog, and extreme weather events, along with the attendant costs of fighting fires and protecting public health, will worsen. There have been high fluctuations in wet-dry climate cycles for the last 30 years in the Northwest. Climate change may increase the annual and decadal variability of precipitation. Climate variability, far more than fire suppression, has led to the sudden rise and severity of wildfires in recent years. In fact, climate variability is the primary determinant of fire occurrence, location, and timing.[388]

Logging that exacerbates climate change will violate the O&C Act's mandate to foster stability of industries and communities in other ways.

- Climate change will likely lead to social unrest and economic upheaval at a global scale that will reverberate at a local level in western Oregon. Extreme weather events and rising sea levels will displace millions of people who will seek refuge in new lands. Our borders are only marginally effective in controlling economic refugees from the south today. This could become must worse in the future. “Climate change is the largest environmental change expected this century. It is likely to intensify droughts, storms and floods, which will undoubtedly lead to environmental migrations and potential conflicts in the areas migrated to. … People facing environmental disasters have no choice but to leave the affected area.

[388] West Coast Governors' Global Warming Initiative; Staff Recommendations to the Governors; November, 2004. http://www.oregon.gov/ENERGY/GBLWRM/docs/WCGGWINov04Report.pdf

The larger the migration and the shorter the period over which it occurs, the harder it is to absorb the migrants, raising the likelihood of conflict. For instance, migrants clash over jobs, resources and way of life, and violent interactions such as theft, beating, armed scuffles, seizure of resources and property, murders and insurgencies are likely." Springer (2007, November 28)[389]

- Climate change will alter growing conditions and displace agricultural and forest industries. Climate change will increase forest disturbance and impair seedling establishment and harm the timber industry.
- Warming is expected to lead to denser vegetation, higher fuel loads, as well as more frequent and intense droughts which is a recipe for more wildfire.[390] Increasing wildland fires will threaten the stability homes and communities located within or adjacent to fuel-rich wildlands. Climate change is expected to increase the length of fire seasons. Communities will have to spend more money preparing for and fighting fires. Wildfire in the urban interface is disruptive to communities and climate change will increase fire hazard in the community zone. U.S. Forest Service Chief Gail Kimbell said that warming globe and urban sprawl are making fires increasingly dangerous. "Fires are burning hotter and bigger, becoming more damaging and dangerous to people and to property," she said. "Each year the fire season comes earlier and lasts longer." Nation's Forest Chief warns of 'hotter and bigger' fires[391], BLM must store more carbon in mature & old-growth forest forests in order to reduce this hazard to communities and industries.
- Climate change will increase competition for limited water resources, which will adversely impact community and economic stability in western Oregon. Increasing frequency and duration of droughts caused by climate change will limit water supply for electricity generation, as well as municipal, industrial, and agricultural uses causing a destabilizing influence on communities and industries that rely on snow, water, energy, and a stable climate. Reduced snow pack will destabilize the agricultural industry, the winter recreation industry, the reservoir recreation industry, and municipal and industrial water supply. "Human well-being and ecosystem health in many places are being seriously affected by changes in the global water cycle, caused largely by human pressures. … The warming of the ocean, in particular its surface waters, and the feedback of heat to the atmosphere are changing rainfall patterns, affecting the availability of freshwater and food security, and health. Due to the ocean's great heat storage capacity and slow circulation, the consequences of its warming for human well-being will be widespread." [392] "The 2000 report by the Global Water Partnership calls upon the international community to work towards 'Water Security'

[389] Climate Change Likely To Result In Eco-migration: What Can Be Done?. ScienceDaily. Retrieved November 29, 2007, from http://www.sciencedaily.com- /releases/2007/11/071126134703.htm *citing* Reuveny R (2007). Ecomigration and violent conflict: case studies and public policy implications. Human Ecology (DOI 10.1007/s10745-007-9142-5)

[390] Joint Fire Science Program. The Fire-Climate Connection. Fire Science Digest Issue 1, October 2007. http://www.firescience.gov/Digest/Fire_Science_Digest_1.pdf

[391] Thursday, October 25, 2007. By Erik Robinson, Columbian staff writer. http://www.columbian.com/news/localNews/2007/10/10252007_Nations-forest-chief-warns-of-hotter-and-bigger-fires.cfm

[392] Russell Arthurton, Sabrina Barker, Walter Rast, and Michael Huber. Chapter 4 – Water *in* Global Environment Outlook (GEO4). http://www.unep.org/geo/geo4/report/04_Water.pdf

as an overarching goal at all levels from local through to global."[393] This will require urgent action to avoid and mitigate climate change.

- The agricultural sector is particularly vulnerable to water supply constraints caused by climate change. For instance, "In most areas of the Willamette Basin, surface water supplies have been fully allocated — no further water is available for new surface water rights and in dry years more junior water rights are not satisfied."[394] Climate change will only make this situation worse. Warming is expected to raise temperatures, increase evaporative demand, reduce water stored as snowpack, and reduce water availability during summer periods when water supplies are already in short supply and over appropriated. Summers are expected to get warmer and dryer. The irrigation season in western Oregon overlaps with periods of expected increasing water scarcity.[395] Water availability is also a major factor in the value of farm land, so climate change is likely to decrease land values where water supply is limited.[396] BLM should analyze the expected impact of climate change on agricultural water supply[397] and use that information to inform its decision whether it is wise to make climate change worse by logging more mature and old-growth forest.
- Climate change will alter the incidence of diseases affecting humans, crops, and forests potentially impacting community health and stability.

Consider the following maps showing the examples of watersheds that are expected to suffer from low summer streamflows (even without considering climate warming).[398] These areas are likely to become even more water stressed under a warmer climate. What happens to the farmers, community water supplies, and fish if BLM does not stop logging mature and old-growth forests?

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[393] Motoyuki Suzuki. Water in Our Future, Chapter 11, Global Water Crisis. http://202.253.138.71/ENV/Files/Global%20Water%20Crisis%20Suzuki.doc

[394] J. Baker J. Van Sickle D. White. Water Sources and Allocation. *in* Willamette River Basin Atlas 2nd Edition. Chapter 3 - Water Resources. http://www.fsl.orst.edu/pnwerc/wrb/Atlas_web_compressed/3.Water_Resources/3h.water_sources_alloc_web.pdf

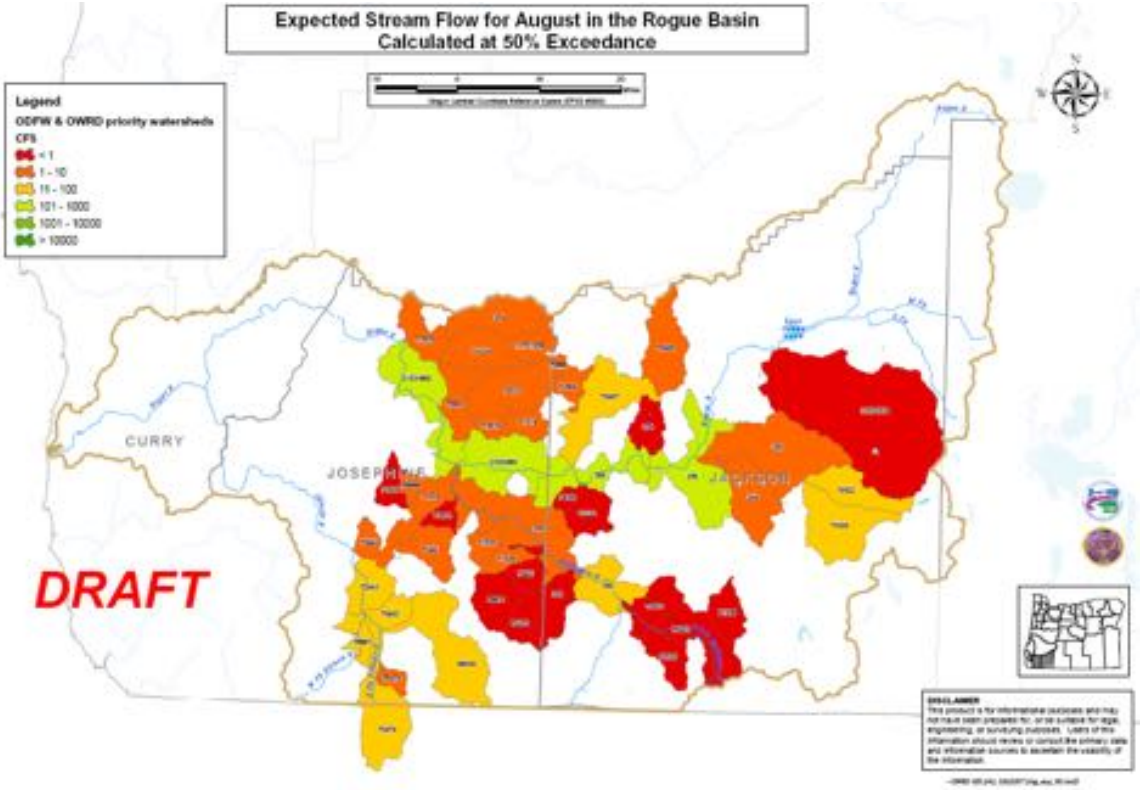
[395] Richard M. Cooper, PE. Determining Surface Water Availability in Oregon. State of Oregon Water Resources Department. Open File Report SW 02-002. Appendix E http://www1.wrd.state.or.us/pdfs/reports/SW02-002.pdf

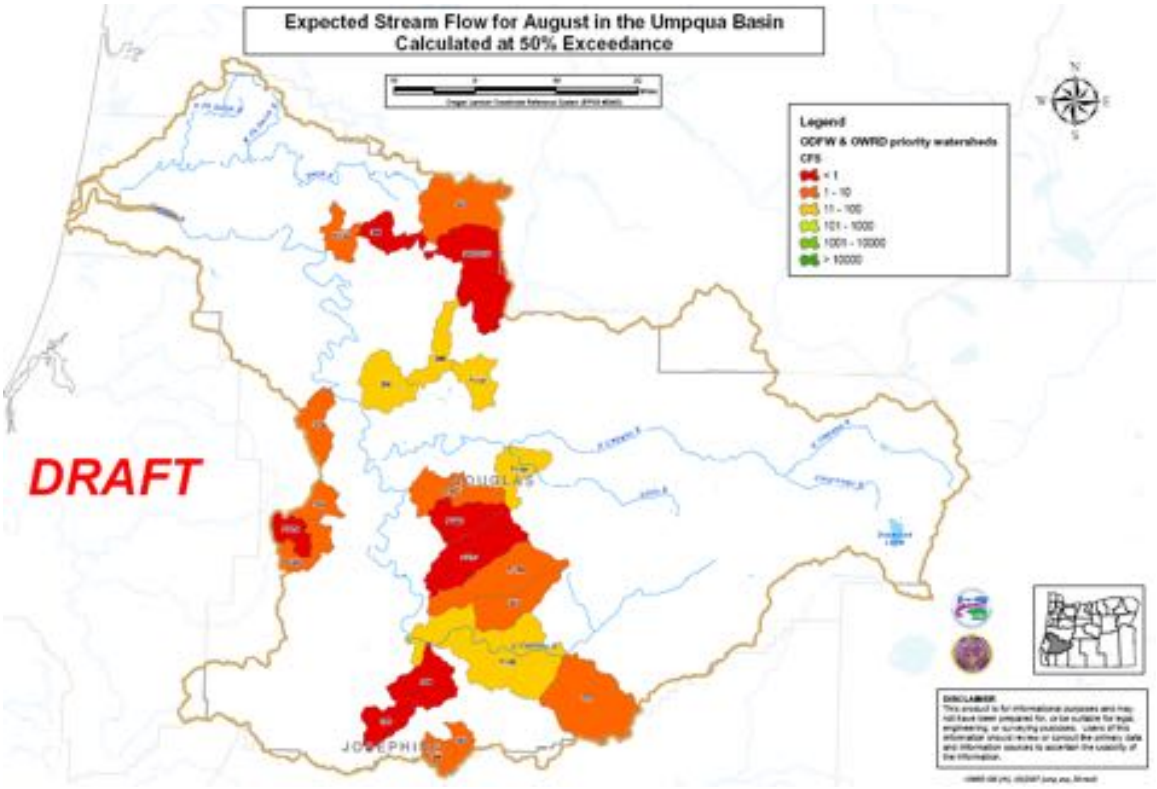
[396] Wolfram Schlenker, W. Michael Hanemann, and Anthony C. Fisher. 2005. Water Availability, Degree Days, and the Potential Impact of Climate Change on Irrigated Agriculture in California. April 2005. http://are.berkeley.edu/~fisher/ClimateChange.pdf

[397] Here are some tools that may be useful to conduct this analysis:

- Wolfram Schlenker, W. Michael Hanemann, and Anthony C. Fisher. 2005. Water Availability, Degree Days, and the Potential Impact of Climate Change on Irrigated Agriculture in California. April 2005. http://are.berkeley.edu/~fisher/ClimateChange.pdf,
- Guobin Fu 2005. Modeling Water Availability And Its Response To Climatic Change For The Spokane River Watershed. PhD Dissertation Washington State University. December 2005. https://research.wsulibs.wsu.edu:8443/dspace/bitstream/2376/413/1/g_fu_120605.pdf

[398] Oregon Water Resources Department. 2007. Strategic Measurement Plan Approved by Water Resources Commission 2000-2001. Information Provided by OWRD March 8, 2007 http://www1.wrd.state.or.us/pdfs/reports/Priority_WAB_Report03-2007.pdf


Expected Stream Flow for August in the Rogue Basin
Calculated at 50% Exceedance
Legend
ODFW & OWRD priority watersheds
CFS
< 1
1 - 10
11 - 100
101 - 1000
1001 - 10000
> 10000
CURRY
JOSEPHINE
JACKSON
DRAFT
DISCLAIMER


Expected Stream Flow for August in the Umpqua Basin
Calculated at 50% Exceedance
Legend
ODFW & OWRD priority watersheds
CFS
< 1
1 - 10
11 - 100
101 - 1000
1001 - 10000
> 10000
DRAFT
DOUGLAS
JOSEPHINE
DISCLAIMER

Maps showing "summer stream flow restoration priorities" established by the Oregon Water Resources Department for all watersheds in Oregon are available here: http://nrimp.dfw.state.or.us/nrimp/default.aspx?p=297. BLM must disclose that climate change that is exacerbated by continued logging of mature & old-growth forests will spread and intensify water shortages in these watersheds and destabilize communities and industries that rely on plentiful clean water.

The IPCC 4th Assessment Report Synthesis described a variety of highly relevant social and economic impacts from climate change. See IPCC Table SPM.3 below which shows just a sample of the relevant impacts. These impacts would clearly tend to destabilize local communities and industries in violation of the O&C Act and the EIS must disclose that continued loss of older forests on BLM lands will exacerbate climate change and contribute to causing these destabilizing impacts.

Table SPM.3. Examples of possible impacts of climate change due to changes in extreme weather and climate events, based on projections to the mid- to late 21st century. These do not take into account any changes or developments in adaptive capacity. The likelihood estimates in column two relate to the phenomena listed in column one. (Table 3.2)

Phenomenon[a] and direction of trend	Likelihood of future trends based on projections for 21st century using SRES scenarios	Examples of major projected impacts by sector			
		Agriculture, forestry and ecosystems	Water resources	Human health	Industry, settlement and society
Over most land areas, warmer and fewer cold days and nights, warmer and more frequent hot days and nights	*Virtually certain*[b]	Increased yields in colder environments; decreased yields in warmer environments; increased insect outbreaks	Effects on water resources relying on snowmelt; effects on some water supplies	Reduced human mortality from decreased cold exposure	Reduced energy demand for heating; increased demand for cooling; declining air quality in cities; reduced disruption to transport due to snow, ice; effects on winter tourism
Warm spells/heat waves. Frequency increases over most land areas	*Very likely*	Reduced yields in warmer regions due to heat stress; increased danger of wildfire	Increased water demand; water quality problems, e.g. algal blooms	Increased risk of heat-related mortality, especially for the elderly, chronically sick, very young and socially isolated	Reduction in quality of life for people in warm areas without appropriate housing; impacts on the elderly, very young and poor
Heavy precipitation events. Frequency increases over most areas	*Very likely*	Damage to crops; soil erosion, inability to cultivate land due to waterlogging of soils	Adverse effects on quality of surface and groundwater; contamination of water supply; water scarcity may be relieved	Increased risk of deaths, injuries and infectious, respiratory and skin diseases	Disruption of settlements, commerce, transport and societies due to flooding; pressures on urban and rural infrastructures; loss of property
Area affected by drought increases	*Likely*	Land degradation; lower yields/crop damage and failure; increased livestock deaths; increased risk of wildfire	More widespread water stress	Increased risk of food and water shortage; increased risk of malnutrition; increased risk of water-and food-borne diseases	Water shortage for settlements, industry and societies; reduced hydropower generation potentials; potential for population migration
Intense tropical cyclone activity increases	*Likely*	Damage to crops; windthrow (uprooting) of trees; damage to coral reefs	Power outages causing disruption of public water supply	Increased risk of deaths, injuries, water- and food-borne diseases; post-traumatic stress disorders	Disruption by flood and high winds; withdrawal of risk coverage in vulnerable areas by private insurers, potential for population migrations, loss of property
Increased incidence of extreme high sea level (excludes tsunamis)[c]	*Likely*[d]	Salinisation of irrigation water, estuaries and freshwater systems	Decreased freshwater availability due to saltwater intrusion	Increased risk of deaths and injuries by drowning in floods; migration-related health effects	Costs of coastal protection versus costs of land-use relocation; potential for movement of populations and infrastructure; also see tropical cyclones above

Notes:

a) See WGI Table 3.7 for further details regarding definitions.

b) Warming of the most extreme days and nights each year.

c) Extreme high sea level depends on average sea level and on regional weather systems. It is defined as the highest 1% of hourly values of observed sea level at a station for a given reference period.

d) In all scenarios, the projected global average sea level at 2100 is higher than in the reference period. The effect of changes in regional weather systems on sea level extremes has not been assessed.

Table SPM.3 IPCC 2007. 4th Assessment Report Synthesis. [399]

[399] http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf

The uncertain effects of climate change is not a valid excuse for inaction because: (a) uncertainty itself has a cost, making it more difficult and expensive to plan for the future and make rational investments. For instance, the cost of insurance will likely increase; and (b) change itself has adverse impacts; in many cases the likelihood of change is fairly certain. it is only the direction and/or magnitude of change that is uncertain.

VII. O&C ACT – BLM MUST HELP MITIGATE CLIMATE CHANGE TO ENSURE PERMANENT FOREST PRODUCTION AND SUSTAINED YIELD

Logging that exacerbates climate change will cause increases in insects, fire, possibly wind, and will make some marginal sites potentially incapable of maintaining permanent forest cover thereby violating the O&C Act's requirement to maintain permanent forest production.

The Northwest Forest Plan, 10-Year Monitoring Program Synthesis Report (Haynes 2006) says "[*C]limate change effects within the Plan area are most likely to be at lower elevations, in drier provinces at ecotones between forest and nonforest areas. Many of these effects would be manifest as increases in disturbance frequency and severity of fires, wind, disease, and insect outbreaks*."[400] Because BLM's western Oregon forest lands are relatively low-elevation and include eco-tones between forest and non-forest habitats, Haynes' summary descriptions of climate change impacts have direct relevance to BLM's legal obligations under the O&C Act. Even small changes in BLM's ability to maintain forest cover at the margins of ecotones, implicates BLM's obligation to maintain "permanent forest production."

BLM must take seriously the O&C Act mandate to maintain permanent forest production. Marginal sites that are currently on the biological edge between forest and other vegetation types are particularly vulnerable to climate change. Increased disturbance and increased drought stress will push some sites over the edge from forest to shrub or grassland.

Scientists predict that seedling establishment will become more difficult under a warmer climate. After fire (and logging) some sites will simply not be able to re-establish forest cover. To the extent that BLM continues to log mature and old-growth forests they will be exacerbating climate change and contributing to the root cause of the forest establishment problem thus violating the "permanent forest production" mandate of the O&C Act.

Well-established forests are generally more resilient to drought and disturbance than young forests. Clearcutting reduces fire resiliency, which sets the stage for forest establishment problems described above. BLM must not conduct activities that increase the risk that the site will be unable to re-establish forest cover in the future. In simple terms, clearcutting and climate change are incompatible because it is uncertain that forest can be re-established after any loss of forest cover. Existing forests have a much better chance of maintaining permanent forest production than non-forested sites.

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[400] Haynes, Richard W.; Bormann, Bernard T.; Lee, Danny C.; Martin, Jon R., tech. eds. 2006. Northwest Forest Plan—the first 10 years (1994-2003): synthesis of monitoring and research results. Gen. Tech. Rep. PNW-GTR-651. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 292 p. http://www.fs.fed.us/pnw/publications/gtr651/

After tracking 21,000 trees over 22 years USGS researchers found - "*Mortality rates increased in both of two dominant taxonomic groups (Abies and Pinus) and in different forest types (different elevational zones). The increase in overall mortality rate resulted from an increase in tree deaths attributed to stress and biotic causes, and coincided with a temperature-driven increase in an index of drought. Our findings suggest that these forests (and by implication, other water-limited forests) may be sensitive to temperature-driven drought stress, and may be poised for die-back if future climates continue to feature rising temperatures without compensating increases in precipitation."*[401] Apparent climatically induced increase of mortality rates in a temperate forest.[402] "*This study is important because ... modeling studies suggest that, over a period of decades, even small changes in mortality rates can profoundly change a forest*," said USGS scientist Dr. Nate Stephenson, the study coauthor.[403] Even with no discernible trend in precipitation levels, increasing temperatures will increase evaporative demand and increase annual water deficit, which leads to stress, mortality, and reduced tree establishment. This study showed a very close correlation between average annual rate of tree mortality in undisturbed old forests and the three-year running average of the water deficit index.

VIII. O&C ACT – BLM MUST HELP MITIGATE CLIMATE CHANGE TO ACHIEVE "REASONABLE PRICES ON A NORMAL MARKET" FOR ITS TIMBER SALES

The O&C Act requires sale of timber at reasonable prices in a reasonable market. BLM cannot argue that O&C Act requires them to cut and sell trees in today's market because doing so would be adverse to the other goals of the O&C Act (permanent forest production, regulate water flow, protect watersheds, and community economic stability). The way the O&C Act is structured, BLM may only sell timber sales if they take steps to correct market failures by among other things internalizing market externalities. Unfortunately, the market has many imperfections that remain unaddressed.

Due to various economic externalities, prices are not reasonable and markets are not normal. A normal market requires that all costs and benefits involved in the transaction are internal to the buyer and seller. If costs of the transaction are externalized and born by someone other than the buyer and seller (such as CO_2 emissions and water pollution that are borne by the public), then the price will not reflect the full costs of production and consequently the price will be artificially low. Prices are supposed to reflect all costs and benefits because we rely on prices to send accurate signals to the market about rational investments in capacity and how much of any given product to produce or consume relative to substitutes.

Since the price of wood products derived from mature & old-growth forests is artificially low, then investors are receiving bad signals form the market and are maintaining excess capacity which produces an irrationally high level of wood products from mature & old-growth forests relative to market substitutes such as wood products from thinned young stands. In other words, externalities lead to market failure, unreasonably low prices, and abnormal markets. This is elementary college economics.

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[401] Van Mantgem, P.J., and N.L. Stephenson. 2007.
[402] Ecology Letters 10:909–916.
[403] http://www.usgs.gov/newsroom/article.asp?ID=1716

The UK's Stern Report said *"When people don't pay for the consequences of their actions we have market failure. [Climate change] is the greatest market failure the world has seen*."[404] The Stern Report states, "*human-induced climate change is at its most basic level an externality. Those who produce greenhouse-gas emissions are bringing about climate change, thereby imposing costs on the world and on future generations, but they do not face directly, neither via markets nor in other ways, the full consequences of the costs of their actions. ... [GHG] emitters do not have to compensate those who lose out because of climate change. In this sense, human-induced climate change is an externality, one that is not 'corrected' through any institution or market, unless policy intervenes*."[405] Stern warns that the externalities of climate change are unique because the consequences of climate change are long-term and potentially irreversible.

Other externalities that contribute to market failure and unreasonably low prices for large logs include: degraded water quality, loss of wildlife habitat, loss of ecosystem services like pollination, nutrient cycling, etc. The economic costs of addressing climate change due to the release of carbon caused by logging mature & old-growth forests are not reflected in the prices of BLM timber sales, and the costs of addressing the climate change caused by such logging are not born by the buyers and sellers of those logs but rather they are born by the public at large and by other industries that are harmed by climate change. *"[Climate change] is the greatest and widest-ranging market failure ever seen. ... policy must promote sound market signals, overcome market failures and have equity and risk mitigation at its core."*[406]

The ecosystem services provided by BLM's western Oregon forest lands are "public goods" that present another economic problem that leads to unreasonable prices and abnormal markets for BLM timber sales. Water quality, livable climate, and wildlife habitat are public goods which have undisputed value to people and communities, but because no one can be excluded from enjoying those resources when they fail to pay, the market fails to provide investors with incentives to produce rational and necessary quantities of those services. As a result the market provides too little of those ecosystem services.

The climate is a public good: those who fail to pay for it cannot be excluded from enjoying its benefits and one person's enjoyment of the climate does not diminish the capacity of others to enjoy it too. Markets do not automatically provide the right type and quantity of public goods, because in the absence of public policy there are limited or no returns to private investors for doing so: in this case, markets for relevant goods and services (energy, land use, innovation, etc) do not reflect the consequences of different consumption and investment choices for the climate. Thus, climate change is an example of market failure involving externalities and public goods.

> *... The impacts [of climate change] are likely to have a significant effect on the global economy if action is not taken to prevent climate change, so the analysis has to consider*

[404] http://www.hm-treasury.gov.uk/media/A/8/stern_speakingnotes.pdf
[405] Stern Report, Chapter 2. http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm
[406] Stern Report http://www.hm-treasury.gov.uk/media/4/3/Executive_Summary.pdf

potentially non-marginal changes to societies, not merely small changes amenable to ordinary project appraisal.[407]

The total social and economic return on carbon storage in mature & old-growth forests is higher than the total social and economic return on logging those forests, but the abnormal market does not reflect this reality. BLM's plans to increase logging of older forest represents rational behavior only from the perspective of the internal returns to BLM and the timber industry, but BLM is not behaving rationally when one considers total social welfare. In a normal market the interests of the timber industry, the public and the BLM would converge. The market failures described above (externalities and public goods) cause the interests of the public and the BLM to diverge. The O&C Act requires BLM to intervene to correct market failures and sell timber only when the market is normalized, when prices are reasonable, and when the market sends accurate price signals that further the public interest.

The IPCC 4th AR Synthesis finds that "A wide array of tools exist, or will soon be available, to adapt to climate change and reduce its potential effects. One is to put a price on carbon emissions." This is another means of internalizing externalities, normalizing markets, and making prices reasonable.

IX. ESA – BLM MUST HELP MITIGATE CLIMATE CHANGE TO CONSERVE LISTED SPECIES

Climate change is a threat to listed species because all the cascading effects of warming: drought, peak flows, low flows, fire, insects, disease, etc. will alter the quality and quantity of habitat, predator prey interactions, plant/pollinator relations, plant/herbivore interactions, etc. The stress of these cascading impacts is added to the existing stresses that lead each species to be listed. The cumulative impacts will be significant and must be fully disclosed and considered in the FEIS.

The Marbled Murrelet Recovery Plan recommends conserving stands over 80 years old because climate change may increase forest disturbance placing habitat at risk and because it may not be possible to replicate suitable habitat for the murrelet under the climate of the future.

Oregon Wild and others raised several issues during scoping related to the effect of climate change on spotted owls:

Spotted Owl new information includes the potential effect of climate change on regional vegetation patterns; **Implications**: Under a new climate regime, we may not be able to regrow new owl habitat in the reserves as assumed in the NW Forest Plan. Existing old forests are relatively resilient to climate change. It is risky to be conducting regeneration harvest and expect to be able grow new owl habitat in the reserves under an uncertain climate regime.

The FWS 5- Year Review of the Status of the Northern Spotted Owl says:

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[407] Stern Report, Chapter 2. http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm

The Northwest Forest Plan was adopted in 1994, and significantly altered management of Federal lands. The substantial increase in reserved areas and associated reduced harvest (approximately 1 percent per year to 0.24 percent per year) has substantially reduced this threat to northern spotted owls. However, the plan allows some loss of habitat and assumed some unspecified level of continued decline in northern spotted owls. The SEI panel noted that many, but not all of the scientific building-blocks of the Northwest Forest Plan have been confirmed or validated in the decade since adoption, though one major limitation appears to be the inability of a reserve strategy to deal with invasive species. Reserves provide no protection against viruses, fungi or invasive owls. ***Climate change is an additional threat to northern spotted owls that was not explicitly addressed in the Northwest Forest Plan*** *and, more generally, is not readily addressed by a reserve-based conservation strategy. Neither of these issues reduces the important contribution of the Northwest Forest Plan to northern spotted owl conservation"*[408]

Jerry Franklin's summarized the "findings" of the Northern Spotted Owl Status Review scientific review panel as follows:

... in view of current uncertainties, such as the eventual outcome of the Spotted Owl/Barred Owl competition, West Nile Virus, and Sudden Oak Death, and whatever else comes along -- such as global change and other kinds of introductions -- existing suitable habitat could be important to the persistence of the Northern Spotted Owl. [repeated with emphasis] Existing suitable habitat could be important to the persistence of the Northern Spotted Owl, i.e., risk to Northern Spotted Owl may increase if additional suitable habitat is removed. It is not clear where the Spotted Owl may find the refuge or refuges from new threats within existing suitable habitat. Barred Owl intrusions do not negate the need for structurally complex forest habitat to sustain Northern Spotted Owl based on existing knowledge.[409]

X. ESA – BLM MUST HELP MITIGATE CLIMATE CHANGE TO TAKE STEPS TO AVOID FUTURE LISTINGS

Scientists predict that a large fraction of species are potentially imperiled by climate change. BLM must consider not only the species within western Oregon, but those all over the world that could be adversely impacted by climate change. The IPCC's 4th Assessment Report synthesis says that "Climate change is likely to lead to some irreversible impacts. There is medium confidence that approximately 20- 30% of species assessed so far are likely to be at increased risk of extinction if increases in global average warming exceed 1.5-2.5oC (relative to 1980-1999). As global average temperature increase exceeds about 3.5oC, model projections suggest significant extinctions (40-70% of species assessed) around the globe. {3.4}"[410]

Climate change may even threaten the survival of many species. Detailed research into the possibility of species extinctions due to climate change, published in the respected American

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[408] FWS Status Review p 43 [http://pacific.fws.gov/ecoservices/endangered/recovery/pdf/NSO_5-yr_Summary.pdf].

[409] U.S. Fish & Wildlife Service Scientific Review Panel for the Northern Spotted Owl. June 22, 2004 Public Hearing. Washington State University, Vancouver campus. Transcript of proceedings at 121. http://www.sei.org/owl/meetings/minutes/june-meeting-transcripts.pdf

[410] IPCC 2007. 4th Assessment Report Synthesis. http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf

journal Nature in 2004, used climatic modelling to examine possible impacts on a total of 1,103 terrestrial plant and animal species found in many different regions of the world.

Precise predictions could not be made, since the climatic models contain many uncertain factors, but the resultant scenarios nevertheless indicated that global warming would have clear impacts on biodiversity. The more temperatures rise, the more species will be driven into extinction. Some species may become extinct due to the disappearance of their natural habitats, while others could vanish because they are unable to move rapidly enough into new regions where conditions would still meet their requirements.

The research results also indicated that 15– 21% of the species endangered by climate change could be saved if we are able to limit the extent and impacts of climate change through rapid reductions in greenhouse gas emissions combined with improvements in the sequestration of carbon.

The more average global temperatures rise, the more species will be threatened with extinction.[411]

[411] Thomas, C.D., et al. 2004

Rise in average global temperature by 2050	Proportion of the studied 1,103 species facing extinction	
	mean value	range values
0,8– 1,7°C	18%	9– 31%
1,8– 2,0°C	24%	15– 37%
>2,0°C	35%	21– 52%

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XI. CLEAN AIR ACT — BLM MUST PREVENT AND CONTROL CO_2 AIR POLLUTION.

Logging mature and old-growth forests causes the emission of CO_2 pollution to the atmosphere. The Clean Air Act supersedes the O&C Act and requires BLM to control CO2 emissions through on-site carbon storage and management. Since this RMP Revision is a long-term plan, BLM should anticipate changes in water pollution regulations. DEQ is currently taking public comment on reporting requirements for GHG emissions. 42 USC § 7402(b) requires all federal agencies to use their authorities to further the goals of the Clean Air Act. Sections 7401(b)(1) and 7470(1) set forth clear goals to protect the public welfare by limiting air pollution such as CO_2.

XII. CLEAN WATER ACT — BLM MUST PREVENT AND CONTROL CO_2 WATER POLLUTION.

Logging mature and old-growth forests causes the emission of CO_2 pollution to the atmosphere with is ultimately absorbed by the ocean where it is converted to carbonic acid. Slight alterations of the pH of the ocean alters mineralization processes like calcification which can have serious adverse consequences on marine ecosystems. Since this RMP Revision is a long-term plan, BLM should anticipate changes in water pollution regulations.

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[412] Finnish Environment Institute. 2005. The impacts of climate change on biodiversity. 9/21/2005 (Updated).

http://www.ymparisto.fi/default.asp?node=17418&lan=en#a3 *citing* Thomas, C.D. et al. 2004. Extinction risk from climate change. Nature 427, p.145-148. http://www.ymparisto.fi/download.asp?contentid=32647&lan=fi

In August 2007 the Center for Biological Diversity officially requested that the ocean waters off Oregon be declared impaired under the Clean Water Act due to ocean acidification caused by the absorption of human-produced carbon dioxide. Listing a water body as "impaired" allows states to limit the discharge of pollutants that are contributing to impairment.

The atmosphere and ocean freely exchange carbon dioxide, and as atmospheric levels of carbon dioxide increase, so does the absorption of carbon dioxide by the ocean. The ocean takes up about 22 million tons of carbon dioxide each day and has absorbed about half of the carbon dioxide released into the atmosphere by human activities. This excess carbon dioxide changes the chemistry of seawater, making it more acidic: Ocean acidity, measured in pH, has already changed 0.11 pH on average due to human-generated carbon dioxide since preindustrial times — a significant, approximately 30-percent rise in acidity. If current emissions trajectories continue, an additional change of 0.5 units is predicted by the end of the century. These changes will be irreversible on human timescales.

Already, ocean acidification is damaging surface waters and having an impact on marine ecosystems. It makes unavailable the compounds necessary for marine organisms to build shells and skeletons, thus impeding the growth of plankton, starfish, urchins, oysters and other shelled organisms as well as coral. Due to ocean acidification, coral reefs will begin to erode more quickly than they can rebuild. And these changes are occurring so quickly that marine life will have great difficulty adapting to changing seawater chemistry.[413]

XIII. LOGGING TO REDUCE FIRE-INDUCED GREENHOUSE GAS EMISSIONS WILL BACKFIRE

The DEIS claims that logging provides climate benefits but this is not supported (in fact refuted) by the best available science. DEIS (158-159) says

Many studies have found that active management, particularly in forests adversely affected by fire suppression, could reduce both carbon losses and increases in greenhouse gas emissions from wildfires. Results from various thinning and burning prescriptions indicate that the short-term reductions in carbon result in long-term benefits to carbon storage and greenhouse gas emissions by reducing fire-induced mortality, maintaining a higher fraction of carbon in live trees, increasing drought resistance, and reducing competition for water, nutrients, and light.[414]

This is an incomplete, erroneous, and misleading description of the carbon consequences of logging and the interaction of logging with fire. BLM needs to critically review the sources cited. Do these studies really support what BLM is suggesting? Are there distinguishing features? Are the study designs sound? Are the study conclusions really supported by the study results?

[413] Center for Biological Diversity. "Seven Coastal States Petitioned to Address Ocean Acidification: Clean Water Act Requires Regulation of Carbon Dioxide That Could Drive Ocean Species Extinct." August 15, 2007 Press Release.

[414] Stephens et al. 2009, Hurteau and North 2010, North and Hurteau 2011, Stephens et al. 2012, Hurteau et al. 2014, Loudermilk et al. 2014, Volkova et al. 2014.

Some of the studies cited by the DEIS (158-159) directly contradict BLM's assertion that logging has climate benefits. Many of these studies are generally not applicable to western Oregon because they are from different biophysical settings, and they generally fail to properly account for the low probability that fuel reduction logging will interact with wildfire --

- Volkova et al (2014)[415] This study does not support BLM's assertion that logging provides climate benefits. This study looked at forest carbon after fire occurred, so it selected for areas where there was 100% overlap between treatments and fire. This fails to account for the real world (low) probability of fuel treatments interacting with fire, and all the GHG emissions caused by fuel treatments that did not subsequently burn. Also, this study was in a completely different (eucalyptus) forest type.
- Stephens et al (2009)[416] This study does not support BLM's assertion that logging provides climate benefits. This study appears to assume a 100% chance that fire will interact with treatments, which is not a real world probability that treatments will interact with wildfire. Drawing conclusions about the carbon benefits of fuel reduction logging requires consideration of the relative extent and probability of emissions from logging and wildfire. Also, the study cautions readers to limit conclusions to young stands in the Sierra Nevada that are recovering from past timber harvest.
- Hurteau & North (2010)[417] This study does not support BLM's assertion that logging provides climate benefits, saying -
  In the absence of wildfire or if wildfire emissions are lower than the carbon stock reduction necessary to mitigate high-severity fire risk, fuels treatments could have a net negative impact on carbon stocks and thus reduce the forest's potential to mitigate climate change (Mitchell et al., 2009). … . The higher intensity overstory thinning treatments will require longer periods of time before they sequester the carbon removed and emitted during treatment. By removing large overstory trees that often contain >65% of the aboveground carbon, these treatments incur a substantial immediate carbon stock reduction and require a much longer recovery period. While large tree percent changes in C were high in these treatments (Table 1), there are simply fewer large trees ha−1 to store C. In earlier research we also found overstory thinning did not substantially decrease the risk of high-severity fire compared to understory thinning treatments (North et al., 2009).

This study made no attempt to quantify the probability that fire would interact with fuel treatments. Other studies that have attempted to estimate these probabilities show that fuel reduction logging results in greater GHG emissions than doing nothing. See below. This study also failed to account for the climate consequences of the extra carbon in the atmosphere while the forest is recovering from logging related carbon loses. Even if the carbon is later recaptured by the forest as a result of regrowth after logging, that does not neutralize the adverse climate effects suffered during the lag time.

Loehman et al (2014) have criticized Hurteau and North (2008) (and others) saying:

Recent studies (Hurteau and North, 2008, 2010; Hurteau et al., 2008a; North et al., 2009; *Reinhardt and Holsinger, 2010) have focused on carbon responses to fire in individual forest*

[415] http://www.publish.csiro.au/nid/114/paper/WF14009.htm
[416] http://nature.berkeley.edu/stephenslab/wp-content/uploads/2015/04/Stephens-et-al.-FFS-Carbon-CJFR-8-09.pdf
[417] http://www.fs.fed.us/psw/publications/north/psw_2010_north(hurteau)002.pdf

stands as a basis for gaining insight into terrestrial-atmospheric carbon fluxes. Suggested management treatments to protect, maintain, or enhance forest carbon stocks forest carbon stores include mechanical fuels treatments, prescribed fire, and suppression of wildfires (Canadell and Raupach, 2008; Hurteau and North, 2008, 2010; Hurteau et al., 2008b; McKinley et al., 2011; Stephens et al., 2012). Results from these studies suggest that fuel treatments can reduce wildfire severity and protect forest carbon stocks from future loss from severe wildfires (Hurteau and North, 2008; Hurteau et al., 2008b; Stephens et al., 2009b), but management of carbon in fire-prone and fire-adapted forests is more complex than simply minimizing wildfire carbon emissions and maximizing stored carbon in individual stands. The stochastic and variable nature of fires, the relatively fine scale over which fuels treatments are implemented, and potentially high carbon costs to implement them suggest that fuel treatments are not an effective method for protecting carbon stocks at a stand level (Reinhardt et al., 2008; Reinhardt and Holsinger, 2010).

Rachel A. Loehman, Elizabeth Reinhardt, Karin L. Riley 2014. Wildland fire emissions, carbon, and climate: Seeing the forest and the trees – A cross-scale assessment of wildfire and carbon dynamics in fire-prone, forested ecosystems. Forest Ecology and Management 317 (2014) 9–19.[418]

- Hurteau et al (2014)[419] This study does not support BLM's assertions that logging provides climate benefits, saying –
  Fire effects on the forest can be managed by altering forest structure and fuel loads, thereby reducing the risk of carbon loss due to wildfire (Hurteau et al., 2009). However, this risk reduction measure carries a carbon stock reduction cost and the carbon balance of a specific treatment is dependent upon a wildfire burning in the treated area, the end-use of the trees harvested during treatment, among other factors … Generally, the probability of a fire event occurring at most forest locations in any given year is quite low."

This study speculated about how trees in the Sierra Nevada Mountains of California may become mal-adapted as a result of global warming, but this study found wide variation in the effects on forest carbon depending on various future climate scenarios for the Sierra Nevada. ("The large influence of GCM on carbon storage suggests that reducing uncertainty in modeling forest growth response to wildfire mitigation treatments will require further refinement of climate projections") Refinement of climate scenarios should of course be region-specific. BLM should not be using wild speculations from dry/open forests of California to set policy for moist/dense forests of western Oregon. ("our findings highlight the need to overcome the scale mismatch between GCMs and the typical forest management unit. Recent research suggests the substantial influence of local terrain on mediating climate (Dobrowski, 2011) making even downscaled climate projections too coarse to capture the fine scale climate variability that can influence tree growth.") Finally, this study highlights uncertainty. It does not make concrete recommendations to conduct logging to help store carbon or help forests adapt to climate change. ("[T]he current variability in downscaled global climate projections adds considerable uncertainty to projecting how management actions to alter forest structure and composition and climate will interact in the future.")

[418] http://www.fs.fed.us/rm/pubs_other/rmrs_2014_loehman_r001.pdf
[419] http://www.fs.fed.us/psw/partnerships/tahoescience/documents/p029_Hurteau2014Tahoe.pdf

- Loudermilk et al (2014)[420] This study does not support BLM's assertion that logging provides climate benefits. Figures 4 and 5 in this publication clearly show that not logging results in greater forest carbon storage than any of the fuel reduction scenarios.
  Over the near future, more forest C would be removed from the system than would be released without treatment (i.e., from ecosystem respiration); creating a net C 'cost' … . Eventually, reduced fire severity and enhanced forest re-growth would lead to a net gain in C storage at the management area and landscape level. … Our simulated fuel treatments … controlled wildfire C emissions, and in the long run resulted in a net C gain. These positive outcomes far outweigh the intermediary loss in forest C from biomass removal,…

However, this conclusion is not supported by the study results or any other evidence. While the carbon density of the treatment and no treatment scenarios appear to converge in the year 2100, the study fails to account of the climate consequences associated with the excess carbon in the atmosphere in the decades prior to 2100. This is sloppy accounting that does not meet NEPA standards. The near-term climate effects caused by logging-related carbon emissions are not neutralized by carbon uptake that occurs decades in the future. This study also recognized that carbon benefits depend on the probability of future fire but made no attempt to quantify that probability.

Achievement of a net C gain … depended on wildfire activity: Fuel treatments were more effective in a more active fire environment, where the interface between wildfires and treatment areas increased and caused net C gain earlier than as compared to our scenarios with less wildfire activity … regulation of C emissions may force forest managers to balance the use of fuel treatments for reducing wildfire risk against goals to maintain or increase C sequestration (Hurteau et al., 2008). This will require consideration of the net balance between the immediate loss of C from live and detrital matter during fuels management (e.g., mechanical thinning and prescribed burning) against the long-term C sequestration potential associated with reduced C emissions from lower intensity wildfires.

This study also assumed that wildfire activity would increase thus increasing the probability that treatments would interact with fire. This assumption may or may not hold on BLM lands where aggressive fire suppression remains the norm. Furthermore, this study looked at fuel reduction targeted close to homes and communities, not across the landscape as BLM proposes.

BLM should then conduct a much more thorough review of credible opposing viewpoints. In virtually all cases, commercial logging will increase GHG emissions relative to not logging, even after accounting for emissions related to wildfire. Numerous experts have carefully studied the issue and conclude that logging to reduce fire and reduce carbon emission will actually make matters worse, not better.

Law & Harmon conducted a thorough literature review and concluded …

Thinning forests to reduce potential carbon losses due to wildfire is in direct conflict with carbon sequestration goals, and, if implemented, would result in a net emission of CO2 to the atmosphere because the amount of carbon removed to change fire behavior is often far larger

[420] http://www.fs.fed.us/psw/partnerships/tahoescience/documents/p049_Loudermilk2014.pdf

than that saved by changing fire behavior, and more area has to be harvested than will ultimately burn over the period of effectiveness of the thinning treatment.[421]

XIV. BLM NEEDS TO ACCURATELY DESCRIBE THE PROBABILISTIC NATURE OF THIS ISSUE

- Premises:
  - Fire and logging both emit GHG;
  - No one can predict where or when fire will occur, therefore logging to modify fire behavior must be spatially extensive;
  - Fuels regrow after logging, so treatments will have to be repeated;
  - Fire is relatively infrequent, so fire will rarely interact with fuel reduction treatments during the period they are presumed effective. Many acres will be treated and few acres will actually interact with fire, so fuel treatments and associated GHG emissions will occur "unnecessarily" (i.e., without any fire benefits to offset the GHG emissions caused by logging);
  - Fire is mostly controlled by weather (e.g., temperature, humidity, wind), not by fuel conditions.
  - Logging has complex effects of fire behavior. Logging might make fire worse in some cases.
  - Logging will have only marginal effects on fire in most cases – slightly reducing fire intensity and fire size.
  - Logging will very rarely be perfectly timed, perfectly located, perfectly scaled, and perfectly implemented to result in meaningful fire control and significant GHG benefits.
- Conclusion: Logging to control fire does not provide climate benefits, because, the combined GHG emissions associated with logging plus emissions associated with wildfire are highly likely to be far greater than the GHG emissions associated with fire alone.
- Note: The limited exception to this conclusions involve cases where three conditions are met: (i) smallest fuels are removed (ii) from forests with the most frequent fire return interval, and (iii) where fire suppression is not being practiced. These conditions do not occur on BLM lands in western Oregon. "Smallest fuels" means non-commercial thinning, not removal commercial-sized logs that store a lot of carbon. BLM emphasizes commercial logging. Forests in western Oregon have an intermediate-to-long fire return interval, and BLM cooperates with the state to aggressively suppress every fire.

Logging proponents often claim that logging will increase carbon storage controlling carbon emissions caused by natural processes such as fire and insect-induced mortality. This is simply counter-factual. In most cases, managing forests in an effort to control natural processes that release carbon will only make things worse by releasing MORE carbon. This is mostly because no one can predict where fire or insects will occur, so the treatments must be applied to broad landscapes, yet the probability of fire or insects at any given location remains low, and only a

[421] Law, B. & M.E. Harmon 2011. Forest sector carbon management, measurement and verification, and discussion of policy related to mitigation and adaptation of forests to climate change. Carbon Management 2011 2(1). http://terraweb.forestry.oregonstate.edu/pubs/lawharmon2011.pdf.

small fraction of the treated areas will actually experience fire or insects. As a result, many acres will be treated "unnecessarily" and therefore the cumulative carbon emissions from logging to control fire and insects (plus the carbon emissions from fire and insects that occur in spite of control efforts) are greater than emissions from fire and insects alone.
Before attributing carbon benefits to fuel reduction logging please consider numerous credible opposing viewpoints, including:

- John L Campbell, Mark E Harmon, and Stephen R Mitchell. 2011. Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions? Front Ecol Environ 2011; doi:10.1890/110057[422] (Results suggest that the protection of one unit of C from wildfire combustion comes at the cost of removing three units of C in fuel treatments.)
- Mitchell, Harmon, O'Connell. 2009. Forest fuel reduction alters fire severity and long-term carbon storage in three Pacific Northwest ecosystems. Ecological Applications. 19(3), 2009, pp. 643–655. [423]
- Reinhardt, Elizabeth, and Lisa Holsinger 2010. Effects of fuel treatments on carbon-disturbance relationships in forests of the northern Rocky Mountains. Forest Ecology and Management 259 (2010) 1427–1435.[424] ("Although wildfire emissions were reduced by fuel treatment, the fuel treatments themselves produced [carbon] emissions, and the untreated stands stored more carbon than the treated stands even after wildfire. … Our results show generally long recovery times …")
- Jim Cathcart, Alan A. Ager, Andrew McMahan, Mark Finney, and Brian Watt 2009. Carbon Benefits from Fuel Treatments. USDA Forest Service Proceedings RMRS-P-61. 2010.
- Law, B. & M.E. Harmon 2011. Forest sector carbon management, measurement and verification, and discussion of policy related to mitigation and adaptation of forests to climate change. Carbon Management 2011 2(1).
- Dina Fine Maron 2010. FORESTS: Researchers find carbon offsets aren't justified for removing understory (E&E Report 08/19/2010, reporting on the WESTCARB Project)[425]
- Restaino, Joseph C.; Peterson, David L. 2013. Wildfire and fuel treatment effects on forest carbon dynamics in the western United States. Forest Ecology and Management 303:46-60.[426] ("… C costs associated with fuel treatments have can exceed the magnitude of C reduction in wildfire emissions, because a large percentage of biomass stored in forests (i.e., stem wood, branches, coarse woody debris) remains unconsumed, even in high-severity fires (Campbell et al., 2007; Mitchell et al., 2009). … Wildfire occurrence in a given area is uncertain and may never interact with treated stands with reduced fire hazard, ostensibly negating expected C benefits from fuel treatments. Burn probabilities in treated stands in southern Oregon are less than 2%, so the probability that a treated stand encounters wildfire and creates C benefits is low (Ager et al., 2010).)"

[422] http://nnrg.org/files/CampbellJohn-65945.pdf; http://scholarsarchive.library.oregonstate.edu/xmlui/bitstream/handle/1957/26174/CampbellJohn.Forestry.CanFuelReductionTreatments.pdf.
[423] http://www.fs.fed.us/pnw/pubs/journals/pnw_2009_mitchell001.pdf.
[424] http://www.fs.fed.us/rm/pubs_other/rmrs_2010_reinhardt_e002.pdf
[425] https://pacificforest.org/pft-in-the-media-2010-climatewire-8-19-10.html.

[426] http://www.fs.fed.us/pnw/pubs/journals/pnw_2013_restiano001.pdf

- Goslee, K., Pearson, T., Grimland, S., Petrova, S., Walls, J., Brown, S., 2010. Final Report on WESTCARB Fuels Management Pilot Activities in Lake County, Oregon. California Energy Commission, PIER. CEC-500-XXXX-XXX; AND Pearson, T.R.H., Goslee, K., Brown, S., 2010. Emissions and Potential Emission Reductions from Hazardous Fuel Treatments in the WESTCARB Region. California Energy Commission, PIER. CEC-500-XXXX-XXX. (Summarized by Restaino & Peterson (2013) as follows: "Pearson et al. (2010) and Goslee et al. (2010) developed methodologies to evaluate C dynamics associated with fuel treatment projects in low to mid-elevation forest in northern California and Oregon. The authors, with consultation from teams of scientists, quantify C storage and release within the context of a six-point conceptual framework: annual fire risk, treatment emissions, fire emissions, forest growth and re-growth, re-treatment, and the shadow effect (i.e., treatment effect outside the treated area). Results indicate that the mean annual probability of wildfire for the study region is less than 0.76%/year, and treatments reduce C stocks by an average of 19%. Where timber is removed, 30% of extracted biomass is stored in long-lasting wood products. Wildfire emissions in treated stands, quantified with the Fuel Characteristic Classification System, are reduced by 6% relative to untreated stands. Growth estimates for a 60-year simulation horizon, derived from FVS, indicate that in the absence of wildfire, untreated stands sequester 17% more C than treated stands. However, in simulations that include wildfire, treated stands sequester 63% more C than untreated stands. The shadow effect is unlikely to be large enough to affect net GHG emissions. In summary, initial reductions in C stocks (e.g., thinning), combined with low annual probability of wildfire, preclude C benefits associated with fuel treatments, even if harvest residues are used for biomass energy.")
- Chiono, Lindsay 2011. Balancing the Carbon Costs and Benefits of Fuels Management. Research Synthesis for Resource Managers. Joint Fire Science Program Knowledge Exchange.[427] ("[T]he net carbon impact of fuel treatments is further complicated by the probabilistic nature of wildfire occurrence and the impermanence of post-treatment stand conditions … [T]reatment activities produce an immediate carbon emission while future wildfire emissions are uncertain … Depending on the intensity of treatment, the quantity of carbon removed may be substantial enough to negate gains from avoided wildfire emissions. … cumulative emissions from fuels reduction activities repeated in order to maintain low hazard conditions over time can overwhelm avoided wildfire emissions, resulting in a net carbon loss.")

Mitchell, Harmon, O'Connell. 2009. Forest fuel reduction alters fire severity and long-term carbon storage in three Pacific Northwest ecosystems. Ecological Applications. 19(3), 2009, pp. 643–655 [428]

ABSTRACT:... *Our simulations indicate that fuel reduction treatments in these ecosystems consistently reduced fire severity. However, reducing the fraction by which C is lost in a wildfire requires the removal of a much greater amount of C, since most of the C stored in forest biomass (stem wood, branches, coarse woody debris) remains unconsumed even by high-severity wildfires. For this reason, all of the fuel reduction treatments simulated for the west Cascades*

[427] https://static.squarespace.com/static/50083efce4b0c6fedbca9def/t/51632bf8e4b00b25a8fa21d3/1365453816037/CFSC_Chiono_Carbon_and_Fuel_Mngmt.pdf
[428] http://www.fs.fed.us/pnw/pubs/journals/pnw_2009_mitchell001.pdf

and Coast Range ecosystems as well as most of the treatments simulated for the east Cascades resulted in a reduced mean stand C storage. One suggested method of compensating for such losses in C storage is to utilize C harvested in fuel reduction treatments as biofuels. Our analysis indicates that this will not be an effective strategy in the west Cascades and Coast Range over the next 100 years. We suggest that forest management plans aimed solely at ameliorating increases in atmospheric CO2 should forego fuel reduction treatments in these ecosystems, with the possible exception of some east Cascades Ponderosa pine stands with uncharacteristic levels of understory fuel accumulation. Balancing a demand for maximal landscape C storage with the demand for reduced wildfire severity will likely require treatments to be applied strategically throughout the landscape rather than indiscriminately treating all stands.
Notes on Mitchell & Harmon:

- The authors assumed that fire severity was determined exclusively by fuel variables but not weather. This may over-estimate the efficacy of fuel treatments on fire severity. The conclusion that fuel manipulation leads to reduced fire behavior may be an unavoidable result of the assumptions, rather than a reflection of reality.

- The only treatment that showed some promise was understory removal (not canopy removal) in fire-suppressed dry pine stands, but the carbon storage benefit from reduced fire severity in this best case scenario was minuscule, only about 0.6-1.2%. The modeled treatments on the eastside of the Cascades failed to include canopy removal which is a common practice in fuel reduction efforts and one that removes more carbon than understory treatments. Also, this analysis might give too much credit to fuel treatments because they excluded climatic variation from the analysis (meaning that in their analysis the treated stands never burned uncharacteristically in spite of the treatments.

Similar results were found at the stand scale by Reinhardt and Holsinger (2010):

> *We simulated effects of fuel treatments on 140 stands representing seven major habitat type groups of the northern Rocky Mountains using the Fire and Fuels Extension to the Forest Vegetation Simulator (FFE-FVS). Changes in forest carbon due to mechanical fuel treatment (thinning from below to reduce ladder fuels) and prescribed fire were explored, as well as changes in expected fire behavior and effects of subsequent wildfire. Results indicated that fuel treatments decreased fire severity and crown fire occurrence and reduced subsequent wildfire emissions, but did not increase post-wildfire carbon stored on-site. Conversely, untreated stands had greater wildfire emissions but stored more carbon. ... The results do not support the use of fuel treatments soley to protect carbon stocks or reduce emissions. Although wildfire emissions were reduced by fuel treatments, the fuel treatments themselves produced emissions, and the untreated stands stored more carbon than the untreated stands even after wildfire. [and even considering carbon stored in wood products derived from treated stands.]*[429]

And by Campbell, Harmon & Mitchell 2011:

[429] Reinhardt, Elizabeth, and Lisa Holsinger 2010. Effects of fuel treatments on carbon-disturbance relationships in forests of the northern Rocky Mountains. Forest Ecology and Management 259 (2010) 1427–1435.

Abstract: *It has been suggested that thinning trees and other fuel-reduction practices aimed at reducing the probability of high-severity forest fire are consistent with efforts to keep carbon (C) sequestered in terrestrial pools, and that such practices should therefore be rewarded rather than penalized in C-accounting schemes. By evaluating how fuel treatments, wildfire, and their interactions affect forest C stocks across a wide range of spatial and temporal scales, we conclude that this is extremely unlikely. Our review reveals high C losses associated with fuel treatment, only modest differences in the combustive losses associated with high-severity fire and the low-severity fire that fuel treatment is meant to encourage, and a low likelihood that treated forests will be exposed to fire. Although fuel-reduction treatments may be necessary to restore historical functionality to firesuppressed ecosystems, we found little credible evidence that such efforts have the added benefit of increasing terrestrial C stocks.*

Summary:

• Carbon (C) losses incurred with fuel removal generally exceed what is protected from combustion should the treated area burn

• Even among fire-prone forests, one must treat about ten locations to influence future fire behavior in a single location

• Over multiple fire cycles, forests that burn less often store more C than forests that burn more often

• Only when treatments change the equilibrium between growth and mortality can they alter long-term C storage

Conclusions

Across a range of treatment intensities, the amount of C removed in treatment was typically three times that saved by altering fire behavior.

the protection of one hectare of forest from wildfire required the treatment of 10 hectares, owing not to the low efficacy of treatment but rather to the rarity of severe wildfire event.

Long-term simulations of forest growth, decomposition, and combustion illustrate how, despite a negative feedback between fire frequency and fuel-driven severity, a regime of low-frequency, high-severity fire stores more C over time than a regime of high-frequency, low-severity fire.

John L Campbell, Mark E Harmon, and Stephen R Mitchell. 2011. Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions? [430] It is important to recognize that "the equilibrium between growth and mortality" must consider all forms of mortality, not just that caused by fire, but also mortality caused by logging.

Restaino & Peterson (2013) conducted a literature review of this issue and reported:

[430] Front Ecol Environ 2011; doi:10.1890/110057
http://scholarsarchive.library.oregonstate.edu/xmlui/bitstream/handle/1957/26174/CampbellJohn.Forestry.CanFuelReductionTreatments.pdf

All studies agree unequivocally that untreated stands release more emissions to the atmosphere during wildfire than treated stands…. However, most studies in this review include assumptions of future wildfire frequency and probability that skew long-term trade-off analyses by overestimating the ability of fuel treatments to reduce wildfire emissions over long time scales. For example, fuel treatments have a finite life expectancy, and fire hazard increases over time as fuels accumulate in treated areas. Repetition and maintenance of fuel treatments are necessary in order to effectively maintain reduced fire hazard over time (Peterson et al., 2005; Johnson et al., 2007, 2011) and thus must be included in analyses of long-term C storage. Although Rhodes and Baker (2008) suggest that 2.0–4.2% of areas treated to reduce surface fuels are likely to encounter wildfires that would otherwise be high or moderate-high severity without treatment, most studies assume future wildfire probability of 100%, reporting inferences that essentially detail a ''best-case scenario'' for wildfire missions mitigation. Annual probability of wildfire in dry temperate forests for a given stand is approximately 1% (Ager et al., 2010; Pearson et al., 2010; Campbell et al., 2011). … To benefit total ecosystem C storage, the removal and release of C through fuel treatments must not exceed the expected reductions in wildfire emissions. Substantial treatment costs through timber harvest, prescribed fire, and milling waste exceed observed and simulated reductions in wildfire emissions. … The ability of fuel treatments to mitigate future fire behavior and move forest structure to a more fire-resistant condition is well documented. However, C costs associated with fuel treatments have can exceed the magnitude of C reduction in wildfire emissions, because a large percentage of biomass stored in forests (i.e., stem wood, branches, coarse woody debris) remains unconsumed, even in high-severity fires (Campbell et al., 2007; Mitchell et al., 2009). … Wildfire occurrence in a given area is uncertain and may never interact with treated stands with reduced fire hazard, ostensibly negating expected C benefits from fuel treatments. Burn probabilities in treated stands in southern Oregon are less than 2%, so the probability that a treated stand encounters wildfire and creates C benefits is low (Ager et al., 2010).)[431]

Lindsay Chiono (2011) of the Wildland Fire Science Laboratory at UC Berkeley prepared a synthesis of the research for resource managers and said:

[T]he net carbon impact of fuel treatments is further complicated by the probabilistic nature of wildfire occurrence and the impermanence of post-treatment stand conditions … [T]reatment activities produce an immediate carbon emission while future wildfire emissions are uncertain … Depending on the intensity of treatment, the quantity of carbon removed may be substantial enough to negate gains from avoided wildfire emissions. East of the Cascade crest in Oregon, a modeling study of carbon dynamics that included modeled wildfires found that while understory removal treatments slightly enhanced carbon storage over the long term, higher levels of biomass removal reduced mean ecosystem carbon (Mitchell et al., 2009).'' … [W]hen treatments must be repeated in the interim between wildfires in order to maintain low hazard conditions. Similarly,

[431] Restaino, Joseph C.; Peterson, David L. 2013. Wildfire and fuel treatment effects on forest carbon dynamics in the western United States. Forest Ecology and Management 303:46-60. http://www.fs.fed.us/pnw/pubs/journals/pnw_2013_restiano001.pdf

when wildfire frequency is low, the quantity of carbon removed in treatments over time can overwhelm likely wildfire losses. Net emissions were most pronounced in the west Cascades where historical fire return intervals were very long… [I]n southern Oregon and northern California, Goslee and others (2010) took an approach that incorporates the stochastic nature of wildfire occurrence. Rather than scheduling a wildfire event soon after fuel treatment, a calculation that maximizes treatment benefits, they used an estimate of the local fire return interval for the period of 2001 to 2008 -- an annual burn probability of 0.6% -- to assess carbon emissions. Partly owing to this low wildfire risk, they found that fuel treatments, which included commercial timber harvest and pile burning of noncommercial biomass, produced an effective immediate net emission of 10-20.8 tons of carbon per acre. … [S]ome general principles have begun to emerge. Achieving a net carbon gain appears more likely when the quantity of carbon removed during treatment is minimized, when harvested biomass is converted to long-lived wood products, and where the risk of wildfire occurrence is high… Conversely, cumulative emissions from fuels reduction activities repeated in order to maintain low hazard conditions over time can overwhelm avoided wildfire emissions, resulting in a net carbon loss.[432]

Even the Chief of the Forest Service recognizes these trade-offs. "[M]anagement practices, designed to restore ecosystem health, may in the near-term reduce total stored carbon below current levels."[433]

Hudiburg et al (2001 state:

Strategies for reducing carbon dioxide emissions include substitution of fossil fuel with bioenergy from forests, where carbon emitted is expected to be recaptured in the growth of new biomass to achieve zero net emissions, and forest thinning to reduce wildfire emissions3. Here, we use forest inventory data to show that fire prevention measures and large-scale bioenergy harvest in US West Coast forests

Lead to 2–14% (46–405 Tg C) higher emissions compared with current management practices over the next 20 years.

In our study region, we found that thinning reduced NBP under all three treatment scenarios for 13 of the 19 ecoregions, representing 90% of the region's forest area. The exceptions where NBP was not reduced were primarily due to high initial fire emissions

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[432] Chiono, Lindsay 2011. Balancing the Carbon Costs and Benefits of Fuels Management. Research Synthesis for Resource Managers. Joint Fire Science Program Knowledge Exchange. https://static.squarespace.com/static/50083efce4b0c6fedbca9def/t/51632bf8e4b00b25a8fa21d3/1365453816037/CFSC_Chiono_Carbon_and_Fuel_Mngmt.pdf

[433] Gail Kimball, March 2009 Testimony before House Committee On Natural Resources, Subcommittee On National Parks, Forests, And Public Lands. http://www.fs.fed.us/congress/111thCongress/Documents/CY%202009%20Hearings/HNRC%202009-03-03%20Climate%20Change/2009-03-03A.Kimbell.pdf.

compared to NEP (for example, Northern Basin and North Cascades; Supplementary Fig. S2). The dominant trend at the ecoregion level was mirrored at the regional level, with the bioenergy production scenario (highest thinning level) resulting in the region becoming a net carbon source (Supplementary Table S2 and discussion of state-level estimates). Regionally, forest biomass removals exceeded the potential losses from forest fires, reducing the in situ forest carbon sink even after accounting for regrowth, as found in previous studies with different approaches or areas of inference8,18.

Because we have assumed high reductions in fire emissions for the areas treated in each scenario, it is unlikely we are underestimating the benefit of preventive thinning on NBP.[434]

North and Hurteau (2009) note that the carbon costs of fuel reduction may be mitigated by focusing on small fuels -

When evaluating carbon released by different fuels treatments, managers will need to weigh tradeoffs between immediate prescribed burn emissions, increased fuel reduction with thinning and an increase in milling waste, and potential future wildfire emissions. ... Previous Teakettle studies (Innes et al. 2006, North et al. 2007, Hurteau and North 2009) coupled with this research suggest treatments could be modified to more effectively minimize carbon stock reductions while still significantly reducing fuels and promoting large tree development. Significant increases in wildfire resistance can be achieved by thinning only smaller ladder fuels and fire-sensitive intermediate trees without reducing the majority of the live-tree carbon pool in intermediate pines and large trees of all species. ... Thinning and prescribed fire treatments that reduce small tree densities may influence stand development by redirecting growth resources and carbon storage into more stable stocks such as large, long-lived fire-resistant pines (Hurteau and North 2009). ... Our research suggests most of the benefits of increased stand-level fire resistance can be achieved with small reductions in carbon pools.[435]

XV. THE DEIS UNDERESTIMATES THE SOCIAL COST OF CARBON

NEPA's requirement to take a "hard look" requires BLM to consider the effects of logging-related GHG emissions. This includes disclosing the social cost of carbon (SCC) as a proxy for the impacts of GHG emissions. GHG emissions from logging (and other land management activities) impose significant costs on society, such as the cost of damage caused by climate

[434] Tara W. Hudiburg, Beverly E. Law, Christian Wirth, and Sebastiaan Luyssaert. 2011. Regional carbon dioxide implications of forest bioenergy production. Nature - Climate Change. Letters. 23 OCTOBER 2011 | DOI: 10.1038/NCLIMATE1264.
http://www.dnr.wa.gov/Publications/em_fp_biomass_regional_carbon_dioxide_implications_of_forest_bioenergy_production.pdf

[435] North, Hurteau, Innes. 2009. Fire suppression and fuels treatment effects on mixed-conifer carbon stocks and emissions. Ecological Applications, 19(6), 2009, pp. 1385–1396.
http://www.plantsciences.ucdavis.edu/affiliates/north/Publications/Eco%20Apps%20article%20North%20et%20al%20Fuel%20treatments%20forest%20carbon.pdf

change and ocean acidification, the costs of adapting to climate change, and the cost of sequestering carbon to mitigate emissions. CEQ's draft guidance on NEPA and Climate Change recognizes that the social cost of carbon ("SCC") is a "harmonized, interagency metric that can provide decision-makers and the public with some context for meaningful NEPA review." 79 Fed. Reg. 77802, 77827. "The SCC estimates the benefit to be achieved, expressed in monetary value, by avoiding the damage caused by each additional metric ton (tonne) of carbon dioxide (CO2) put into the atmosphere. Ruth Greenspan and Dianne Callan, World Resources Institute, More than Meets the Eye: The Social Cost of Carbon in U.S Climate Policy, in Plain English (July 2011) at 1. The EIS should carefully disclose these social costs. The express purpose of SCC analysis is to provide an apples-to-apples basis for comparing a project's economic benefits (e.g. timber receipts) with GHG pollution impacts (Social Cost of Carbon). Where SCC is not analyzed and disclosed, these impacts (costs) are hidden from the public and, in fact, often "paid for" by the broader environment and public in the form of degraded ecological resiliency, public health impacts, and more.

The DEIS (p 483) made two estimates of the Social Cost of Carbon Dioxide ($37/tonne and $109/tonne based on the expected *average* SCC and the *95th percentile* case) and concludes "Of the two estimates presented, the BLM considers the "average" scenario to be more likely." BLM needs to explain why they think the average case is more likely. There is a lot of evidence that the average case vastly under-estimates the true social cost of carbon pollution. The Interagency Working Group that developed these estimates admits that they did not include all the costs of greenhouse gases emissions in their estimates, (e.g. ocean acidification). Furthermore, the IPCC report-writing process tends to be conservative in estimating the effects of climate change. Extreme outcomes tend to be discounted until the evidence supporting them is highly compelling. Nevertheless, there is a real and significant possibility that extreme climate outcomes will occur and high social costs will manifest. Several sources support this:

- Glenn Scherer and DailyClimate.org 2012. Climate Science Predictions Prove Too Conservative - Checking 20 years worth of projections shows that the Intergovernmental Panel on Climate Change has consistently underestimated the pace and impacts of global warming. December 6, 2012. http://www.scientificamerican.com/article/climate-science-predictions-prove-too-conservative/ ("Across two decades and thousands of pages of reports, the world's most authoritative voice on climate science has consistently understated the rate and intensity of climate change and the danger those impacts represent, say a growing number of studies on the topic.").

- Chris Mooney 2014. The world's climate change watchdog may be underestimating global warming. October 30, 2014. http://www.washingtonpost.com/blogs/wonkblog/wp/2014/10/30/climate-scientists-arent-too-alarmist-theyre-too-conservative/ ("According to a number of scientific critics, the scientific consensus represented by the IPCC is a very conservative consensus. IPCC's reports, they say, often underestimate the severity of global warming, in a way that may actually confuse policymakers (or worse). The IPCC, one scientific group charged last year, has a tendency to "err on the side of least drama." And now, in a new study just out in the Bulletin of the American Meteorological Society, another group of researchers echoes that point. In scientific parlance, they charge that the IPCC is focused on avoiding what are called "type 1" errors -- claiming something is happening when it really is not (a "false positive") --

rather than on avoiding "type 2" errors -- not claiming something is happening when it really is (a "false negative"). The consequence is that we do not always hear directly from the IPCC about how bad things could be.").

- SkepticalScience.com. How the IPCC is more likely to underestimate the climate response http://www.skepticalscience.com/ipcc-scientific-consensus.htm ("A recent study (Freudenburg 2010) investigated what it calls 'the Asymmetry of Scientific Challenge', the phenomenon in which reports on science fail to evaluate all outcomes, favoring certain probabilities while ignoring others. In the case of the IPCC, the researchers found that the media steadfastly challenge the predictions on the basis that they are exaggerated, worst-case scenarios. What they fail to speculate on is whether the opposite is true; that it may be equally correct to suggest that things might be far worse.

Niemi (2015) prepared a critique showing that BLM under-estimated the Social Cost of Carbon and explained how the analysis can be improved:

> **Summary**
> *Actions that reduce the amount of carbon stored in federal forests contribute to disruption of the global climate by increasing atmospheric concentrations of carbon dioxide. The climate disruption raises the risk of economic harm—locally, nationally, and globally—from extreme weather events, higher temperatures, changes in precipitation, rising sea levels, acidification of oceans, and changes in ecosystems. Laws and executive orders require managers of federal forests to account for these risks. This paper describes the recent failure of the Bureau of Land Management (BLM), to satisfy the requirements. It also describes the steps the BLM must take to meet its obligations, and illustrates the method the BLM and other federal forest management agencies should use to account for carbon-related risks in the future.*
>
> *The BLM failed to account for climate-related risks when it selected its Preferred Alternative for managing federal forests in western Oregon. If implemented, this alternative would yield more timber but less forest carbon than another alternative. Using old data and a conservative view of risk, the BLM provided information that indicates the additional climate-related costs may:*
> *• Outweigh the additional timber-related benefits by 2-to-1.*
> *• Equal $91,000 per additional timber-related job.*
> *• Equal $4 for every $1 of additional timber-related payments to local counties.*
> *Current data, plus a widely accepted view of risk indicates the additional climate-related costs may:*
> *• Outweigh the additional timber-related benefits by more than 30-to-1.*
> *• Equal $1.6 million per additional timber-related job.*
> *• Equal $68 for every $1 of additional timber-related payments to local counties.*
> *The BLM disregarded this information when choosing its Preferred Alternative. To satisfy its legal and administrative requirements, the BLM should fully and clearly describe the climate related risks that accompany the Preferred Alternative, and explain its justification for imposing these risks on the individuals, households, businesses, and communities that would bear them. This justification should address both the reduction in overall economic wellbeing that would result from implementing the Preferred*

> *Alternative and the moral issues that arise from imposing climate-related risk on those that would not enjoy the timber benefits.*[436]

Niemi (2015) explained that, "Moore and Diaz (2015) found that accounting for the impacts of climate on economic growth increases the Interagency Working Group's estimates of the social cost of carbon by a factor of six." [437]

One way that economists deal with uncertain outcomes with high social costs is to account for uncertainty itself as a cost. The DEIS (p 502) says the analysis "addresses the value of carbon storage from a social perspective, where the value of carbon storage is derived from nonmarket valuation techniques such as avoided cost and avoided risk." However, the EIS does not fully account for uncertainty so it underestimates the value of conserving forests to avoid risk.

The agency must recognize that the federal estimate of SCC likely underestimates—perhaps significantly—the climate impacts of GHG pollution. As the U.S. Environmental Protection Agency has concluded:

> *Given current modeling and data limitations, [the federal SCC values] do[] not include all important damages. As noted by the IPCC Fourth Assessment Report, it is "very likely that [SCC] underestimates" the damages. The models used to develop SCC estimates, known as integrated assessment models, do not currently include all of the important physical, ecological, and economic impacts of climate change recognized in the climate change literature because of a lack of precise information on the nature of damages and because the science incorporated into these models naturally lags behind the most recent research.*[438]

Ackerman & Stanton (2010) do not support using the average or "central estimate":

> *Agencies seeking to incorporate climate change considerations in rules and regulations often rely on a cost-benefit analysis, weighing the cost of curbing emissions against the expected damages from every ton of carbon dioxide (CO2) that goes into the atmosphere*

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[436] Niemi, E. 2015. Accounting for Climate-Related Risks In Federal Forest-Management Decision, 10 May 2015 [draft]. Federal Forest Carbon Coalition Background Paper 2015–2. http://static1.1.sqspcdn.com/static/f/551504/26259333/1432605642583/SocialCostsOfCarbonOClandsNiemiMay2015.pdf?token=wDqoa5RkP8EoBLlsRWIPPRuahzg%3D

[437] c*iting* Moore, F.C., and D.B. Diaz. 2015. "Temperature Impacts on Economic Growth Warrant Stringent Mitigation Policy." Nature Climate Change. 12 January. http://www.eenews.net/assets/2015/01/13/document_cw_01.pdf ("Optimal climate policy in this model stabilizes global temperature change below 2 ◦C by eliminating emissions in the near future and implies a social cost of carbon several times larger than previous estimates. A sensitivity analysis shows that the magnitude of climate change impacts on economic growth, the rate of adaptation, and the dynamic interaction between damages and GDP are three critical uncertainties requiring further research. In particular, optimal mitigation rates are much lower if countries become less sensitive to climate change impacts as they develop, making this a major source of uncertainty and an important subject for future research.")

[438] EPA, The Social Cost of Carbon, http://www.epa.gov/climatechange/EPAactivities/economics/scc.html.

— a value known as the "social cost of carbon" (SCC). … While no definite SCC has been set so far, an interagency working group has endorsed a "central" estimate of $21 per ton of CO2 in 2010, or roughly 20 cents per gallon of gasoline — far too small a price incentive to prompt substantive mitigation measures.

In the United Kingdom, which started estimating prices for carbon emissions several years ago, the government's latest calculation is a range of $41 – $124 per ton of CO2, with a central case of $83. An expanded calculation of carbon prices for the United States should at least explore prices in this range …[439]

The 2006 "Stern Review" from the UK Treasury concluded that each ton of carbon dioxide emitted will cause $85 worth of damage to the world's economy.[440] According to the Congressional Research Service, capturing and storing most of the carbon from coal as it is combusted costs between $43-89/ton of CO_2, and this price will likely increase after the many safety, environmental, and efficiency problems with carbon capture and storage (CCS) are fully accounted for. [441] That's another good indication of the value of a storing a ton of carbon in forests.

ABSTRACT: The 2013 Interagency Working Group on the Social Cost of Carbon (IWG) updated the U.S. social cost of carbon (SCC) for 2015 from a central value of $24 to $37 using three integrated assessment models (IAMs): DICE-2010, FUND 3.8, and PAGE09. The SCC is the additional economic damage caused by one ton of carbon dioxide. While some have questioned the increase in the SCC as too high, a thorough examination of the latest scientific and economic research shows that $37 should be viewed as a lower bound. This is because the studies available to estimate the SCC omit many climate impacts—effectively valuing them at zero. Where estimates are available for a given type of impact, they tend to include only a portion of potential harms. This paper represents the first attempt to systematically examine and document these omissions for the latest versions of the three IAMs used by the IWG, as well as earlier versions when they are used in calibrating the updated models. … [H]ot spot damages include[e] increases in forced migration, social and political conflict, and violence; weather variability and extreme weather events; and declining growth rates. A better accounting of catastrophic damages is also needed, as well as many other impacts.[442]

We reestimate the values from the models (1) using a range of discount rates and methodologies considered more appropriate for the very long time horizons associated with climate change and (2) using a methodology that assigns "equity weights" to

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[439] Frank Ackerman, Elizabeth A. Stanton. 2010. The Social Cost of Carbon - A Report for the Economics for Equity and the Environment Network. April 1, 2010. http://www.e3network.org/papers/SocialCostOfCarbon_SEI_20100401.pdf.

[440] http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm.

[441] Parker, Folger & Stine. 2008. Capturing CO2 from Coal-Fired Power Plants: Challenges for a Comprehensive Strategy. CRS Report for Congress. http://www.fas.org/sgp/crs/misc/RL34621.pdf *citing* S. Julio Friedmann, Carbon Capture and Sequestration As a Major Greenhouse Gas Abatement Option (November 2007), p. 11.

[442] Howard, P. 2014. OMITTED DAMAGES: What's Missing From the Social Cost of Carbon. http://costofcarbon.org/files/Omitted_Damages_Whats_Missing_From_the_Social_Cost_of_Carbon.pdf

damages based upon relative income levels between regions—i.e., a dollar's worth of damages occurring in a poor region is given more weight than one occurring in a wealthy region. Under our alternative discount rate specifications, we find an SCC [social cost of carbon] 2.6 to over 12 times larger than the Working Group's central estimate of $21"…[443],[444] *If the agency chooses to disclose the economic and other benefits of logging, they must also disclose the social costs.* [445]

ENVIRONMENTAL JUSTICE

In spite of the DIES admission that the timber industry is inherently volatile and increased timber harvest may have an adverse effect on community stability, as well as the high social cost of carbon, the DEIS (p 472) still concludes that alternatives with more logging (e.g., alternatives B and C) will provide greater benefits in terms of "community capacity and resiliency" and environmental justice. BLM chose 13 metrics of community capacity and resiliency, but these were chosen among a larger set of metrics. We are concerned that the subset of metrics chosen failed to accurately reflect the community benefits of forest conservation. BLM's analysis of these issues need to better reflect the adverse effects of timber industry volatility and the fact that the cost of climate change will fall disproportionately on the poor and disadvantaged communities. BLM also limited it's analysis to communities in the planning area even though the adverse effects of climate change and ocean acidification will be felt far beyond that limited geographic scope.

University of California-Berkeley environmental health scientist Rachel Morello-Frosch studied low-income communities in the U.S. and found something she calls a "climate gap" -

The effects of climate change would likely hit hardest in places with the fewest resources to adapt. And we're not just talking about the developing world or tiny island nations. …

… the climate gap describes a hidden pattern that we have found that indicates that communities of color and poor households within the United States are gonna be suffering more from the economic and health consequences of climate change than other Americans. In other words the climate gap is not only an international question, which has been the focus of a lot of climate change debates over the years, it's also very much an acute domestic problem within the United States.[446]

Morello-Frosch's reports includes:

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[443] Laurie T. Johnson & Chris Hope, 2012. The social cost of carbon in U.S. regulatory impact analyses: an introduction and critique, J Environ Stud Sci. DOI 10.1007/s13412-012-0087-7. http://www.springerlink.com/content/863287021p06m441/fulltext.pdf?MUD=MP

[444] See *High Country Conservation Advocates v. U.S. Forest Service*, — F.Supp.3d —, 2014 WL 2922751 (D. Colo. June 27, 2014) (holding that BLM's NEPA analysis of climate change impacts was inadequate, and that the EIS must provide a justification for not using the social cost of carbon as a protocol to evaluate impacts).

[445] See *Sierra Club v. Sigler*, 695 F.2d 957, 979 (5th Cir. 1983), *Hughes River Watershed Conservancy v. Glickman*, 81 F.3d 437, 448 (4th Cir. 1996); *Columbia Basin Land Prot. Assn v. Schlesinger*, 643 F.2d 585, 594 (9th Cir. 1981).

[446] Climate Change and America's Poor. Living on Earth Radio Transcript. Air Date: Week of June 12, 2009.

http://loe.org/shows/segments.html?programID=09-P13-00024&segmentID=2.

Key Findings

> *There is a climate gap. The health consequences of climate change will harm all Americans—but the poor and people of color will be hit the worst.*
>
> ***What hasn't made headlines—yet—is the climate gap: the disproportionate and unequal impact the climate crisis has on people of color and the poor.*** *Unless something is done, the consequences of America's climate crisis will harm all Americans—especially those who are least able to anticipate, cope with, resist and recover from the worst consequences. This analysis is of California, which in many ways is a microcosm of the entire United States.*
>
> *Climate change is an issue of great importance for human rights, public health, and social fairness because of its profound consequences overall and the very real danger that poor neighborhoods and people of color will suffer even worse harms and hazards than the rest of Americans. This "climate gap" is of special concern for California, home to one of the most ethnically and economically diverse populations in the country.*
>
> ***The climate gap means that communities of color and the poor will suffer more during extreme heat waves.*** *For instance, African Americans in Los Angeles are nearly twice as likely to die from a heat wave than other Los Angeles residents, and families living below the poverty line are unlikely to have access to air conditioning or cars that allow them to escape the heat.*
>
> ***The climate gap means that communities of color and the poor will breathe even dirtier air.*** *For example, five of the smoggiest cities in California also have the highest densities of people of color and low-income residents. These communities are projected to suffer from the largest increase in smog associated with climate change.*
>
> ***The climate gap means that communities of color and the poor will pay more for basic necessities.*** *Low-income and minority families already spend as much as 25 percent of their entire income on just food, electricity and water—much more than most Americans.*
>
> ***The climate gap is likely to mean fewer job opportunities for communities of color and the poor.*** *The climate crisis may dramatically reduce or shift job opportunities in sectors such as agriculture and tourism, which predominantly employ low-income Americans and people of color.* [447]

California's Office of the Attorney General prepared a report on the "unequal impacts" of global climate change, saying -

> *Global warming will not affect everyone equally. As the Office of Environmental Health Hazard Assessment stated in its 2010 report, the adverse impacts of climate change are expected disproportionately to affect those who are socially and economically*

[447] Rachel Morello-Frosch, Ph.D., MPH | Manuel Pastor, Ph.D. | James Sadd, Ph.D. | Seth B. Shonkoff, MPH. The Climate Gap - Inequalities in How Climate Change Hurts Americans & How to Close the Gap. http://loe.org/images/content/090612/ClimateGapReport_full_report_web.pdf (emphasis in original).

disadvantaged, including the urban poor, the elderly, children, traditional societies, agricultural workers and rural populations. Disproportionate impacts can occur where certain groups lack the social and economic resources necessary to relocate to avoid impacts, or to purchase the technology necessary to adapt to our changing climate. According to a 2009 report by California's Climate Change Center, "[w]ithout proactive policies to address these equity concerns, climate change will likely reinforce and amplify current as well as future socioeconomic disparities, leaving low-income, minority, and politically marginalized groups with fewer economic opportunities and more environmental and health burdens."[448]

Lynn et al (2011) state:

The effects of climate change are expected to be more severe for some segments of society than others because of geographic location, the degree of association with climate-sensitive environments, and unique cultural, economic, or political characteristics of particular landscapes and human populations. Social vulnerability and equity in the context of climate change are important because some populations may have less capacity to prepare for, respond to, and recover from climate-related hazards and effects. Such populations may be disproportionately affected by climate change. … [C]onsiderations that pertain to the effects of climate change on socially vulnerable populations are identified.[449]

BLM's analysis of environmental justice must include the full geographic scope of the impacts of climate change. Many of the adverse social impacts of climate change will occur elsewhere in the U.S. and the world.

One important way to avoid unequal distribution of the costs of climate change is to avoid those costs in the first place. EPA just released a report on the impacts of climate change and the value of mitigation. They only looked at environmental justice in one section of the report dealing with coastal property impacts such as sea level rise, but they found that many disadvantaged communities along the west coast are especially vulnerable and would benefit from mitigation efforts (such as optimizing carbon storage in BLM forests). "Areas of higher social vulnerability are more likely to be abandoned than protected in response to unmitigated sea level rise and storm surge." The basic message is that taking action to store carbon today helps avoid imposition of high costs of adaptation on communities least able to afford those costs.[450] The example of coastal property damage is just a small part of the environmental justice implications of climate change. As another example, the cost of any adverse health impact associated with

[448] State of California Department of Justice - Office of the Attorney General. https://oag.ca.gov/environment/climate-change/unequal-impacts *referencing* Linda Mazur, Carmen Milanes, Karen Randles, David Siegel, 2010. INDICATORS OF CLIMATE CHANGE IN CALIFORNIA: ENVIRONMENTAL JUSTICE IMPACTS December 2010. http://oehha.ca.gov/multimedia/epic/pdf/ClimateChangeEJ123110.pdf

[449] Kathy Lynn, Katharine MacKendrick, and Ellen M. Donoghue. 2011. Social Vulnerability and Climate Change: Synthesis of Literature. General Technical Report, PNW-GTR-838, August 2011. http://www.fs.fed.us/pnw/pubs/pnw_gtr838.pdf

[450] EPA 2015. Climate Change in the United States: Benefits of Global Action. http://www2.epa.gov/cira/downloads-cira-report; http://www2.epa.gov/sites/production/files/2015-06/documents/coastalproperty.pdf

climate change will fall disproportionally on poor people with limited access to health care. In fact, nearly all future adaptation costs caused by global climate change will fall unfairly on those least able to pay.

BLM should adopt an alternative that minimizes carbon emissions and timber harvest and maximizes forest carbon store and other non-consumptive ecosystem services.

I. BLM SHOULD OPTIMIZE FOREST CARBON STORAGE TO HELP MEET CLIMATE MITIGATION GOALS

The DEIS should disclose whether the cumulative effects of logging-related GHG emissions are consistent with emissions reduction goals established by state and federal government and international agreements.

In 2007, the Oregon legislature passed HB 3543 that codifies greenhouse gas reduction goals for the state: namely, by 2010 to begin to reduce greenhouse gas emissions, by 2020 to achieve greenhouse gas levels 10% less than 1990 levels and by 2050 to achieve greenhouse gas levels 75% below 1990 levels. ORS § 468A.205. Logging-related GHG emissions will conflict with attainment of these goals. Greater conservation of BLM forests will help meet these goals.

BLM should also strive to harmonize with State of Oregon statewide land-use planning goals (adopted in administrative rules) that prohibit land use activities that exceed the "carrying capacity" of air and water resources. OAR 660-015-0000(5) - (6). The Department of Land Conservation and Development (DLCD) defines "carrying capacity" as a "Level of use which can be accommodated and continued without irreversible impairment of natural resources productivity, the ecosystem and the quality of air, land, and water resources." There is a large body of science indicating that we are already beyond the level of CO2 in our atmosphere that can be described as safe or reversible.

> *In November 2014, in a historic joint announcement with China, President Obama laid out an ambitious but achievable target to reduce greenhouse gas emissions in the United States in the range of 26 to 28 percent below 2005 levels by 2025.* [451]

On June 25, 2013, President Obama released his Climate Action Plan, which includes forest conservation among the "first pillar"[452] of efforts to reduce emissions, saying:

> *Preserving the Role of Forests in Mitigating Climate Change: America's forests play a critical role in addressing carbon pollution, removing nearly 12 percent of total U.S. greenhouse gas emissions each year. … Conservation and sustainable management can help to ensure our forests continue to remove carbon from the atmosphere…* [453]

Advancing efforts to protect our forests" is also mentioned in the 6th U.S. Climate Action Report under the United Nations Framework Convention on Climate Change (UNFCCC). The agency should advance this national climate goal by conserving public forests. Carbon emissions from

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[451] https://www.whitehouse.gov/climate-change; https://www.whitehouse.gov/the-press-office/2014/11/11/fact-sheet-us-china-joint-announcement-climate-change-and-clean-energy-c

[452] U.S. Dept of State 2013. draft 6th Climate Action Report http://www.state.gov/e/oes/climate/ccreport2014/index.htm (page 12).

[453] http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf

logging public lands directly conflict with this important national goal and indicate potential significant impacts requiring an EIS.

Logging related GHG emissions (and forgone opportunities for increased storage of carbon in forests) will conflict with these state, federal and international GHG reduction goals.

COMMUNITY STABILITY AND PROSPERITY

BLM appears to be emphasizing "sustained yield" for its own sake, while sacrificing opportunities to increase carbon storage and recreation, even though the DEIS clearly shows that the economic value of recreation and carbon storage on BLM lands greatly exceed the value of wood products. This makes no sense. BLM needs to consider alternatives that do more to optimize carbon storage, provide more low-impact recreation opportunities, and produce other ecosystem services and non-commodities. Sustained yield should not be a goal unto itself, but an outcome of sound forest conservation.

Goals related to timber production and carbon storage are in direct conflict with each other. Alternatives that increase logging and increase timber revenue, sacrifice economic benefits of carbon storage that vastly exceed the value of wood products. Furthermore, increased logging tends to be destabilizing to local communities, while emphasizing non-consumptive ecosystem services will tend to have a stabilizing economic influence. All these economic factors should play an important role in BLM's final choice among alternatives. BLM should maximize economic benefits for public lands management by minimizing logging and emphasizing non-consumptive values like clean water, carbon storage, biodiversity conservation, and low impact recreation.

The DEIS creates the appearance of a false dichotomy: timber jobs vs recreation jobs, e.g., Table 3-177 (DEIS p 536). The EIS needs to reflect the fact that "recreation" is far too narrow view of the economic alternative to logging, because forest conservation provides economic benefits across virtually every sector of the economy. It is more accurate to recognize that Oregon's greatest economic asset is our quality of life which offers a "second paycheck" to every Oregonian and attracts high quality workers and diverse new businesses that want to hire those people. The DEIS needs to accurately reflect the fact that conserving BLM forest contributes to Oregon's quality of life, while timber harvest degrades habitat, water quality, climate stability, scenic views, and harms Oregon's quality of life. The choice is not timber versus recreation, but rather, timber versus every other economic sector in the state that depends very much on the flow of these ecosystem services to support its diversified economy.

The DEIS (p 545) says "Changes in timber harvest are the primary influences on projected future BLM-based employment and earnings in local economies in the planning area. This is because changes by alternative for other resources are either unavailable or very small." There are several problems with this analysis:

- The conclusion that BLM can positively influence the local timber economy is brought into question by the fact that the timber industry is volatile, declining, and subject to a wide range of forces beyond BLM's control, e.g., "commodity-based industries are subject to the highs

and lows of business cycles not only in the United States, but also internationally." DEIS (p 568).

- BLM assumes inappropriately that recreation and other economic sectors are insensitive to logging on BLM lands. This ignores the fact that logging degrades not only the recreation experience, but also degrades a wide variety of ecosystem services and amenity values that must be carefully conserved in order to sustain and grow other sectors of the economy. BLM needs to disclose the fact that the overall economy is likely to thrive, not just "in spite" of reductions in federal log supply caused by increased emphasis on conservation, but "because" of greater conservation of public lands.[454]
- This conclusion also ignores the adverse effects of volatility in the wood products sectors, which diminishes the social value of jobs in those sectors and adds to a variety of social problems related to job insecurity. "If industries increase that exhibit historic instability, they may inject greater economic instability into their host communities." DEIS (p 568).

DEIS (p 569) says "Industrial specialization can be beneficial to an area, though it may, at the same time, subject the area to greater volatility. Growth and stability are both important though sometimes competing concepts in a portfolio of economic growth and development considerations." This seems to imply that BLM can stimulate increased rates of economic growth by increasing federal timber supply. The DEIS fails to recognize that this is highly unlikely given the fact that the timber industry is a mature industry that is stagnant and declining relative to other sectors that are growing much faster.

The DEIS failed to adequately consider trends. For instance, timber jobs are trending down; recreation (and other) jobs are trending up.

> *Between 1990 and 2000, employment grew by 29 percent in the 72 counties in the Plan area. During the same period, manufacturing grew by 3 percent, compared to 56 percent employment growth in the services sector. Most of the other major industries grew at rates varying between 23 and 32 percent (fig. 3-1). [p 37]*
>
> *Federal forests were becoming highly valued for recreation, visual quality, and the protection of water, wildlife, and fish. The regional economy was also maturing. Agriculture and industries based on the extraction of forest resources showed little growth. The percentage of people in the region whose livelihood was based on the extraction of goods and services from federal lands shrank. [p 38]*
>
> *The total decline of 30,000 jobs in the primary processing industries (SIC 24 and SIC 26) [during the 1990s] is contrasted to changes in total employment across all industries in the Plan area. During the 1990s, there was an increase in total employment of 1.4 million jobs. Primary wood-products processing accounted for 2 percent of all jobs in the Plan area in 1990 and dropped to 1 percent by 2000. [p 41]*[455]

[454] See Neimi, Whitelaw, & Johnston 1999. The Sky Did NOT Fall. ECONorthwest. http://pages.uoregon.edu/whitelaw/432/articles/SkyDidNotFallFull.pdf

[455] USDA/USDI. 5-volume Northwest Forest Plan, 10-Year Socioeconomic Monitoring Report, http://www.fs.fed.us/pnw/publications/gtr649/pnw-gtr649_vol3_pt5.pdf.

Other notable economic trends include:

- Declining real wages in the timber industry, especially when compared to other industries. It does not makes sense to encourage growth in an industry that is systematically trying to break-up unions, reduce wages, reduce benefits, etc.
- Declining jobs per million board feet of timber harvest. If the goal is to create jobs, it does not make much sense to feed more public wood to an industry that uses more machines and computers and fewer people.
- Shrinking share of total employment in the timber industry relative to the economy as a whole. It is unwise economic policy to prop up declining/polluting industries like timber. It is better to focus limited public resources on clean, growing industries.
- Increasing consolidation in the industry. Jobs are becoming concentrated in areas near the I-5 corridor, where communities have more options for economic growth and diversification. BLM cannot stop this trend by increasing the wood supply.
- "Areas with high levels of natural amenities have enjoyed growing populations and income levels in the past decade. Much of this growth has come from the immigration of people with income from self-employment or investments. These new migrants are usually well-educated and often work as executives or professionals or in such industries as finance, insurance, and real estate or business services. Communities may find that policies that enhance the quality of life (better schools, environmental protection, etc) can attract more of these people who are in a financial position to act upon their residential preferences. This in turn can stimulate economic development." [456]

Many of the tables in the socio-economic section of the DEIS are labelled "total jobs" even though the DEIS really only looked at timber jobs and recreation jobs, and failed to disclose amenity-induced job creation. "Total jobs" should not be used to describe jobs in just two sectors of the economy.

The DEIS makes several statements about conservation alternatives causing "disproportionately negative economic effect" for certain counties, but these conclusions do not consider all of the economic factors or even all of the job creation factors.

The DIES implicitly recognizes that lands close to communities are disproportionately valuable for recreation. DEIS (p 489) says that BLM manages about 50% of the land located within 30-minute driving time of the 12 largest communities in western Oregon, and 34% within 60-minute driving time. However, the DEIS also implies that the economic value of recreation is similar across alternatives. DEIS (p 526) says that the economic value of $250 million for recreation is "consistent across all alternatives." This fails to recognize that logged over lands are far less desirable for recreation. Logged areas are unsightly and tend to have a lot of trip-hazards from brush and logging debris, plus a lot of thistles and blackberries which are barriers to recreation. The EIS should disclose how much of the BLM land within 30 and 60-minute driving time is in timber harvest land allocation versus reserve land allocations. The EIS must disclose the adverse

[456] Peter B. Nelson. 1999. Quality of Life, Nontraditional Income, and Economic Growth New Development Opportunities for the Rural West. Rural Development Perspectives, vol. 14, no. 2. http://www.ers.usda.gov/publications/rdp/rdpsept99/rdpsept99e.pdf

economic impact of increased timber harvest within a 60 minute drive of communities large and small.

The DEIS uses economic multipliers from OFRI which tend to inflate the economic importance of the timber industry.

To understand local communities, the ID Team interviewed elected officials. These people have a clear economic conflict of interest, so they are unlikely to provide unbiased information about the overall wants and needs of the county with respect to public lands.

The DEIS does not accurately represent the relationship between big cities/small cities. Money flows from big cities to small, so small cities will enjoy trickle down benefits if BLM emphasizes conservation and amenity-based economic growth, even if those effects are felt first in larger cities.

BLM's attempt to switch from thinning back toward regeneration might gain some economic efficiency in terms of sale preparation and logging implementation, but it also creates uncertainty in terms of social acceptability of clearcutting and risk of litigation. The DEIS did not account for this.

The analysis assumes that BLM is a "price taker." This means that BLM has such a minor effect on supply that the market does not notice if they supply more or less timber and prices do not change. This has a variety of implications in terms of "leakage" in the carbon storage analysis, etc.

I. DEIS ANALYSIS OF NON-MARKET ECONOMIC VALUES NEEDS IMPROVEMENT

DEIS Tables 3-159 and 3-173 provides some information on non-consumptive and non-market economic values but this analysis is inadequate:

- The DEIS failed to quantify many economic benefits of conservation even though there are tools available to do so, such as surveys inquiring about people's "willingness to pay" for endangered species recovery, old growth restoration, biodiversity, etc...
- The DEIS failed to recognize variation among alternatives, and thus failed to recognize the value of conservation. The DEIS (P 480) says "it is not possible to calculate how BLM actions could affect the values of these goods and services using market prices." For instance, Table 3-173 seems to indicate that all the alternatives have similar economic values for recreation, which ignores the fact that logged lands are far less desirable for recreation. (See recreation comments) BLM can provide quantitative estimate of these economic impacts or at least predict the relative economic values based on each alternative's relative emphasis on logging versus conservation. The EIS must clearly reflect that fact that alternatives with greater conservation will tend to provide greater non-market economic benefits.
- The DEIS failed to integrate the extensive analysis of timber economics with these non-consumptive and non-market economic values. It is critical that the EIS provide some way of comparing the economic value of conservation versus logging. If the EIS puts a dollar value on timber, but leaves non-market values unquantified, the unavoidable effect will be to artificially elevate the importance of timber and devalue non-market economic benefits of conservation.

- The value of water quality protection is likely underestimated. The DEIS focused on source water protection for drinking watersheds. High quality water is valuable for many purposes other than drinking water, including: swimming, fishing, supporting biodiversity, diluting downstream pollution, etc. The DEIS needs to disclose the value of providing water quality that goes beyond the bare minimum necessary to meet legal requirements. The law allows some pollution, and BLM timber sales often contribute sediment to streams, but BLM can provide social and economic benefits by preventing any degradation of water quality.
- The DEIS fails to quantify and underestimates the economic value of conserving biodiversity. Maintaining biodiversity is critical for climate change mitigation, maintaining the genetic resources for developing future crops sources of medicine, preserving genes and proteins that could be useful in future technology, conserving pollination services, hunting/fishing/wildlife-watching, etc. The DEIS needs to disclose the value of providing biodiversity that goes beyond the bare minimum necessary to meet legal requirements. Instead of just striving to conserve threatened and endangered species, BLM should strive to prevent other species from being listed, and should strive to maintain and restore healthy populations of native wildlife. The law may allow some degradation of wildlife resources, and BLM regeneration timber sales often degrade habitat, but BLM can provide social and economic benefits by preventing degradation of biodiversity.

Table 3-159. Summary of economic value of goods and services derived from BLM-administered lands in western Oregon, 2012.

Good or Service	Type of Valuation	Economic Value in 2012
Biodiversity and Sensitive Species	Qualitative	Not Monetized
Carbon Storage	Non-Market	$99 million
Cultural Meaning	Qualitative	Not Monetized
Energy Production	Market	$0.032 million
Grazing	Market	$0.022 million
Minerals	Market	$0.015 million
Recreation	Non-Market	$222.8 million
Scenic Amenities	Qualitative	Not Monetized
Source Water Protection	Qualitative	Not Monetized
Special Forest Products	Market	BLM Revenue: $0.2 million; Market Value Low $0.4 million, Market Value High $6.5 million
Timber	Market	$20.8 million (Harvest Value)

[DEIS p 508]

Table 3-173. Table summary of effects on economic value of goods and services derived from BLM-administered lands in Western Oregon.

Good/Service	Type of Valuation	Economic Value in 2012	Impact by Alternative				
			No Action	Alt. A	Alt. B	Alt. C	Alt. D
Biodiversity and Sensitive Species	Qualitative	Not Monetized	-	Lower value/less increase associated with less increase in structurally-complex forest.	Higher increase associated with more increase in structurally-complex forest.	Less increase associated with less increase in structurally-complex forest.	Higher increase associated with more increase in structurally-complex forest.
			-	Diminished economic well-being associated with less butterfly habitat. Economic values associated with species generally protected or enhanced in the long run.			
Carbon Storage	Non-Market ($ millions)	$99	$131.4	$179.3	$165.0	$54.6	$232.8
			Average per year 2013 - 2022				
Cultural Meaning	Qualitative	Not Monetized	Value of cultural sites and artifacts protected across all alternatives. Overall effect on cultural meaning impossible to assess at the present scale of analysis.				
Energy Production	Market	$0.032 million	Value of energy production across all alternatives limited by lack of demand. Supply of biomass would increase; Supply of land available for wind/ROW development would decrease.				
Grazing	Market	$0.022 million	No change in supply or value of grazing.				No grazing would reduce value to $0.
Minerals	Market	$0.015 million	Small change in acres available for quarry development would not likely be large enough to change quantity or value of minerals produced. No change in value of locatable or leasable minerals.				
Recreation	Non-Market ($ millions)	$222.8	$250.1 (Consistent under all alternatives)				
Scenic Amenities	Qualitative	Not Monetized	Potential 77% reduction in VRI Class II could reduce value of aesthetic resources	Potential 75% reduction in VRI Class II could reduce value of aesthetic resources	Potential 82% reduction in VRI Class II could reduce value of aesthetic resources	Potential 82% reduction in VRI Class II could reduce value of aesthetic resources	Potential 90% reduction in VRI Class II could reduce value of aesthetic resources
Source Water Protection	Qualitative	Not Monetized	No change under any alternative.				
Special Forest Products	Market	BLM Revenue: $0.2 million; Market Value Low $0.4 million, High $6.5 million	Changes in supply of lands suitable for the production of Category 1 and Category 2 species produce relatively small changes and would likely have a small effect on the overall supply, and thus the value, of each category of special forest product in the planning area.				
Timber	Market ($ millions)	$20.8	$93.0	$56.2	$72.9	$134.9	$37.4
			Average per year 2013 - 2022				

[DEIS p 526]

Several sources support our recommendation to take a broader view of the economic value of biodiversity, and the need for BLM to strive to do much more than just conserve species that are already listed:

> *Preserving biodiversity also means preserving a reservoir of as-yet-undiscovered medical treatments and cures. … Ecological policies that seek to preserve biodiversity and limit human influences on ecosystem organization may thus be in the best interest of public health, both because biodiversity can yield treatments for existing diseases and*

provide a buffer against exposure to emergent ones. … Conservation makes good sense in just the same way that preventive medicine does.[457]

[B]iodiversity is positively related to the ecological functions that underpin the provision of ecosystem services. … [E]cological restoration is likely to lead to large increases in biodiversity and provision of ecosystem services, offering the potential of a win-win solution in terms of combining biodiversity conservation with socio-economic development objectives.[458]

Recently, some scientists have expressed renewed interest in natural products research following the failure of alternative drug discovery methods to deliver lead compounds in key therapeutic areas such as immunosuppression, anti-infectives and metabolic diseases.

"Natural products research remains invaluable when it comes to providing that initial lead," Wani said. "Before we explored the Pacific Yew tree we had no idea that we could treat cancer and other diseases through microtubule overproduction."

Wani said such discoveries support his contention that "nature is the best chemist."

Another proponent of natural products research at RTI, Dr. David Kroll researches milk thistle compounds as a possible way to treat prostate cancer.

"The natural world has 10 times more chemical diversity than synthetic compounds," said Kroll, a senior research pharmacologist. "We just have to get to it in time." [459]

It is also important to conserve biodiversity because it could prove useful to humans in was that have not yet been investigated. Only a fraction of plant species have been tested for activity against cancer, AIDS, Alzheimer's, infectious bacteria, etc. For example, Research Triangle Institute International (RTI.org) is funded by a grant from the American Cancer Society, to test more than 10,000 mushroom extracts for the presence of chemicals that have potential as chemotherapy drugs. BLM forests harbor tremendous fungal diversity, much of which remains unsurveyed and unrecognized when logging projects are proposed.

[457] American Council on Science and Health. Why Biodiversity Is a Public Health Issue. November 2, 2005. http://www.acsh.org/factsfears/newsID.658/news_detail.asp.

[458] José M. Rey Benayas, Adrian C. Newton, Anita Diaz, and James M. Bullock. 2009. Enhancement of Biodiversity and Ecosystem Services by Ecological Restoration: A Meta-Analysis. Science 28 August 2009: 1121-1124.

[459] Taxol Pioneer Calls for Greater Emphasis on Natural Products Research , Feb 18, 2005.

http://www.rti.org/newsroom/news.cfm?obj=9BB6E900-3E77-4CEC-9EB6321166A3E61C.

THE COQUILLE LANDS

Reading the DEIS, we do not see clearly what BLM is proposing to do with the lands surrounding the Coquille Tribal Forest, but we do know that the BLM has been trying to decouple tribal management from BLM management standards.

In 1995, Congress granted the Coquille Tribe approximately 5,400 BLM lands with explicit conditions on forest management. It is Congress's intent, as written in law, that management of the Coquille Tribal Forest shall be managed "subject to the standards and guidelines of Federal forest plans on adjacent or nearby Federal lands, now and in the future." [460] BLM says it's purpose is to coordinate with the Coquille Tribe on management of "adjacent and nearby" BLM lands. This purpose will undermine Congressional intent by weakening standards on adjacent federal lands, for the express purpose of ensuring the Tribal forest is managed different than the rest of BLM lands. Congress' intent was to manage lands *similarly*, but the purpose of BLM's effort here is to ensure that tribal trust lands are managed *different* than most of BLM lands in western Oregon.

DEIS at 582 expressly states that, "The Tribe specifically wants to decouple management of the Coquille Forest from BLM management practices." BLM must not accommodate this decoupling because it very clearly violates Congressional intent that management of the tribal forest be coupled to management of BLM lands. Congress explicitly said management of the tribal forest shall be managed "subject to the standards and guidelines of Federal forest plans on adjacent or nearby Federal lands, now and in the future."[461] The phrase "subject to" makes clear that BLM management standards lead, and tribal forest management must follow.

We encourage BLM to coordinate with the Coquille Tribe (and others), especially developing and considering alternatives that will lead to meaningful advances in conservation and community stability.

DEAD AND DOWN WOOD STANDARDS

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, and at least 20% of birds in the western Oregon Doug-fir forests depend on snags for feeding or nesting.[462] 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,

[460] 25 U.S.C. 715c(d).
[461] Id.
[462] Hagar 2007, Cline et al. 1980.

which is the primary prey of the northern spotted owl, as well as the common merganser, silver haired bat, and fisher, and American marten.[463]

Many BLM special status bat species are also dependent on standing dead trees. These bats are associated with decadent live trees and large snags with sloughing bark, which are used variously as solitary roosts, maternity roosts, and hibernacula by bat species associated with Douglas-fir forests.

Over the past 100 years, most of Oregon's native old-growth forests have been logged, taking with them their potential to grow large, die naturally and become snags that provide essential wildlife habitat, and many parts of the management area are currently in a deficit of large snags. To protect this essential wildlife habitat, the Northwest Forest Plan establishes mandatory minimum snag retention standards for timber sales on federal public lands, which has been incorporated in to the existing BLM District RMPs: Retain snags in a timber harvest unit at levels sufficient to support species of cavity nesting birds at 40% of potential population levels. This 40% requirement must be met throughout the Matrix with per acre requirements met on areas averaging no larger than forty acres. *See e.g., Salem BLM RMP at 21*

The BLM's draft RMP for Western Oregon does away with this biologically-driven snag retention standard, replacing it with draft standards that treat existing and newly created snags as interchangeable, and averages the snag density standards across the "scale of the harvest unit" which could be hundreds, if not thousands, of acres.

While each alternative offers a slightly different quantification for snags, both existing and created, the approach is essentially the same: no specific snag retention standards – just a vague direction to "retain existing snags and existing down woody material during silivicultural treatments except for safety or operational reasons." This is coupled with the direction to create new snags at the time of harvest. *See RMP EIS at 962, 974, 984*. The lack of quantified retention standards coupled with a reliance on human-created snags poses the threat of significant habitat loss for snag-dependent species.

As large snags are required for the habitat requirements of many species but are in short supply due to past and present management the Western Oregon RMP should exclude stands with high snag densities from harvest, or utilize buffers in order to protect snags, particularly legacy snags.[464]

Ease of human access, along with timber harvest, has a significant negative impact on snag density.[465] Forest stands which are thinned retain snag densities approximately three times lower than in stands with no history of logging, and snag densities in forest stands adjacent to roads are approximately three times lower than those not adjacent to roads. [466]

None of the draft RMP EIS alternatives take the necessary steps to protect or retain existing snags, and so will exacerbates the current deficit of legacy snags. Since all alternatives allow for

[463] Aubrey & Raley 2002.
[464] Cline et al. 1980, Windom and Bates 2008.
[465] Windom and Bates, 2008.
[466] Id.

snags to be cut as needed for "safety or operational reasons" and do not include any protective buffers for legacy snags, the alternatives do not ensure that essential snag habitat 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 draft RMP fails does not explain how the BLM will maintain adequate snag density to provide for even minimum wildlife habitat needs. This is especially crucial because many of the management areas already exist in a state of insufficient snag density due to past management practices and numerous recent timber sales. A general statement of 'trying' to retain snags, which lacks any numeric standards or actual accountability, is insufficient to address the current snag deficiency crisis, or to ensure that existing snags are protected and retained.

I. CREATED SNAGS CANNOT BE RELIED ON TO PROVIDE QUALITY HABITAT

All the alternatives rely on the creation of new snags, rather than the specific retention of existing snags, to provide adequate wildlife habitat. There are two key problems with the approach that the draft RMP EIS did not adequately address. First, while snag density may be augmented by killing live trees, the range of diameters of the trees available in young stands from which to create snags may not be adequate for many cavity-using species. Snags < 50cm dbh are infrequently used as nest or roost sites by cavity-using wildlife in western Oregon (Mellen et al.: DecAID).

Second, there is a significant time lag between the creation of snags and their utility as habitat. A study that monitored 1,267 created snags in Willamette National Forest found trees killed within the last 10 years had little decay and had neither ant colonies nor adequate nesting roosting cavities. (Boleyn, et. al., 2002). Regarding the keystone snag species pileated woodpeckers, the study found foraging use in only 1.5% of created snags after 10 years. *Id.* A created snag is *not* interchangeable with an already existing snag as regards wildlife habitat needs and the RMP EIS should reflect this time lag and its impacts on species distribution after management actions that remove existing snags.

II. DEADWOOD RETENTION STANDARDS ARE NECESSARY IN RIPARIAN RESERVES

The draft RMP EIS does not seem to include snag and deadwood retention standards specific to Riparian Reserves. In fact, removing dead trees as needed for safety or operational reasons is explicitly allowed in Riparian Reserves, without any limitations on size of the tree or proximity to the waterbody.[467] A recently published peer-reviewed study by two research scientists from the National Oceanic and Atmospheric Administration (NOAA) directly addressed the need to retain large dead wood in Riparian Reserves, as it is the key driver of attaining riparian biodiversity.[468] The final management guidelines of the RMP should require a specific numeric standard for retention of large dead wood, both standing and downed, in Riparian Reserves.

[467] Draft RMP EIS at 917.
[468] Pollack & Beechie, 2014.

III. ADEQUATE SOURCES OF DEADWOOD ARE ESSENTIAL FOR SOIL PRODUCTIVITY

Retaining adequate sources of deadwood is also essential for long term soil health – an issue not addressed in the draft RMP's Management Direction for Soil, which focus primarily on limiting soil compaction and disturbance and does not include protecting the sources of long-term soil productivity.[469]

Soil and soil productivity are fundamental aspects of forested ecosystems that influence 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. [470]Large woody debris (LWD) provides important sources of organic matter and nutrients in soils, which are vital to the long-term maintenance and protection of soil productivity.[471]

Despite these the well-known importance of LWD to soil productivity the draft RMP EIS fails to disclose that scientific information has repeatedly noted that one of the most effective, efficient and important ways to restore degraded soil productivity is to retain all sources of LWD and organic matter and prevent additional soil disturbances in degraded areas. (Kattlemann, 1996; Beschta et al., 2004). The final RMP EIS should include specific numeric standards for retention of existing LWD in all management areas sufficient to provide for both habitat and long-term soil productivity.

LANDS WITH WILDERNESS CHARACTERISTICS

Pursuant to the Federal Land Policy and Management Act (FLPMA), "The Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values (including, but not limited to, outdoor recreation and scenic values), giving priority to areas of critical environmental concern. This inventory shall be kept current so as to reflect changes in conditions and to identify new and emerging resource and other values." 43 U.S.C. §1711(a). Wilderness character is a resource for which BLM must keep a current inventory. As the U.S. Court of Appeals for the Ninth Circuit recently held: "wilderness characteristics are among the 'resource and other values' of the public lands to be inventoried under § 1711. BLM's land use plans, which provide for the management of these resources and values, are, again, to 'rely, to the extent it is available, on the inventory of the public lands, their resources, and other values.' 43 U.S.C. § 1712(c)(4)." *Oregon Natural Desert Ass'n v. Bureau of Land Management*, 531 F.3d 1114, 1119 (9th Cir. 2008). Therefore, BLM is required to consider "whether, and to what extent, wilderness values are now present in the planning area outside of existing WSAs and, if so, how the Plan should treat land with such values." *Id*. at 1143.

[469] RMP EIS 929-30.
[470] Beschta et al., 2004.
[471] Beschta et al., 2004; Karr et al., 2004.

BLM now has current guidance requiring updating its inventory of lands with wilderness characteristics and considering protection of those values. Instruction Memorandum (IM) 2011-154 and Manuals 6310 and 6320 contain mandatory guidance on implementing that requirement. The IM directs BLM to "conduct and maintain inventories regarding the presence or absence of wilderness characteristics, and to consider identified lands with wilderness characteristics in land use plans and when analyzing projects under the National Environmental Policy Act (NEPA)." BLM must update its inventory of lands with wilderness characteristics as part of this land use planning process. Manual 6310 provides detailed guidance on conducting inventories of lands with wilderness characteristics. The manual identifies situations when BLM must update its inventory:

1. The public or the BLM identifies wilderness characteristics as an issue during the National Environmental Policy Act (NEPA) process.
2. The BLM is undertaking a land use planning process.
3. The BLM has new information concerning resource conditions, including wilderness characteristics information submitted by the public that meets the BLM's minimum standard described in the Wilderness Characteristics Inventory Process section of this policy.
4. A project that may impact wilderness characteristics is undergoing NEPA analysis.
5. The BLM acquires additional lands. (6310.06.A).

Many of these conditions apply to lands under consideration, which have not been actively re-inventoried by the BLM using the detailed standards and procedures set out in the current guidance. Once there is new information that meets the general submission standards, then "as soon as practicable, the BLM shall evaluate the information," including field checking as needed and comparing with existing data to see if previous conclusions remain valid. BLM is also required to document its rationale and *make it available to the public*. 6310.06.B.2 (emphasis added).

Further, BLM Manual 6310 also sets out detailed guidance on how to identify wilderness characteristics, including how to define "naturalness," "roads," "outstanding opportunities for solitude or primitive and unconfined recreation," and "supplemental values." The guidance explicitly cautions that, "undeveloped possessory interests (e.g., mineral leases) are not treated as impacts to wilderness characteristics because these rights may never be developed." 6310.06.C.3.d. Furthermore, the BLM is supposed to consider "existing conditions as opposed to potential future conditions" when evaluating lands for wilderness characteristics. 6310.06.B. Thus, BLM should not rule out lands as having wilderness characteristics (or for management to protect those characteristics) either because there are valid existing rights or the lands are in proximity to an area with other development or rights-of-way.

The current guidance was not available during BLM's previous evaluation of potential lands with wilderness characteristics and requires that the BLM update its inventory to comply with the agency's official interpretation of FLPMA.

BLM needs to identify wilderness areas being considered by congress, unroaded areas adjacent to forest service wilderness, and unroaded areas adjacent to forest service inventoried roadless areas.

The BLM cannot pre-empt the will of Congress by damaging areas currently being considered in wilderness legislation. Specifically the areas identified as "Wild Rogue Wilderness" and "Devils Staircase Wilderness" in Senator Wyden's O&C legislation must be reserved from timber harvest modeling and any management actions that would damage wilderness characteristics. These areas would also need to be identified for mineral withdrawal in the RMP. Additionally the BLM must conduct a geospatially explicit analysis to identify potential BLM wilderness adjacent to existing Forest Service wilderness and large inventoried roadless areas such as the South Kalmiopsis Roadless Area. For example, lands adjacent Forest Service lands in the Rough and Ready Creek drainage need to be evaluated for wilderness and mineral withdrawal. Other ultramafic lands on the west side of the Illinois Valley also need to be considered for eventual wilderness designation as a combined unit with Forest Service roadless areas.

BEST MANAGEMENT PRACTICES

Use of Best Management Practices traces its origins to the Clean Water Act as an approach to minimize impacts from nonpoint sources of water pollution. As defined by the CWA: Best Management Practices (BMPs), are methods, measures or practices selected by an agency to help minimize its nonpoint source control needs. BMPs include but are not limited to structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters. 40 CFR §130.2(m).

Environmental advocacy group Bark has surveyed many timber sales for compliance with Best Management Practices and found several violations. For example, in the Salem BLM's Missouri Ridge Timber Sale, the BMPs limit "ground based operations to relatively dry soil conditions". Based on what we saw on the ground we are confident in highlighting that soils were not dry while operations were taking place. The degree of soil damage on the roads, skid trails and landings, including deep ruts and compacted mud are good indicators that this BMP was not followed. A local resident also reported that logging and hauling occurred during rainy conditions when he visited the unit in fall 2013.

Similarly, when Bark staff and volunteers surveyed the Annie's Cabin Timber Sale after logging, they found that BMPs were not followed, specifically regarding erosion control measures were to be placed on the roads post-implementation. Bark found that the only such measures included shallow earthen waterbars, which were not effective in preventing channelization along the roads, carrying sediment down the roadbed (pictured at right). This road is obviously NOT fully stabilized.

These findings point to both the inability of the BLM timber sale administrators to ensure BMPs and timber contract specifications are fully complied with, and the insufficiencies of BMPs in preventing environmental harm. Thus, when the BLM asserts that resource extraction projects

will not have significant environmental impacts because of the BMPs, it can offer no assurance that these BMPs will be fully implemented, or will be effective at minimizing or mitigating the known environmental impacts.

Not only is the BLM unable to assure that the BMPs will, in fact, be followed and/or mitigate the adverse impacts, recent studies disclose that even if followed, BMPs do not consistently reduce adverse environmental effects. In the context of road construction BMPs, there is reliable data indicating that BMPs cannot always reduce the adverse impacts of road building on aquatic resources to ecologically negligible levels, especially within the context of currently pervasive watershed and aquatic degradation.[472] The nationwide assessment of BMP effectiveness commissioned by the USEPA performed by the Great Lakes Environmental Center (GLEC) specifically noted that BMPs aimed at reducing road impacts are not 100% effective, and, in particular, that efforts to prevent road drainage to streams have considerable potential for failure, especially in the Pacific Northwest. [473]

In its report, GLEC found that in the Pacific Northwest, "conventional BMPs for road construction may not be sufficient to prevent adverse effects on stream channels and fish habitat."[474] Activities implemented with somewhat effective BMPs still often contribute to negative cumulative effects on aquatic systems.[475] Espinosa et al. (1997) documented that aquatic habitats were severely damaged by roads and logging in several watersheds despite BMP application, and that blind reliance on BMPs in lieu of limiting or avoiding activities that cause aquatic damage serves to increase aquatic damage.

Not only is the effectiveness of the BMPs included unsupported by field data, the draft BLM RMP fails to include the most effective BMPs:

- avoidance of implementing damaging logging, landing, and road activities in high hazard, sensitive, or degraded areas, such as stream crossings, Riparian Reserves, and unstable terrain, such as earthflows; and
- full protection of an adequate width of riparian areas to prevent or reduce the transmission of upslope impacts to streams.

The management practice of avoiding high impact activities in sensitive terrain has long been recognized to be far more effective than attempting to reduce such impacts via other BMPs with limited effectiveness. Avoidance of sensitive areas is critical, because as GLEC (2008) noted with respect to road impacts, "in some cases, however, control of the problem may not be feasible: location 'trumps' management practice." It has long been recognized that full protection of the area of vegetation within 200 to >300 ft of the edge of all stream types is one of the most important and effective ways to limit the impacts from upslope logging-related disturbances, as numerous independent scientific assessments have repeatedly concluded.

[472] Ziemer and Lisle, 1993; Espinosa et al., 1997; Beschta et al., 2004; GLEC, 2008
[473] GLEC, 2008.
[474] Id.
[475] Ziemer et al., 1993; Rhodes et al., 1994; Espinosa et al. 1997; Beschta et al., 2004; GLEC, 2008.

3P FALL BUCK AND SCALE

Page 39 of the DEIS indicates that the BLM intends to conduct pre-decisional falling of trees in proposed logging units as a timber cruising mechanism. The impacts of this proposed practice are not disclosed or analyzed in the document. Federal courts have already rejected pre-decisional falling as an irretrievable commitment of resources. No other state or federal land management agency finds it necessary to rely upon pre-decisional timber felling to achieve accurate timber cruise data. The proposal to revive 3P Fall Buck and Scale is arbitrary and capricious.

SUDDEN OAK DEATH

The DEIS analysis of the no action alternative is inaccurate because it assumes no treatment of SOD, even though it is routinely conducted under the no action alternative. This makes the effects analysis unrealistic and inaccurate.

BLM should consider the fact that SOD treatments have limited effectiveness because SOD continues to expand in spite of ongoing treatments. Does BLM know how much (if any) SOD treatments slow the spread of the disease? The pathogen has survived eradication treatments in many sites and 8 of the previously know sites expanded in spite of aggressive eradication efforts. The size of the Curry County quarantine area expanded from 9 to 11 square miles.[476]

DEIS at 746 indicates that BLM did not consider the effects of Sudden Oak Death (SOD) on spotted owls. ("The BLM analysis did not address these conservation needs because they are habitat-independent and would be unaffected by RMP decisions. ") This is inadequate. BLM specifically says they intend to adopt a RMP Revision that minimizes the spread of SOD (DEIS p 76). SOD treatment involves aggressive logging and burning of infected sites. This is a habitat effect that must be considered in the FEIS.

SOD eradication efforts pose their own threat to spotted owl habitat, because eradication means cutting all vegetation in infested sites (plus a buffer) and burning it in place. Thus eradication removes potential owl habitat and the burn intensity harms soils and retards the future growth of owl habitat. We are not suggesting that eradication should not be done, only that before the "SOD war" is over, lots of owl habitat may be lost to the cause.

Whether or not BLM adopts an alternative that does not aggressively treat SOD with logging, BLM should still consider the cumulative habitat effects of logging plus SOD-induced mortality among tree species that provide habitat for spotted owls and their prey. SOD adds to the cumulative uncertainty faced by the spotted owl and reinforces the need to conserve all suitable owl habitat. Jerry Franklin's summarized the "findings" of the Northern Spotted Owl Status Review scientific review panel as follows:

[476] See ODF, Forest Log, Summer 2004. http://web.archive.org/web/20041109114540/http://www.odf.state.or.us/Portal/forestlogs04/ForestLogSum2004.pdf.pdf

The implications of the scientific findings with regards to conservation strategies. ... ... in view of current uncertainties, such as the eventual outcome of the Spotted Owl/Barred Owl competition, West Nile Virus, and Sudden Oak Death, and whatever else comes along -- such as global change and other kinds of introductions -- existing suitable habitat could be important to the persistence of the Northern Spotted Owl. [repeated with emphasis] Existing suitable habitat could be important to the persistence of the Northern Spotted Owl, i.e., risk to Northern Spotted Owl may increase if additional suitable habitat is removed. It is not clear where the Spotted Owl may find the refuge or refuges from new threats within existing suitable habitat. Barred Owl intrusions do not negate the need for structurally complex forest habitat to sustain Northern Spotted Owl based on existing knowledge.[477]

CONCLUSION

The proposal to abandon the unified cohesive forest, watershed and wildlife strategy of the NWFP is unwise and undermines many of the assumptions relied upon to facilitate recovery plans, habitat conservation plans, critical habitat designations, and ESA listing determinations throughout Oregon and the Northwest. A forest plan that increases riparian reserve logging, clearcutting, and the logging of known survey and manage habitat will create less certainty, not more, concerning timber harvest on BLM managed public forestlands.

[477] U.S. Fish & Wildlife Service Scientific Review Panel For The Northern Spotted Owl. June 22, 2004 Public Hearing. Washington State University, Vancouver Campus. Transcript Of Proceedings, page 121. http://www.sei.org/owl/meetings/minutes/june-meeting-transcripts.pdf.

Note: If any of web links in this document are broken, they may be resurrected using the Wayback Machine at Archive.org. http://wayback.archive.org/web/

References

Aubrey, K. and Raley, C. 2002. The Pileated Woodpecker as a Keystone Habitat Modifier in the Pacific Northwest. USDA General Technical Report PSW-GTR-181.

Beschta, R.L., Rhodes, J.J., Kauffman, J.B., Gresswell, R.E, Minshall, G.W., Karr, J.R, Perry, D.A., Hauer, F.R., and Frissell, C.A., 2004. Postfire Management on Forested Public Lands of the Western USA. Cons. Bio., 18: 957-967.

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

Cline, S., Berg, A., and Wight, H., Snag Characteristics and Dynamics in Douglas-Fir Forests, Western Oregon, *The Journal of Wildlife Management*, Vol. 44, No. 4 (Oct., 1980), pp. 773-786.

Espinosa, F.A., Rhodes, J.J. and McCullough, D.A. 1997. The failure of existing plans to protect salmon habitat on the Clearwater National Forest in Idaho. J. Env. Management 49(2):205-230.

(GLEC) Great Lakes Environmental Center, 2008. National Level Assessment of Water Quality Impairments Related to Forest Roads and Their Prevention by Best Management Practices. Final Report. Report prepared for US Environmental Protection Agency, Office of Water, Contract No. EP-C-05-066, Task Order 002.

Hagar, J., "Key elements of stand structure for wildlife in production forests west of the Cascade Mountains." Pp. 35-48 in Harrington, Timothy B. and Gretchen Nicholas, tech. eds., "Managing for wildlife habitat in Westside production forests." Gen. Tech. Rep. PNW-GTR-695. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, Or., 2007.

Karr, J.R., Rhodes, J.J., Minshall, G.W., Hauer, F.R., Beschta, R.L., Frissell,C.A., and Perry, D.A, 2004. Postfire salvage logging's effects on aquatic ecosystems in the American West. BioScience, 54: 1029-1033.

Kattelmann, R., 1996. Hydrology and water resources. Sierra Nevada Ecosystem Project Final Report to Congress, Vol. II: pp. 855-920.

Pollock, M. M., T. J. Beechie. 2014. Does riparian forest restoration thinning enhance biodiversity? The ecological importance of large wood. *Journal of the American Water Resources Association*, 50(3):543-559.

Rhodes, J.J., McCullough, D.A., and Espinosa Jr., F.A., 1994. A Coarse Screening Process for Evaluation of the Effects of Land Management Activities on Salmon Spawning and Rearing Habitat in ESA Consultations. CRITFC Tech. Rept. 94-4, Portland, Or.

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

Ziemer, R.R., and Lisle, T.E., 1993. Evaluating sediment production by activities related to forest uses--A Northwest Perspective. Proceedings: Technical Workshop on Sediments, Feb., 1992, Corvallis, Oregon. pp. 71-74. Terrene Inst., Washington, D.C.

References

Anthony, R. G. 2013. Effects of Riparian Thinning on Marbled Murrelets and Northern Spotted Owls. Science Review Team.

BLM/FS/FWS/NOAA Fisheries-Memorandum dated June 6, 2013 concerning riparian reserve thinning.

Doppelt,B., R. Hamilton, C. Deacon Williams, M. Koopman, 2008. Preparing For Climate Change in the Rogue River Basin of Southwest Oregon. http://www.geosinstitute.org/images/stories/pdfs/Publications/ClimateWise/ROGUEWORKSHOP_FINALsinglewebsite.pdf

Firman, J.C. and 7 others. 2011. Landscape Models of Adult Coho Salmon Density Examined at Four Spatial Extents. Transactions of the American Fisheries Society. 140:440-455.

Hanson, C.T. , D.C. Odion, D.A. Dellasala, and W.L. Baker. 2009. Overestimation of Fire Risk in the Northern Spotted Owl Recovery Plan. Conservation Biology 23:1314-1319. http://www.cof.orst.edu/cof/teach/fs505/Readings/hanson_cb_2009.pdf

Harvey and Lisle 1999. Scour of Chinook Salmon Redds on Suction Dredge Tailings. North American Journal of Fisheries Management 19:613-617. Available at http://www.fs.fed.us/psw/rsl/projects/water/Harvey99.PDF

Leinenbach, P. G.McFadden, and C. Torgersen3 . 2013. Effects of Riparian Management Strategies on Stream Temperature Science Review Team

NMFS (National Marine Fisheries Service) 2012. Public Draft Recovery Plan for Southern Oregon/Northern California Coast Coho Salmon (*Oncorhynchus kisutch*). National Marine Fisheries Service. Arcata., CA. http://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/southern_oregon_northern_california/soncc_plan_draft_2012_entire.pdf

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

Pollock, M., M. Heim, and D. Werner. 2003 Hydrologic and Geomorphic Effects of Beaver Dams and Their Influence on Fishes. American Fisheries Society Symposium 37

Raphael, M.G. and 7 others. 2013. Assessing the Compatibility of Fuel Treatments, Wildfire Risk, and Conservation of Northern Spotted Owl Habitats and Populations in the Eastern

Cascades: A Multi-scale Analysis. **Final Report:** JFSP Project 09-1-08-31 **Project Website:** https://sites.google.com/a/pdx.edu/vegetation-fire-owl/home

Spies, T. Pollock, M. and G. Reeves. 2013. Effects of Riparian Thinning on Wood Recruitment: A Scientific Synthesis. Science Review Team. http://www.mediate.com/DSConsulting/docs/FINAL%20wood%20recruitment%20document.pdf

Attachments:

1. Anthony, R. G. 2013. Effects of Riparian Thinning on Marbled Murrelets and Northern Spotted Owls. Science Review Team.
2. Benda, Lee Use of Geospatial Data and Models in Natural Resource Management 20 July 2012.
3. BLM/FS/FWS/NOAA Fisheries-Memorandum dated June 6, 2013 concerning riparian reserve thinning.
4. Department of the Interior Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Threatened Status for Oregon Spotted Frog; Proposed Rule
5. DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List a Distinct Population Segment of the Red Tree Vole as Endangered or Threatened.
6. Department of the Interior Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Review of Native Species That Are Candidates for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions; Proposed Rule (fisher, red tree vole)
7. DEPARTMENT OF THE INTERIOR Fish and Wildlife Service50 CFR Part 17Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition to List Two Populations of Black-Backed Woodpecker as Endangered or Threatened
8. Firman, J.C. and 7 others. 2011. Landscape Models of Adult Coho Salmon Density Examined at Four Spatial Extents. Transactions of the American Fisheries Society. 140:440-455.
9. Harvey and Lisle 1999. Scour of Chinook Salmon Redds on Suction Dredge Tailings. North American Journal of Fisheries Management 19:613-617. Available at http://www.fs.fed.us/psw/rsl/projects/water/Harvey99.PDF
10. Illinois Valley Salmon and Botanical Area Map
11. Illinois Valley Salmon and Botanical Area management recommendations
12. Illinois Valley Salmon strongholds map
13. Leinenbach et al. 2013. Effects of Riparian Management Strategies on Stream Temperature Science Review Team;
14. Appendix A – Synopsis of Literature Describing the Effects of Riparian Management on Stream Shade and Stream
15. Appendix B – Consolidated Summary of Literature Describing the Effects of Riparian Management on Stream Shade and Stream Temperature
16. Appendix C – Annotated Bibliography of Literature Describing the Effects of Riparian Management on Stream Shade and Stream Temperature
17. Nawa, R.K. Sixteen page letter dated December 20,2011 from R. Nawa (KS Wild) to K. Symons (BLM) concerning suction dredging and placer mining impacts to coho critical habitat on Sucker Creek, Medford District.

18. Nawa, R.K. Six page letter dated August 25,201 from R. Nawa (Siskiyou Project) to A. Jossie (BLM) concerning placer mining pit impacts to coho critical habitat on Sucker Creek, Medford District.
19. Nawa, R.K. Five page letter dated August 23,201 from R. Nawa (Siskiyou Project) to A. Jossie (BLM) concerning placer mining pit impacts to coho critical habitat on Sucker Creek, Medford District.
20. Pollock, M., M. Heim, and D. Werner. 2003 Hydrologic and Geomorphic Effects of Beaver Dams and Their Influence on Fishes. American Fisheries Society Symposium 37