Hells Canyon Preservation Council, Oregon Chapter Sierra Club, Oregon Wild, Oregon Natural Desert Association, The Lands Council, BARK, Planeto Azul, Wildlands CPR

Comments on the Blue Mountains Forest Revised Land and Resource Management Plan Proposed Action

5-28-10

Table of Contents

Introduction

We are pleased to submit the following comments on the Blue Mountains Forests Revised Land and Resource Management Plan (LRMP) Proposed Action. These comments are the result of a coalition comprised of some of the most experienced and knowledgeable conservationists, scientists, and passionate protectors of ecosystems in the Pacific Northwest and Northern Rockies. We reside, work and recreate all across this region and many of us call the Blue Mountains home.

Combining the Wallowa-Whitman, Malheur, and Umatilla National Forests into one revision process is appropriate because a more integrated approach to management across multiple jurisdictional boundaries is urgently needed as climate change increases the need for wildlife connectivity across landscapes. Forest managers are faced with a common challenge to allow ecological disturbance processes to occur unimpeded at an ecologically meaningful scale in order to restore the landscape patterns and diverse ecosystems that the Blue Mountains region is famed for.

While aware of the facts and the significant challenges that lie ahead, we remain optimistic and inspired by a vision of conservation for the Blue Mountains Ecoregion that is worthy of its natural beauty, ecological function and biological diversity. To be sure:

> "The problems that exist in the world today cannot be solved by the level of thinking that created them." Albert Einstein.

The past century of logging, fire suppression, grazing and mining have by far created the vast majority of problems the Blue Mountains Ecoregion faces today. We must leave this level of thinking behind.

Not many issues capture the importance of the Blue Mountains Ecoregion as well as connectivity. The Blue Mountains Ecoregion is a critical linkage between the Northern Rockies, the most intact and wild ecosystem in the lower 48, and the Cascades Mountains Ecosystems and on to the Klamath Siskiyou Ecoregion and Coast Ranges of Oregon and California. We have been fortunate enough to recently experience the unquantifiable value of these "wild connections" as wolf and moose have returned to Oregon for the first time in decades. The broad representation of the conservation partners that have authored these comments reflects the strong, regional desire for a Blue Mountains Forest Plan that reflects the importance of this region beyond its own borders.

Science, the Framework for Management and Decision Making

One of the most important elements of the Blue Mountains LRMP Revision Process is that it be based on the best available science. Page 3 of the Proposed Action states that "To ensure that land and resource management planning decisions help contribute to sustainable stewardship of the nation's forests, the agency has taken into account the best available science pertaining to the economic and social conditions and ecosystem composition, structure and function." In addition to these areas, the Forest Service should be considering the best available science pertaining to species viability, ecological sustainability, climate change, ecosystem services, biodiversity conservation, and effectiveness monitoring. Being well-steeped in the science, we have noted several major directions to the Proposed Action that are not grounded in the best-available science, and in some cases run counter to it. We have carefully documented our concerns in these comments and we request your careful consideration of the following.

1. Recreation

I. Background: Why Recreation Planning is Important

We believe strongly in the power of recreation to connect people to our public lands, and to nurture lifelong support of those lands and of the agencies like the Forest Service that manage them. We also believe that the human experience of wild places is among the greatest benefits provided by our national forests. In order to provide the opportunity to experience the power of recreation to connect people to place, we believe that recreation must be ecologically, economically, and socially sustainable.

Recreation is an important component of the Forest Planning process because it is through recreation planning that the agency is making decisions about where, when, and how people access and thereby experience our national forests. When visitors have a pleasant recreational experience, it helps to build a connection to and nurture a lifelong support for our nation's forests.

Recreation is a key economic driver nationally representing an estimated 60% of the National Forests' total contribution to the United States GDP—significantly more than logging and other resource extraction activities combined. According to the 2003 National Visitor Use Monitoring survey, an estimated 1.45 million visitors recreate every year on the three national forests covered by the Blue Mountain Forest Plan. Day hiking and visiting a wilderness or primitive area ranked as the top 2 activities for each of the three forests. A Statewide Comprehensive Outdoor Recreation Plan for 2003 to 2007 shows that nature/wildlife observation, bird watching, and hiking were the three activities participated in the most by Oregon residents. See attached document titled Recreation Statistics for more information regarding recreation trends and preferences nation-wide, in Oregon, and in the Blue Mountain planning area.

Dr. Kreg Lindberg studied the economic impact that quiet recreation has on the local economies surrounding the Wallowa-Whitman National Forest (WWNF) as part of the recent travel management planning process. Lindberg found that quiet recreation in particular represents the majority of recreation visits on the WWNF, and that quiet recreation represents the majority of recreation's economic impact on the local economies surrounding the WWNF. Contingent upon the activities and visitors included, Lindberg found that quiet recreation on the WWNF contributes between $2.9 and $5.4 million in labor income, which represents between 137 and 252 jobs. We believe it's likely that similar findings would be reached if such an analysis were performed for the Umatilla and Malheur forests. The model used to perform this analysis on the WWNF as well as the accompanying methodology are attached. (See WWNF Economic Impact Report and CORS

Economic Impact DSS v. 2.0) Decisions in the forest planning process are affected by considerations beyond simply economic impacts, but these figures are reminders that quiet recreation makes a significant contribution to local economies in eastern Oregon.

Raising the importance of recreation, particularly quiet recreation, in forest planning is the only way to recognize the critical economic and social services it provides, and to guarantee that the necessary planning is done to ensure all Americans are able to enjoy our national forests for generations to come. It is also consistent with the directives of the National Forest Management Act and the 1982 forest planning rule, which both require that forest plans provide and plan for recreation.

In furtherance of the above requests, we suggest that the following points relative to recreation be considered as part of the Blue Mountain Forest Planning Process.

II. Purpose and Need Statement in NOI

The purpose and need statement in the Federal Register Notice for the Blue Mountain Forest Planning process[1] states that the forest planning team intends to address recreation by "recogniz[ing] the interdependency of social and economic components with national forest management. The relationship between the national forests and the people who live, work, and play in them is not adequately recognized in the 1990 forest plans." This purpose statement relative to recreation is vague. We believe the Forest Service should clearly state the purpose and need as it pertains to recreation and ensure this purpose and need is outcome-based like the other 4 goals listed in the Federal Register Notice instead of simply recognizing that recreation is an issue that will be addressed in the process. We suggest that this purpose and need be "to facilitate a broad spectrum of Americans to enjoy the national forest while minimizing conflicts among users and ensuring the protection of water, wildlife, cultural resources, wilderness qualities, and other resources."

This suggested purpose statement is consistent with guidance from the 1982 rule which says, "To the degree consistent with needs and demands for all major resources, a broad spectrum of forest and rangeland related outdoor recreation opportunities shall be provided." It is also consistent with Section 1604(g)(3)(A) of the National Forest Management Act, which directs that forest plan guidelines "insure consideration of the economic and environmental aspects of various systems of renewable resource management, including the related systems of silviculture and protection of forest resources, to provide for outdoor recreation (including wilderness), range, timber, watershed, wildlife, and fish."

III. No Action/Baseline

The Forest Service must ensure that the "no action" alternative identifies the appropriate baseline for comparison with the proposed action and other action alternatives.

a. At the time of the release of the proposed action the Malheur National Forest had not initiated scoping for travel planning. It's unclear whether the travel planning decision will be completed before the release of the Forest Plan DEIS. If the Malheur does not have a final decision in place prior to the release of the Forest Plan DEIS, the forest will be open to cross-country travel. Should this be the case, the appropriate baseline current condition of routes available for motorized use on the Malheur National Forest must be comprised of only those roads and trails that are designated for public motor vehicle use. This should not

[1] 75 Fed. Reg. 15403 2010-03-09

include non-motorized trails, decommissioned, Maintenance Level 1, other closed roads, short-term intermittent roads, or other roads that are inappropriate for long-term public motor vehicle use on the national forest. The baseline current condition of motorized routes reflected in the travel map accompanying the Forest Plan DEIS must be limited to the legal, documented routes that were designated for long-term motor vehicle use in a previous decision.

b. The Forest Service must also ensure that the baseline condition for snowmobile use is accurately portrayed. None of the three forests has a forest-wide winter use plan in place. Similar to the situation described above regarding summer motor vehicle use on the Malheur, the baseline current condition of trails available for snowmobile use on all three forests should be limited to those routes that have been designated for this use in a previous decision. Closed roads and non-motorized trails should not be included in the current condition of system trails portrayed on any map accompanying the Forest Planning process simply because OSVs can access these routes under the cross-country travel management paradigm.

IV. Proposed Action

Listed below are several elements of the proposed action relative to recreation that we feel should be improved.

a. Page 66 of the proposed action states that "[w]hile administratively designated areas may be proposed in the forest plan, they are established through a separate process subsequent to the planning process." We believe the Forest Service should reconsider this determination and use its discretion to propose and administratively designate additional special management areas to protect the amazing resources that exist across the planning area. Administratively designated areas that currently occur across the Blue Mountains planning area include geological and botanical areas, research natural areas, and municipal watersheds. We believe there is an opportunity to designate more areas using these and other designations to better manage the resource values in the area. The BLM exercises this discretion when proposing and designating Areas of Critical Environmental Concern (ACEC) and we feel the Forest Service should do likewise.

b. The Forest Service will use the Objectives that begin on page 87 to measure progress towards meeting the desired condition over the life of the plan. For recreation, the only objective listed is to maintain 100 to 140 campgrounds per year to standard. While this is a good objective for recreation, the Forest Service should develop others as well since there's much more to recreation than campgrounds. Given that the gross majority of visitors that frequent the planning area participate in non-motorized activities, objectives should be developed that address their needs:
    - Trailheads and signs for popular hiking trails are maintained
    - Trails are maintained to standard
    - Maintain, expand, enhance or restore the natural quality of viewsheds and soundscapes in areas that are popular among quiet recreationists
    - All areas on the forest designated for non-motorized use are managed as such. This includes ensuring that areas zoned for primitive non-motorized use are managed exclusively for quiet recreation.
    - Road decommissioning targets and timelines are established. The Forest Service should identify a specific number of miles of roads per year that should be

decommissioned, and the agency should prioritize those roads that are degrading water quality and habitat

c. The standards and guidelines relative to recreation need improvement.
   i. We encourage the agency to develop a route density standard for each forest in the planning area that takes into account the best available science regarding the needs of each species. The route density standard should include open and closed roads, unauthorized routes, and motorized trails. This is important given that roads and trails ecologically function the same. Such a standard would be beneficial for recreation because it would, among other things:
      - Improve water quality and fish habitat thereby enhancing the experiences sought by anglers, paddlers, and other water based activities,
      - Improve habitat for game species thereby enhancing the hunting experience as well as habitat for all watchable wildlife for non-consumptive wildlife activities, and
      - Enhance the non-motorized experience by having fewer roads thereby enhancing quietude and opportunities to find solitude which is the experience sought by the majority of visitors to the forests covered by the Blue Mountain planning process.

   ii. There is a point at which so much recreation use is occurring or has occurred that the benefits to participants are reduced. We therefore encourage the agency to develop an ecological carrying capacity standard relative to recreation that serves as a threshold level above which the impacts become unacceptable and require some action on the part of the agency. This limit of acceptable change is necessary to ensure recreation remains enjoyable and sustainable. For more information to help develop this standard, please refer to the attached Review of Recreation Management Frameworks.

   iii. The current goal for *Management Area 1B – Preliminary Administratively Recommended Wilderness Areas and Management Area 1C – Wilderness Study Areas*, is good but needs more. We suggest that the Forest Service manage recommended wilderness areas with an eye towards minimizing user conflict. The management guideline outlined in the proposed action for these areas states "Existing and proposed uses that could compromise wilderness area eligibility prior to congressional designation should not be authorized." (p.108) We encourage the Forest Service to adopt this management approach as a standard, not a guideline. Further, for the reasons described below, we strongly urge the Forest Service to add language expressly noting that these areas be manage for non-motorized, non-mechanized uses only.

   Continued and expanding motorized and mechanized vehicle use compromises wilderness values by:

      - *Diminishing opportunities for solitude.*
        As motorized and mechanized vehicle use increases, opportunities for solitude decline. Stronger vehicles are able to push farther and farther into undeveloped areas. Further, the number of vehicles continues to expand, making it increasingly difficult to escape the sights and sounds of motors in recommended wilderness areas.

As the Clearwater National Forest in Idaho recently observed in its draft travel management plan:

> "As motorized technology continues to be developed levels of access into remote, back-country locations will rise and with this increased use will come additional noise and disturbance which adversely affects attributes of wilderness character."[2]

- *Degrading an area's naturalness.*
  Motorized and mechanized vehicles cause an array of impacts on natural systems, including wildlife and their habitat, air and water quality, the introduction of non-native plant species, and damage to vegetation. Noise from motors disturbs wildlife and can impact opportunities for roosting, foraging, and nesting. Off-route travel and poorly sited motorized routes in areas important for wildlife can easily degrade habitat for an array of species by dividing an area of relatively continuous habitat into smaller, disconnected parcels. Motorized vehicles degrade water quality by causing increased sedimentation and erosion, and through direct and indirect deposits of pollutants. Roads and trails serve as corridors for non-native invasions, and ORVs are frequently cited as the key link in the transport and spread of invasive or noxious plants. The force of rolling wheels under the weight of an ORV easily damages and crushes shrubs, grasses, forbs, and other vegetation. Each of these impacts degrades an area's naturalness.

- *Diminishing opportunities for primitive recreation.*
  Opportunities for hiking, hunting, fishing, camping, horseback riding, and cross-country skiing are diminished by the presence of motorized and mechanized vehicles. Vehicles can scare wildlife, leading to degraded hunting opportunities. Trail conflicts between motorized/mechanized vehicles and hikers, horseback riders, and skiers degrade the primitive recreation experience. Engine noise stemming from motorized vehicles propagates widely across the landscape, which can disrupt and even spoil the primitive, backcountry experience sought by many non-motorized users.

- *Adversely affecting an area's undeveloped character*.
  Routes maintained for motorized and mechanized vehicles often require more expansive maintenance than those maintained for foot and horse travel. Brush clearing utilizing motorized equipment, hardened water crossings, water bars, and bridges are but a few of the impacts often necessary for motorized and mechanized vehicle routes. These modifications diminish an area's undeveloped character and instead show forms of human presence and use.

  The Clearwater National Forest recently reevaluated the wilderness character of areas recommended for wilderness in 1978. The wilderness character of half of the areas was degraded in the intervening years, simply by the continued and expanded use of motorized and mechanized vehicles.[3] The wilderness characteristics of numerous other agency-recommended wilderness areas are

[2] Clearwater National Forest, Travel Planning Draft Environmental Impact Statement, p. 3-83.

[3] Id. p. 3-81-82.

no doubt suffering similar declines, which the agency itself acknowledges.[4] Region One notes that:

> "In some areas, uses have changed or certain types of use have increased significantly, possibly degrading wilderness characteristics. In most cases, use has not been monitored closely enough, if at all, to make a call on how use has changed over the years."

iv. For Management Area 3A – Non-motorized Undeveloped, we recommend that the agency consider its requirements under the Executive Orders, Travel Management Rule, and NFMA to minimize user conflicts. To this end, the Forest Service should include a standard that ensures these areas remain non-motorized, that new motorized routes will not be designated, and that existing motorized routes that detract from the non-motorized undeveloped character of the area will be grandfathered out.

v. For Management Area 3B – Limited Motorized Undeveloped, the existing standard S-59 should be further explain that non-conforming special uses that are degrading the recreational experiences of this area can be grandfathered out.

d. As far as we can tell, the Forest Service's proposed action doesn't include mention of any management prescriptions for definitive land areas to ensure visual quality objectives as directed by the 1982 regulations at 36 CFR 219.21 (f) which states: "the agency shall inventory and evaluate the visual resource as an integrated part of evaluating alternatives in the forest planning process, addressing both the landscape's visual attractiveness and the public's visual expectation and that management prescriptions for definitive land areas of the forest shall include visual quality objectives." The agency should do this for each alternative.

e. The Forest Service's description of the Recreation Background at 2.3 on pages 45 and 46 seems questionable. The NVUM visitors statistics for all of the forests in the planning area show that non-motorized recreation activities – specifically, visiting a wilderness or primate area, day hiking, freshwater fishing, and primitive camping – are the dominate forms of recreation. Yet, the agency has made a gross generalization that the majority of visitors are seeking either highly developed facilities that allow larger recreation vehicles or they are seeking more remote activities accessible via a motor vehicle, specifically with accommodations for off-highway vehicles. Certainly a spectrum of recreation experiences and opportunities is necessary, from backcountry primitive to frontcountry developed, but the agency appears to have consolidated all recreation participation into two groups defined by their preference in motor vehicles. The Forest Service seems to have over-simplified the current condition regarding recreation across the planning area. Recreation visits across the Blue Mountain planning area are much more diverse and complex than the description provided in the Proposed Action. The agency must recognize that a better examination and explanation of the current condition is needed. A thorough examination and accurate description will better inform the agency as it develops the baseline/no action alternative as well as the range of action alternatives and better inform the public as it comments on the Draft EIS. As mentioned above, we've provided recreation statistics as an

[4] Consistency in Land and Resource Management Plans, USDA FS Region One, 8/25/2008

attachment to this letter (See Recreation Statistics) that show the recreation trends relative to this planning process.

f. Acreage proposed for Management Area 3A – Non-motorized Undeveloped is outrageously low. The Malheur proposed 59,303 acres; the Umatilla proposed 24,217 acres; and the Wallowa-Whitman proposed 0 acres. Once again, we urge the Forest Service to keep an eye towards its legal obligation to minimize user-conflicts. Given visitation statistics among non-motorized recreationists to these forests, the three national forests together are proposing only 83,520 acres for non-motorized recreational use out of a total of 5.5 million acres of national forest land, or 1.5% of the planning area. The Wallowa-Whitman, the largest of the three national forests, proposed 0 acres for non-motorized, undeveloped recreation. Given the total size of the planning area, the acreage of roadless lands in these three forests that are available for quiet recreation, and the number of recreation visitors seeking a non-motorized experience, it's imperative that the Forest Service revisit this proposal and find additional acreage for quiet, non-motorized forest visitors.

V. Factors to Consider in the Environmental Analysis

In addition to the traditional impacts on water, wildlife, soils, air, cultural resources and other forest resources analyzed by the agency to meet its obligation under NEPA, we've outlined additional issues that need attention in the environmental analysis.

a. Engine Noise Propagation and Natural Soundscapes

> *"The province of quiet is shrinking. Silence survives like now-rare prairie plants living along railroad tracks."* Howard Mansfield. The Same Ax, Twice.

"Natural quiet" has become increasingly scarce on public lands throughout the Western U.S. Its scarcity is a result of many factors, including the increase in commercial and military air traffic, sight-seeing flights, wide-ranging use of multi-year mechanized management actions across public lands, an increase in the use of all-terrain vehicles (OHVs), energy developments such as power lines, roads and highways and increased development in rural areas. National forests across the Blue Mountains are magnificent in natural wonders and beauty. People in the region, from transitory visitors to long-time residents, come to these forest wonderlands to enjoy and experience the serenity and inspiration of untrammeled nature. However, increasingly the soundscape is being degraded, even inside Wilderness areas. The sounds of motorized vehicles and equipment can be easily heard well within portions of the Eagle Cap and Hells Canyon Wilderness Areas, for example. Natural quiet is an absolute that either exists or does not. The situation is reaching a crisis level. Motorized recreation including snowmobile use is particularly harmful to natural quiet in the Blue Mountains, bringing the widespread intrusion of industrial machines, with their far-reaching noise and harmful impacts, destroying the serenity and natural quiet of areas, while significantly impacting the wildlife, plants, soils, and waterways. Given the growing scarcity of natural quiet coupled with the beneficial effects of natural quiet to most wildlife populations and the recreational experience of forest visitors, the Forest Service must consider the potential impacts from the propagation of engine noise around roads and motorized trails on natural soundscapes, other forest visitors, and wildlife and disclose natural quiet as a resource worth protecting.

The Forest Service must locate ORV areas and trails to "ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other

factors."[5] At the very least, the Forest Service must consider "compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factors."[6] Scientific evidence supports the importance of natural sounds for wildlife, ecosystems and people. National Park Service's Natural Sounds Program Center developed two annotated bibliographies: one regarding the impact that sounds has on wildlife and another on the impact sound has on park visitors.[7] Please accept these two annotated bibliographies (NPS Annotated Bibliography - Impacts of Noise on Visitors and NPS Annotated Bibliography - Impacts of Noise on Wildlife) as part of the administrative record.[8] We encourage you to review these documents to inform the Blue Mountain forest planning process.

Many spatial models and software packages are available for analyzing potential noise propagation from transportation systems, including a GIS model that The Wilderness Society recently developed for the specific purpose of analyzing noise propagation from ORVs in forest landscapes. This model is based on the System for the Prediction of Acoustic Detectability (SPreAD), a workbook issued by the Forest Service and Environmental Protection Agency for land managers to "evaluate potential … acoustic impacts when planning the multiple uses of an area." TWS adapted the SPreAD model to a GIS environment, so that potential noise impacts could be integrated with other variables being considered in the travel management planning process. We have included the user's guide for the SPreAD-GIS model as an appendix to this document (SPreAD-GIS User's Guide v1 1), and we would be happy to provide an up-to-date version of the software at your request. The SPreAD-GIS model can be implemented in your existing ArcGIS software at no additional cost. We expect that the environmental analysis will include maps with projected sound propagation from the proposed systems, and this model is a tool for meeting that reasonable expectation. Moreover, these sound propagation maps should be overlayed with maps related to wildlife habitat and areas known to be used by quiet recreationists, so that the Forest Service can truly analyze the effects of ORV noise on wildlife and quiet recreationists, who constitute the majority of Forest visitors.

Noise generated by the average ATV engines can reach sound levels of 75 -90 decibels. This noise level is equivalent to a rock concert or a busy street. Because of the way they are driven, with frequent engine revving, the sound level is not constant. When this level of noise is generated by more than one vehicle, the resulting noise can be audible more than two miles away. Outside of Wilderness areas, those seeking quiet and solitude will have a difficult time escaping the sounds from ORVs in the planning area, which reduces the ability of these users to access the forest in a manner which they enjoy.

We recommend that the Forest Service analyze the potential impacts of the propagation of engine noise from ORVs around roads and recreational trails, especially impacts on natural soundscapes, sensitive species, and non-motorized recreational users. We recommend that the Forest Service use TWS' SPreAD Model to evaluate the potential acoustic impacts on the planning area from engine noise in this process. We recommend Forest Service take

[5] Executive Order 11644 (Sec. 3(a)(3)).

[6] 36 C.F.R. 212.55(b)(5).

[7] Impacts of Noise and Overflights on Wildlife Annotated Bibliography. National Park Service Natural Sounds Program Center. Available at http://www.nature.nps.gov/naturalsounds/publications/wildlifebiblio.pdf. And Visitor Experience and Soundscapes: Annotated Bibliography. National Park Service Natural Sounds Program Center and Colorado State University. Available at http://www.nature.nps.gov/naturalsounds/publications/Biblio_visitor_experience_soundscapes_2006.pdf.

[8] 42 U.S.C. § 4332(C).

appropriate action to ensure quiet landscapes by reducing motorized route density and designating large areas for non-motorized use based on the findings from your noise propagation analysis.

The National Forest currently contains a Scenic Area designation. We afford this special designation to areas because we are sensitive to what we see. People are also very sensitive to what they hear. One study conducted in Grand Canyon National Park found that almost as many visitors say they come to the park for "natural quiet" (90 percent) as those who come to "view natural beauty" (Mansfield, pg 213). By the time the next Forest Plan Revision comes along, significant degradation and loss of natural quiet will have occurred. We recommend a new designation, "Natural Quiet Areas," akin to Scenic Areas. The results of the above recommended analyses can be used to identify high value natural quiet resource areas remaining within the Blue Mountains. We recommend this analysis for each of the alternatives examined in the DEIS. These areas will represent the reservoir of potential "Natural Quiet Areas" across the 5.5 million acre planning area. This analysis is similar to that performed for watersheds resulted in the identification of key watersheds (pg 20 of Forest Plan). A similar analysis identifying key natural quiet watersheds would also identify areas to target for restoration of natural quiet.

b. Winter Use

Many forests, including the three covered in the Blue Mountain forest planning process, did not consider the inclusion of OSV use in their recent (or ongoing) travel planning process, allowing unmanaged winter motorized recreation to occur indefinitely. We, therefore, urge the agency to use this process as an opportunity to reduce the ongoing resource impact and user conflicts attributed to over-snow vehicle use by improving its management of winter recreation. This section provides information the Forest Service can use to help in its decision making process.

i. Resource Damage

Damage to public natural resources by over-snow vehicles has been documented in a number of national forests and public lands. This damage takes many forms, including tree and tundra damage in alpine areas, treetop damage in forest regeneration areas, stream bank damage and destruction of spawning areas used by Over-Snow Vehicles (OSVs) for crossing and for play, trail and vegetation damage in staging areas during low snow years, and degraded water quality from two-stroke snowmobile emissions. This damage is often not recognized, documented and/or remediated when OSVs are exempted from travel planning.

In addition, OSVs are often given unregulated access to areas inhabited by key wildlife species such as bear, Canada lynx, wolverine, fisher, white-tailed ptarmigan, deer, bighorn sheep and elk. Harassment of wildlife has been reported in many forests. These negative impacts go unrecognized, undocumented and are allowed to persist, unless OSVs are included in the "closed unless designated open" regulatory framework, along with all other motorized users.

It has become apparent in many national forests with designated wilderness areas that trespass by OSVs is a common and persistent occurrence. Wilderness trespass has been documented in many national forests. Many forests did not consider winter use in the recent travel planning process allowing this trespass to occur indefinitely.

ii. User Conflicts

A report by Winter Wildlands Alliance[9] (attached as WWA Winter Recreation Report) reveals that on national forest land in Oregon, there are fourteen times more miles of groomed motorized trails than non-motorized, yet the NVUM data shows two-and-a-half times more skier and snowshoer visits than snowmobile visits. Statewide, there are more than 458,769 ski and snowshoe visits annually and 177,812 snowmobile visits annually. This disparity results in a density of 2,144 skier and snowshoer visits per mile of groomed non-motorized trail compared to only 58 snowmobile visits per mile of groomed motorized trail. These statistics indicate that (a) user conflicts are inevitable when a small minority of users can significantly degrade the recreational experience of over two-thirds of forest users, and (b) that the National Forest in Oregon are giving preferential treatment to one type of winter recreation at the expense of quiet recreationists.

User conflicts between over-snow vehicles and quiet users exist in many, if not most, national forests, and occur on the forests in the Blue Mountain planning area. Ignoring winter use in the forest planning process means these user conflicts are allowed to persist indefinitely, contrary to Executive Orders 11644 and 11989. These conflicts are largely due to the disproportionate impact OSVs have on other forest users. While many quiet recreationists do not detract from OSV users' experience, the reverse is certainly not the case. In certain circumstances, just one OSV can significantly detract from those seeking the quiet and solitude of skiing or snowshoeing in winter. The noise, pollution and high speeds of OSVs not only degrades other users' recreational experience, they can also displace quiet recreationists. In forests frequented by OSVs, quiet users are often forced to go to areas that are usually less desirable for their recreational pursuits, or simply stop using the forest altogether as a result of the agency's lack of planning for OSV use.

iii. Preferential Treatment to OSV Use

We believe that by not planning for over-snow vehicle use, these users receive preferential treatment. In order to eliminate preferential treatment, winter planning should take place at the road/route/trail level across all areas of the Forest that are subject to winter use by OSVs. All motorized vehicles on the Forest should be subject to the "closed unless open" policy established by the 2005 Travel Management Rule. The Forest Service should also identify management zones and areas that will be managed for non-motorized in the winter. These areas should include at the very least, all recommended wilderness areas, areas popular among non-motorized winter recreationists, all recreation areas identified for non-motorized use in the forest planning process, winter habitat and other areas with ecological concerns, and roadless areas.

c. The Forest Service must examine the feasibility of management and enforcement for each alternative under projected budgets, including the cost of the motorized transportation system. We've attached a model and accompanying methodology developed by Dr. Michael Wing with University of Oregon that calculates the cost of the transportation system taking into consideration monitoring, enforcement, road and trail maintenance, installing signs, MVUM printing and publication, etc. (See Travel Analysis Program and Travel Cost Estimator)

[9] "Winter Recreation on Western National Forest Lands, A Comprehensive Analysis of Motorized and Non-Motorized Opportunity and Access," Winter Wildlands Alliance, 2006. From USFS data.

d. The Forest Service must analyze and minimize user conflict. It is important to note that non-motorized users are not likely to return to a given area once their experience is ruined by an objectionable encounter with ORVs. To help in your analysis, we've attached an annotated bibliography developed by Dr. Kreg Lindberg that documents much of the user-conflict research that's been undertaken on this subject. (See Recreation Conflict Report.)

VI. Factors to Consider when Developing NEPA Alternatives for Addressing Recreation

In designing the recreation elements of the planning alternatives, the Forest Service should utilize the information developed pursuant to Sections VI and VII to provide a range of recreation alternatives that will best provide for current and projected recreation needs in winter and summer while operating under known ecological, social, and financial constraints.

In the planning alternatives, and based on the information above:

i. Establish recreational goals and objectives for winter and summer for the planning area.

ii. Identify recreational zones, such as backcountry primitive, community interface, etc. based on overall recreational goals and objectives. Every analysis of recreation on National Forests should involve at least one alternative with a heavy emphasis on traditional, quiet, backcountry recreation that reflects the long history of walking, hunting, fishing and camping on our National Forests. For each zone, establish the desired future condition (that addresses both resource and social factors), management objectives, indicators, and infrastructure needs and gaps. Also establish standards and guidelines designed to achieve and sustain the desired future condition. In particular, establish standards for types of uses (e.g., only uses enumerated are allowed to occur; new uses are only allowed through special use permitting[10]), noise, visual quality, speed, and other thresholds based on capacity assessments. Also, establish standards for route densities (including trails, unauthorized off-road vehicle tracks, and roads, including Maintenance Level 1 Roads and roads outside of the Forest Service jurisdiction but that exist in the forest, together). Analysis of recreation on National Forests should involve at least one alternative with a heavy emphasis on traditional, quiet, backcountry recreation that reflects the long history of walking, hunting, fishing and camping on our National Forests. These opportunities are incredibly healthy and rare.

iii. Determine the facilities needed to meet the recreational goals and objectives established for each of the recreational zones.

iv. Identify educational and outreach activities needed to meet recreational goals and objectives for the general planning area and, as necessary, for particular recreational zones.

v. Meet recreational needs to the extent possible without exceeding capacities and thresholds as identified in Sections V and VII of the Recreation portion of this comment letter. In doing this, determine the ratio of dispersed versus permitted (i.e., outfitted and guided) recreation in each zone.

[10] See management area zoning in Great Sand Dunes National Park General Management Plan, April 2007. http://parkplanning.nps.gov/document.cfm?parkID=67&projectId=11015&documentID=19561.

vi. Examine interactions between recreation opportunities and other multiple uses. This examination should consider the impacts of non-recreation uses and activities on recreation opportunities, activities, and quality of experience. It should also consider the impacts of proposed recreation activities on non-recreation uses and values.

vii. Minimize impacts from ORVs (including snowmobiles) on resources, including natural quiet and other users and uses as directed in 36 CFR 219.21 (g), Executive Order 11644, as amended by Executive Order 11989, and the Travel Management Rule of 2005. To this end, the Forest Service should utilize the "Best Management Practices for Off-Road Vehicle Use on Forestlands: A Guide for Designating and Managing Off-Road Vehicle Routes," during the forest planning process to assist with formulating your alternatives relative to managing motorized recreation. These BMPs represent a comprehensive approach to managing off-road vehicle use and could help the Forest Service identify and develop an appropriate range of alternatives. In fact, Jim Furnish, former Deputy Chief in the Clinton administration, endorsed these scientifically grounded BMPs. Where the Forest Service suggests alternatives that do not comply with these BMPs, we would like an explanation as to why they were not followed. We have attached these BMPs (see document WCPR Best Management Practices) and hope that you find them useful.

viii. Reduce unnecessary duplication in recreation opportunities and better connect recreation opportunities on Forest Service lands with those on other public lands by coordinating to the extent feasible with other public land management and planning agencies. Special attention should be paid to existing or potential connections with community biking and hiking trails in order to better connect recreation opportunities across the regional landscape.

ix. Facilitate access via public transportation and community bike and walking paths to frontcountry portals in the National Forests by coordinating to the extent feasible with existing and proposed transit systems. Linking Forest Service recreation portals into community bike and walking paths not only reduces vehicle miles, increases convenience, and facilitates connections between communities and National Forest lands, but it also stimulates local economies by creating tourism opportunities.

x. Identify the financial cost of implementing each alternative, and provide at least one alternative that can be implemented at projected revenues.

xi. Disallow motorized and mechanized travel off the designated system. This includes any exceptions to the restriction on cross-country travel that are allowed for the purposes of motorized facilitated dispersed camping, motorized game retrieval, or other open areas for forest products gathering or recreational ORV use.

xii. Administratively designate special management areas. There are several designations that currently exist across the planning area including scenic areas, historical, geological, and botanical areas, and research natural areas. There are many more places across the planning area that would benefit from such an administrative designation with meaningful management prescriptions to protect their unique values. These Administratively Designated Special Management Areas would be similar to the Bureau of Land Management's use Areas of Critical Environmental Concern. In addition, these administrative designations should be accompanied by appropriate management prescriptions to ensure that the important values that occur in these areas are protected. It

is entirely within the agency's discretion to administratively designate these special management areas, and we encourage the agency to use this discretion.

VII. General Recreation Planning

a. Conducting a Baseline Assessment

In order to plan for current and future recreation needs, the Forest Service must first understand the baseline recreation conditions on each forest. Understanding relevant facts and circumstances is critical for a successful and balanced recreation planning process.

Forest planning shall provide the best available information about:

i. The physical and biological characteristics that make land suitable for recreation opportunities as directed in 36 CFR 219.21 (a) (1).

ii. Existing recreation. This should include information on existing uses (including dispersed, developed, and special uses), opportunities, settings, experiences, and infrastructure, and descriptions of highly valued recreational areas.

iii. Resource impacts related to current recreational use.

- *Particular resources currently impacted by recreation*. Identify particular resources impacted by existing recreational use. These should include, but not be limited to:
  - Biological resources
  - Physical resources including soils, water courses, and geologic features
  - Natural soundscapes
  - Viewsheds
  - Cultural resources
  - Social resources, including use conflicts amongst recreational uses
- *Types of impacts typically associated with different categories of recreational activity*. Use best available information from scientific studies and monitoring to describe the impacts on forest resources typically associated with the specific recreational uses that occur on the forest.
- *Particular resources with specific sensitivities to different types of recreational uses.* Describe the requirements of specific species or resources of concern as related to recreational use. For example, sage grouse leks require a minimum distance buffer in which ground disturbance is not allowed.

iv. Regional context. This section should describe outdoor recreation opportunities in the forest region with the purpose of reducing duplication in recreation offerings. Often unlike surrounding lands, National Forests have the ability to provide recreational opportunities on large, connected landscapes and to provide a true wilderness experience.

v. Regional and local transit (including trail) systems that interface with the planning area. The purpose of this element is to better understand how forest visitors may travel to and from the forest planning area. Particular attention should be paid to identifying trails on National Forests that potentially intersect with nearby community trails, and identifying public transit opportunities (existing, planned, or potential) that could be tied to recreational trailheads and destinations.

vi. Non-federal land that impedes recreational access

vii. Current and recent revenue sources and amounts for managing recreation

viii. Current partnerships related to recreation.

ix. The visual resource in accordance with 36 CFR 219.21 which states that the agency shall inventory and evaluate the visual resource as an integrated part of evaluating alternatives in the forest planning process, addressing both the landscape's visual attractiveness and the public's visual expectation and that management prescriptions for definitive land areas of the forest shall include visual quality objectives.

b. Recreation Assessment
Using the baseline information collected above, the Forest Service should assess recreation needs and impacts—ecological, social, and financial; current and projected.

Forest planning shall assess, utilizing the information above:

i. Recreation niche: i.e., the recreational settings and experiences which the forest is best suited to provide based on a number of factors including physiography, regional context, protected lands, etc.

ii. Ecological and social capacity: Capacity should be identified on an area-by-area basis (preferably by watershed), and should address both ecological and social factors. A variety of models currently exist on which the Forest Service may wish to base its capacity modeling. Please see attachment entitled "Review of Recreation Management Frameworks" for a brief summary of several extant models.

iii. Effect of non-recreation activities (both existing and planned) on the forest's ability to provide high quality recreational opportunities to a broad spectrum of Americans. For example, the plan should include an assessment of the impacts of allowable oil and gas development, logging, and other non-recreational ground-disturbing activities on recreational experiences and settings as directed in 36 CFR 219.21 (d).

iv. Existing or potential conflicts between different types of recreational uses. Describe conflicts that exist or that may arise amongst recreational users.

Potential bases for conflict include different intensities and styles of trail use (e.g., mountain biking versus hiking), noise, threatened safety, and aesthetics.

v. Recreational needs for dispersed and developed recreation, including consideration of educational providers (e.g., schools, educational NGOs) and other special uses. Provide an analysis of existing and projected recreational needs and desires using best available information such as surveys, SCORP data, demographic data, recreational participation and trends, public school needs, and regional market analyses (e.g., demand on non federal recreational opportunities).

vi. The adequacy of current recreational opportunities and facilities to meet existing and projected needs.

vii. The recreational preference of quiet recreational user groups and the settings needed to provide quality recreation opportunities

viii. The minimum route system to provide adequate access for recreation and the feasibility of connecting recreational access points on the National Forests with transit and local routes including trails. The minimum route system should balance the costs (including risks to natural resources of each route and a fiscal assessment of the transportation system) and benefits (including the recreational and forest management value of each route), and should capitalize on opportunities to connect NFS lands with surrounding communities.

ix. A holistic economic analysis of the recreation components of the plan. The plan should include an analysis of the costs and benefits of recreation policies, infrastructure, enforcement, and mitigation of recreation impacts. This analysis should address all forms of recreation rather than focusing solely on motorized recreation or on commercial recreation businesses. Recreation opportunities on National Forests and Grasslands are among the many amenities provided by these public lands which make rural communities attractive to a growing number of footloose entrepreneurs, retirees and others who are able to choose where they live. The forest plan must consider this particular benefit of recreation in evaluating plan alternatives. See the economic section of this letter (Section V) for a detailed discussion of the role of recreation (and other related economic sectors) in local economies. See attachment titled CORS Economic Impact DSS v. 2.0 and WWNF Economic Impact Report for a model and recent study by Dr. Kreg Lindberg that estimates the impact on local economies of forest-based recreation developing using multipliers from Eastern Oregon as part of the Wallowa-Whitman National Forest's Travel Management Planning Process.

c. Monitoring and Adaptive Management

The Forest Service must provide an effective monitoring and adaptive management protocol to ensure that resources are adequately protected and that high quality recreational opportunities can be maintained for generations to come.

For all planning alternatives:

i. Forest Supervisors have the responsibility to establish monitoring intervals and criteria (FSM 2353.04(h)(8)). Forests should be required to develop an annual monitoring plan, and the results of that monitoring should be made available to the public annually. The forest plan should include a protocol for monitoring compliance with relevant laws including the Clean Water Act, Endangered Species Act, National Historic Preservation Act, Forest Plan standards and progress towards achieving the desired future condition under each alternative. The plan should identify parameters, acceptable ranges, thresholds that trigger adaptive actions, recurrence of monitoring for each parameter, written requirements for record keeping of monitoring results, and costs of monitoring. The forest plan should include a list of minimum and suggested data sets to acquire for resource analysis.

ii. Identify specified management actions that will be taken if monitoring shows that adequate progress towards achieving the desired future condition is not occurring, thresholds are exceeded for specified parameters, or standards are not being met. At a minimum, please identify a suggested procedure to follow if illegal use or environmental damage is witnessed by field personnel or forest users.

iii. Citizen monitoring must be considered by agency officials. When citizen monitoring data demonstrates that inadequate progress is being made towards achieving the desired future condition, that thresholds are exceeded for specified parameters, or that standards are not being met, managers must implement specified management actions to correct on-the-ground conditions.

iv. Implementation Plan for Motorized Use. Travel management culminates with the publication of the Motor Vehicle Use Map. The MVUM by itself provides little or no guidance for officials beyond the designation status of a road and any potential seasonal closures. An implementation plan that includes monitoring, maintenance, adaptive management and triggers, enforcement, decommissioning, reclamation, and visitor education and outreach is necessary. Without this, the MVUM will be much less effective and motorized recreation will continue to go unmanaged. To the extent that a Forest is lacking an implementation plan to accompany the MVUM for agency personnel to follow in order to manage ORV use, the Forest Service should use the Forest Planning Process to make up for this shortfall. We've attached Wildlands CPRs "Six Strategies for Success: Effective Enforcement of Off-Road Vehicle Use on Public Lands" (attached as Six Strategies Report) and "Best Management Practices for Off-Road Vehicle Use on Forestlands: A Guide for Designating and Managing Off-Road Vehicle Routes."

2. Forest Plan Proposed Action Fails to Recognize the Need to Increase Protection of the Last Wildlands

Despite the Forest Service's efforts to take into account the "best available science," it has overlooked the science regarding the human footprint on the planet and the incredibly urgent need

to protect our remaining wildlands. Interestingly, this is not uncommon as Sanderson et al. (2002) state in, *The Human Footprint and the Last of the Wild*:

> "Yet despite the broad consensus among biologists about the importance of human influence on nature, this phenomenon and its implications are not fully appreciated by the larger human community, which does not recognize them in its economic systems (Hall et al. 2001) or in most of its political decisions (Soulé and Terborgh 1999, Chapin et al. 2000)."

To map the human footprint Sanderson et al. (2002) used four types of data as proxies for human influence: population density, land transformation, accessibility, and electrical power infrastructure; a general suite of variables also used in mapping connectivity for wildlife. The final product, mapped at the global scale, illustrates that very few areas remain in the "least influenced" or "wildest" area in the United States. However, there are small areas, and when mapped at a finer scale, these areas correspond to existing Wilderness and the remaining slivers of roadless country on our Public Lands. Careful not to diminish the ecological importance of these relatively small fragmented pieces of our wildlands heritage, Sanderson et al. (2002) refers to the conservation value of these areas as "seeds of wildness."

Concerning management implications Sanderson et al. (2002) make the following recommendations:

> "Conservation practice will typically focus on restoring ecosystems, reconnecting habitat fragments, and reintroducing extirpated species in landscapes cumulatively influenced by roads, human land uses, and high human population density. Where human influence is low (e.g., last-of-the-wild areas), a wider range of conservation targets and actions may be possible. These targets and actions could include creating and managing areas of limited human use (i.e., protected areas)."

> "An important step in generating a willingness to use human capacity for, rather than against, nature is to acknowledge the human footprint. Part of that acknowledgment is a commitment to conserving the last of the wild—those few places, in all the biomes around the globe, that are relatively less influenced by human beings—before they are gone. In large part, this conservation effort will require legal, enforced limits on human uses of natural areas and the knowledge and capacity to manage well in all of the world's biomes. It will also require a willingness to forgo exhausting the last portions of natural ecosystems for short-term economic gain, because once they are gone, it will be very difficult and expensive to bring them back, if they can be brought back at all. To conserve the last of the wild, we must invest our talent and our resources to reclaim a more balanced relationship with the natural world."

Unfortunately the larger human community of the Blue Mountains does not generally appreciate the extent of the human footprint on our landscape. However, land managers with access to remote sensing data and peer-reviewed science have no excuse for failing to acknowledge what is clearly scientifically documented.

There is an entire body of scientific research clearly enumerating the many reasons why wildlands and roadless areas should be protected. Untrammeled wildlands such as Wilderness and roadless areas can be used as benchmarks for assessing the ecological integrity (e.g. genes, species, and assemblages) and processes (e.g., pollination, demography, biotic interactions, nutrient and energy dynamics, and metapopulation processes) expected in the natural habitat or region (see Karr and Chu 1995, Pimentel 2000). The species-rich native communities found in roadless areas

are more likely to withstand invasions (Gelbard and Harrison 2005). Planning is predicated on conserving a sufficient number of ecosystem replicates within protected areas in order to meet representation targets fundamental to conservation of species and ecological sustainability (see Noss and Cooperrider 1994). The Forest Service would advance ecosystem representation targets by solidifying protection for roadless areas (see Strittholt and DellaSala 2001), a goal issued at the international level by both the Millenium Ecosystem Assessment (MA 2005) and the Convention on Biological Diversity (UNEP, 2002). Roadless areas often contribute disproportionately to landscape and regional connectivity (see Strittholt and DellaSala 2001), a critical component of adaptation strategies for climate change, and should be protected as climate refugia.

When it comes to protection of the last remaining wildlands including roadless areas and wild rivers the Forest Service seems much more influenced by local social dogma, than by the best available science.

A. Evaluation of Potential Wilderness

From Letter sent to Blue Mountains Forest Plan Revision Team: March 1, 2010

Conservation organizations presented to the revision team a detailed inventory of all potential wilderness areas in the Blue Mountains. The inventory criteria used was the same as the USFS handbook. The revision team decided, based on a heavily skewed interpretation of the criteria to disqualify 203 of the 205 areas (non-IRAs) that we had identified from inclusion in the inventory. Many of our inventoried areas were field-verified and developed using advanced GIS technology. While we may disagree on certain areas, the disqualification of virtually the entire inventory is unacceptable.

One of the primary flaws in the USFS inventory process is related to the definition of a road. Chapter 70 of the Forest Service handbook inventory criteria identifies roadless areas as areas of sufficient size that do not contain "forest roads . . . or other permanently authorized roads." The definition of forest roads is: "A motor vehicle travelway over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified, or temporary." This definition is a dramatic departure from previous inventory criteria, which defined roadless areas as areas that "do not contain *improved* roads *maintained for travel by standard passenger vehicles*." We believe this criteria best meets the intent of the Wilderness Act and should be retained.

Applying the Chapter 70[11] language will lead to the exclusion of areas that contain unmaintained routes, high-clearance routes, off-road vehicle routes, administrative routes, other vehicle ways, and vehicle routes that are managed as trails. While inclusion of these routes may not be appropriate in areas that the agency is recommending for wilderness, they do not, in and of themselves, exclude an area from consideration. Many roadless areas—and wilderness areas as well—contain such routes, and it is clear that Congress does not view areas that contain such routes as being de facto eliminated from wilderness consideration. We believe that the original inventory criteria should be retained, and the presence of unmaintained routes, high-clearance routes and the like should be addressed in the evaluation process, not the inventory process.

Not only has the Malheur national forest rejected our entire inventory outside of IRAs, it has gone a step further and dropped entire roadless areas, again based on a flawed criteria process. We

[11] Note that we don't think Chapter 70 is even the correct FSH Chapter to be using. Please see section 14 of these comments below.

strongly urge you to add the Flag Creek, North Fork Malheur, Silver Creek and Fox Creek areas back into the inventory.

We are also concerned that the USFS is misapplying wilderness evaluation and management criteria prematurely during the inventory stage. This shouldn't happen until the evaluation stage. There appear to be a number of areas/acres that have been eliminated or not inventoried because of management concerns in general if they were to be recommended as wilderness. These situations are the most prevalent in areas where setbacks or buffers from roads or previous disturbances have been employed or large contiguous areas have been eliminated from the roadless inventory because they were connected by an isthmus.

Applying this type of management criteria may be necessary in the evaluation and recommendation of areas for wilderness (Stage 2) but is wholly inappropriate at this initial inventory stage. In Chapter 70 (FSH 1909.12), the directives indicate that the inventory and wilderness evaluation parts of this process are indeed separate by listing the specific criteria for each in separate sections (i.e., 71.1 Inventory Criteria; 72 Evaluation of Potential Wilderness Areas). Applying the evaluation criteria during the inventory stage results in tens of thousands of acres consistent with the Forest Service's roadless criteria left uninventoried.

The Forest Service must view roadless areas not only as potential future wilderness but also as ecologically significant resources that have value wholly independent of their potential future value as wilderness. "[T]he Secretary of Agriculture shall develop and maintain on a continuing basis a comprehensive and appropriately detailed inventory of all National Forest System lands and renewable resources. This inventory shall be kept current so as to reflect changes in conditions and identify new and emerging resources and values." 16 U.S.C. 1603.

B. Total Acreage of Administratively Recommended Wilderness Is Less Than 1% Of Potential Acreage

From Letter sent to Blue Mountains Forest Plan Revision Team: March 1, 2010

Of the 1.8 million acres conservationists identified as potential Wilderness, the USFS has found only 16,350 acres of recommended Wilderness. That means less than 1% of the potential wilderness areas are being recommended for Wilderness. There is no possible way to interpret this as an objective analysis.

For example, the Umatilla National Forest (UNF) has virtually no recommended wilderness and yet over 21% of the UNF is potential Wilderness. The UNF is surrounded by growing communities that are placing increasing demands on existing Wilderness Areas, as the visitor statistics support. Connectivity across the landscape is not being considered and critical species assemblages that need representation in the Wilderness System are being ignored. None of the seven designated wilderness areas in the Blue Mountains are immediately adjacent to one another, and some are separated by an interstate highway or valley. It is well known that species will greatly benefit from a more connected landscape in the face of climate change. Dry grand fir, dry ponderosa Pine, and moist forest are "under represented" in wilderness areas and 55,000 roadless acres of this type were identified. There are strong scientific reasons for evaluating these areas thoroughly.

Specific Comments on the "Wilderness Need Evaluation", Revised January 11th, 2010

- Table 1, page 1 shows that 21% of the Umatilla National Forest is potential Wilderness, 10% more than the Wallowa-Whitman and 12% more than the Malheur. However, the acreage

recommended for Wilderness on the Umatilla is trivial and does not include a single acre adjacent to the Wenaha-Tucannon Wilderness Area.

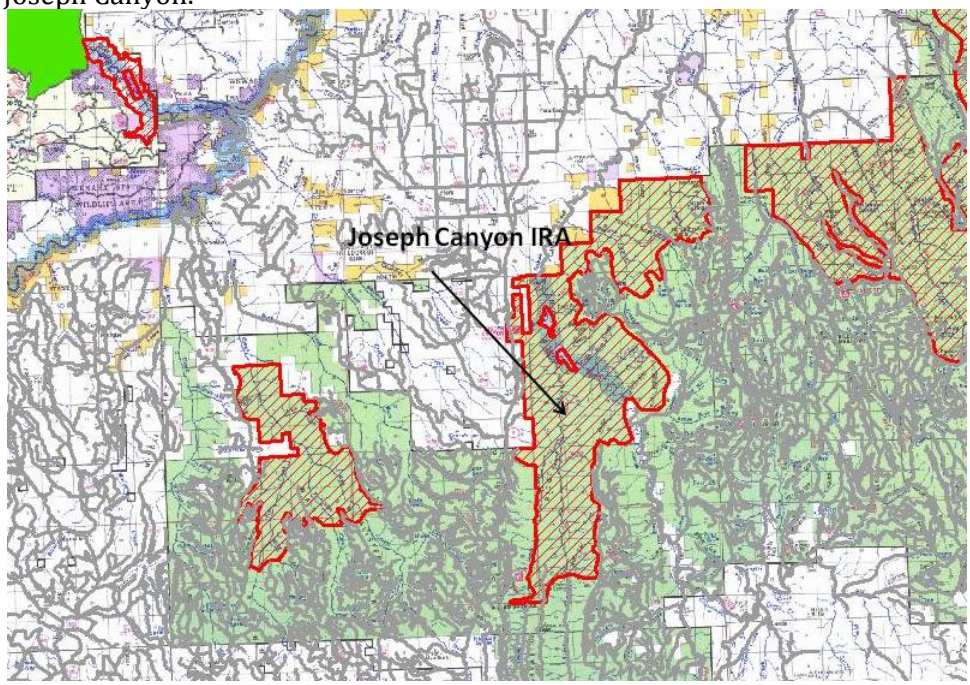
- Page 6 and Figure 2 (page 7). Of the entire Blue Mountains population which includes 15 counties in Oregon, Washington and Idaho, 57% lives in just three counties, Umatilla, Walla Walla and Nez Perce. Well over half of the total population of the Blue Mountains lives closest to the Umatilla National Forest where no meaningful recommendations have been made to accommodate the current population or the projected growth.
- Figure 4 (page 9). The Umatilla and Wallowa-Whitman NF's have the 6th and 7th most total Wilderness visits of all the National Forests in Oregon, Washington and Idaho behind only incredibly high profile west-side National Forests near major population centers and a very high profile Rocky Mountain National Forest and ahead of many well-known National forests. Despite what the Draft says, people are preferentially seeking out the Wilderness areas in the Blues over many closer areas.
- Page 10: "Within the Blue Mountains, the Umatilla National Forest is the most visited for all purposes and also contributes the highest wilderness area use."
- Page 18: "Participation in hiking and walking is expected to grow considerably over the next several years."
- Page 18: "Backpacking, primitive camping, fishing, and horseback riding will increase. Increases in wilderness area visitation may be expected for relaxing, nature study, picnicking, viewing Natural features, wildlife viewing, and visiting historic sites. Hiking and walking is projected to increase the most."
- Page 20: "In addition to hunting, relaxing, fishing, hiking, and walking will continue to be primary activities in the future."
- Page 25 and 26: "None of the seven designated wilderness areas in the Blue Mountains are immediately adjacent to one another, and some are separated by an interstate highway or valley. Connectivity between the existing wilderness areas is a very important element in the Forest Service's contribution to species diversity within the Blue Mountains." The draft fails to consider how expansion of existing Wilderness areas or designation of new areas would help to ensure long-term species connectivity across the Blue Mountains. The Forest Service does not consider if the existing Wilderness system is sufficient to ensure connectivity or what new potential core areas exist. These are fundamental questions that need answering for understanding the effectiveness of the reserve system and how it can be improved.
- Page 27 – 31: Forest Service should not wait until the perception of being overcrowded in Wilderness Areas becomes "common" before doing something about it. Already this perception is common during seasons of high use at numerous trailheads leading into the Eagle Cap Wilderness, the Strawberry Mountain Wilderness, and the Wenaha-Tucannon Wilderness Areas. As indicated by the substitute behavior on page 29, visitors to Wilderness Areas in the Blue Mountains expect to find little to no crowds and if overcrowding is perceived, people will go elsewhere. The Forest Service needs to plan ahead to accommodate the desire for Wilderness experiences that are not ruined by the perception of being "overcrowded." People that live in the Blue Mountains are sensitive to crowds, and people that visit often want to escape a sense of being crowded.
- Page 33: 55,000 acres of potential Wilderness containing vegetation types that are under-represented in the Blue Mountains were identified. No effort has been put forth to illustrate where these areas are, what roadless areas they are within, and to seriously consider Wilderness designation as a tool to protect these rare plant communities. In fact some of these areas are classified as dry Ponderosa Pine. Including representation of this plant

community type in the Wilderness system would be a huge asset as this plant community is mostly gone due to previous logging.

Highlighted Roadless Area's Ready for Administrative Wilderness Recommendation

While a long list of roadless areas could be highlighted, we choose just one from each national forest. It is particularly puzzling that the Forest Service apparently takes so little pride in our Wilderness legacy to overlook even the recommendation of one *new* major Wilderness Area.

1. **Joseph Canyon (Wallowa-Whitman National Forest)**: This roadless area lies adjacent to State Highway 3 on the northern boundary of the Wallowa-Whitman Forest, 20 miles north of Enterprise. The size estimates range from 25,904 acres to 40,221 acres. The area is well known, largely because of its proximity to State Highway 3 and popular roadside viewpoint that overlooks the 2,000-foot depths of Joseph Canyon.



Joseph Canyon Roadless Area *provides critical wildlife habitat, fisheries habitat, and quiet recreation in an otherwise heavily roaded landscape (roads in grey). This Roadless Area also contains Ponderosa Pine Woodlands and old growth forests rare to the area.*

All streams in the Joseph Canyon Roadless area are used by anadromous fish and provide spawning habitat for salmon and steelhead. The area includes Swamp Creek where it is designated as a Wild and Scenic River and includes the Oregon Conservation Strategy Area BM-24. The area is renowned for wildlife and includes Ponderosa Pine Woodlands and old growth forests. There is great historical value that includes all of the major peoples that have shaped the region; the Nez Perce Indians; pioneers and settlers, and early Forest Service. The trails have been used since time immemorial. The area is currently very popular with backcountry hunters and horse-back riding.

The table below is an excerpt from the Wallowa-Whitman National Forest Proposal Meeting Notes, La Grande Oregon (January 29, 2008). The Forest Service lists the semi-primitive

mechanized recreation as the only reason why the Joseph Canyon is not administratively recommended Wilderness.

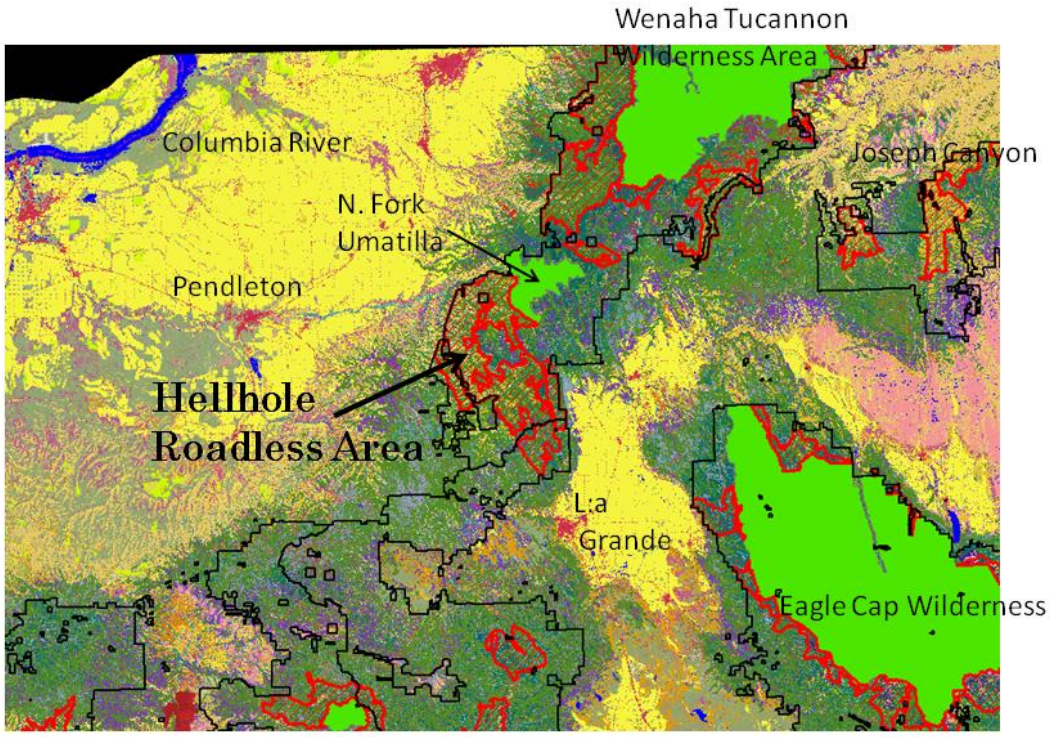
Joseph Canyon	None	Provides semi-primitive motorized and mechanized recreation opportunities

However, motorized use has been historically insignificant in this area and is already causing controversy. Bear hunters recently discovered ATV tracks at the confluence of Davis and Swamp Creeks and reported this to ODFW due to their concerns about impacts to the trails from ATV's. ATV's have never been in this area before. In contrast, traditional recreation has been well established for as long as anyone can remember. The Forest Service has no right to sacrifice history, culture, ecology, conservation, sustainability, cleanliness and more, for a motorized fossil-fuel burning "good time." The tradeoffs are that traditional non-motorized recreators will lose a place that they have been enjoying forever, and wildlife will lose the last secure habitat in the area. How can this be justified? The Forest Service should take action to protect this area.

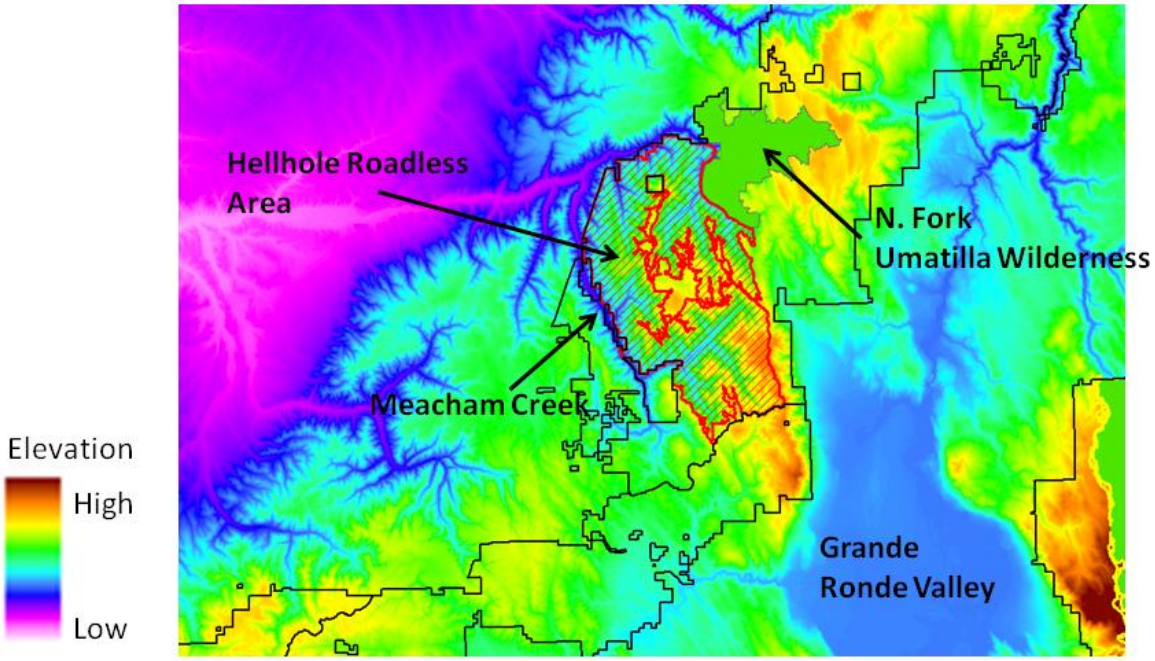
Reasons for Administrative Wilderness Recommendation

i. Joseph Canyon Roadless Area has well established and long history of backcountry hunting and horseback riding, and hiking, and is increasingly threatened by OHV's. Potential for conflict is very high in this area.
ii. Chico Trail has high historic value as a quiet use trail.
iii. Natural quiet and solitude needs protecting in Joseph Canyon
iv. Need to safeguard wildlife habitat security in this otherwise roaded area.
v. Very important connectivity between HCNRA and Wenaha-Tucannon Wilderness. Joseph Canyon is a "stepping stone" and stop over area for dispersing and migrating wildlife.
vi. Roadless Area contains old growth dry PAGS currently underrepresented in preservation system.
vii. Important steelhead spawning habitat and Wild and Scenic River.

2. **Hellhole (Umatilla National Forest)**: Just north of Mt. Emily and about 10 miles out of La Grande lies an enormous area of canyons and forests that occupies one of the most connective, undeveloped regions of lands left on the Wallowa-Whitman National Forest. Interestingly the actual "Hellhole" is seldom visited and considered deep backcountry. It further forms a connection with the tiny North Fork Umatilla Wilderness Area, and then more roadless country to the north that adjoins the Wenaha-Tucannon Wilderness Area. This is a critical connective corridor. The Hellhole is remote, has high natural solitude, and is a perfect place to let natural systems function (see Figures below). The Hellhole Roadless Area should be eagerly proposed and designated Wilderness. It would be an asset beyond what most people understand. The area provides a large area of big game winter range. There are eight dedicated Old Growth forests within the area. Also of note the Bureau of Reclamation has proposed constructing an earth-fill tuck embankment dam, approximately 1,100 feet long and 220 feet high on the North Fork of Meacham Creek, just west of this roadless area.



Hellhole Roadless Area *overlaid on a land cover map. The Hellhole extends across an important corridor of the Umatilla National Forest and forms a critical large scale animal movement and plant migration corridor. Wilderness designation would be the best and highest use of this land for many reasons, including climate change preparation.*



Hellhole Roadless Area *on Digital Elevation Model. This image illustrates that the Hellhole Roadless Area boundary includes high ridges along the Southeast boundary and then drops down to Meacham Creek (West boundary) and the Umatilla River (North boundary). Reserves that include broad elevational gradients have exceptional value for biological conservation. The Hellhole is one of the most important areas to protect on the Umatilla National Forest.*

3. **<u>Murderer's Creek</u> (Malheur National Forest):**

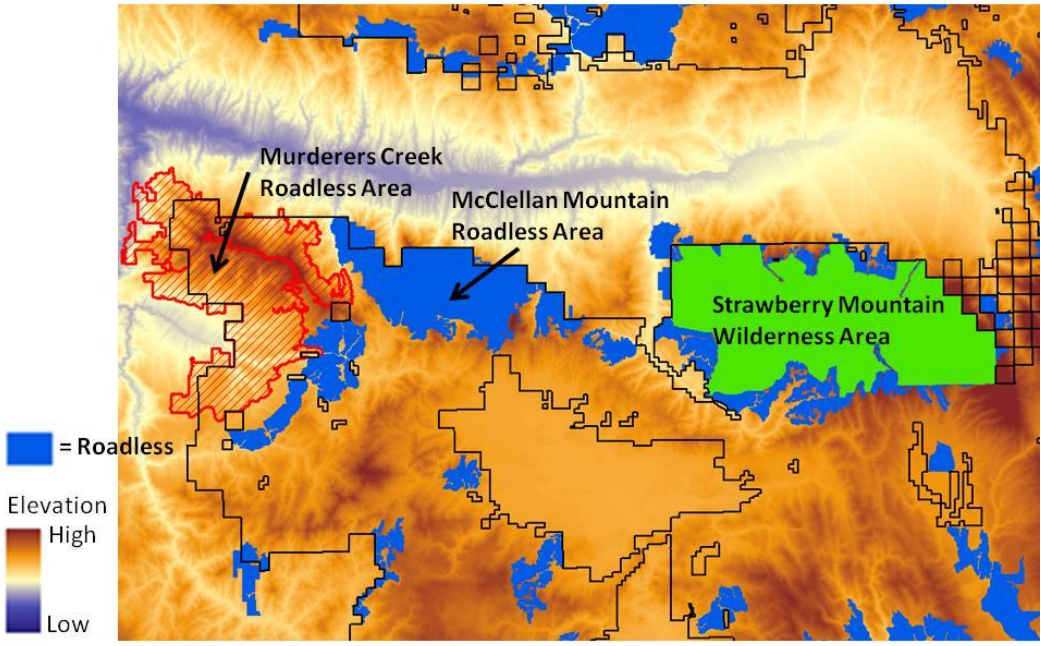
Aldrich ridge and the surrounding approximately 44,000 acre roadless area that has been referred to as the Murderer's Creek Roadless Area is an ecologically rare never-logged undeveloped roadless area forest. The contiguous roadless extent of this area includes the 5,000+ acre Aldrich, Dry Cabin, & Cedar Grove inventoried and uninventoried roadless areas, adjoining BLM and Oregon State lands, and the Todd roadless area, along with a mix of other uninventoried unroaded contiguous forests. This area includes redband trout and steelhead salmonid spawning streams and focal old forest habitat for American marten; wolverine; goshawk; Lewis,' black-backed, pileated and other woodpeckers; a host of neotropical migrant and native avian species; and other old growth forest dependent species (see photo at left). Its forests include the only Alaskan Yellow Cedar Grove remaining in the greater region. The area supports an abundant diversity of rare native forest flowers and plants. Forest soil communities are among the most ecologically intact remaining in the Blue Mountains region. The roadless forests include numerous springs, seeps, bogs, marshes, ponds, and waterways. Evidence of pre-European settlement era native presence abounds, including obsidian flake scatter sites, hunting points, trails, and campsites. Its watersystems are important salmonid tributaries to the Middle Fork John Day River. Adjoining roadless areas (Field Peaks, Moon Mountain and others) connect this large roadless expanse with the Strawberry Wilderness to the east and the Black Canyon Wilderness and Spanish Peaks roadless in the Malheur National Forest to the west.

This roadless area has been proposed for wilderness since the 1970's. Ecologically inappropriate harmful Forest Service logging and management projects, including the Aldrich, JOBS, Billy I and II, Thorn, and others, have been the source of public community contention, appeals, and litigation over the course of the previous decades. Each of these projects has been prevented from incurring harms in this rare ecologically intact large roadless area.

The area is poised to play an irreplaceable role in the maintenance of numerous regional and listed species and species of concern. Far ranging species such as wolves, wolverine, and lynx have potential habitat, refugia, and transitory connective habitat with adjoining roadless and wilderness to the east and west located along and near the geological fault line that raised the Aldrich ridge and connected ridges spanning from the Ochoco to the Strawberry wilderness.

It is imperative that the new BMFP provide permanent protection for this rare ecologically intact forest ecosystem and the many wildlife, avian, botanical, and aquatic regional species of concern and federal and state listed species this area supports. The Forest Plan must protect the unlogged roadless character of the entire contiguous

approximately 44,000+/- roadless potential wilderness area, and begin the substantive process towards its eventual wilderness designation.



Murderer's Creek Roadless Area *(red boundary): Protecting the East-West corridor stretching from the Strawberry Mountains and across the Aldrich Mountains is essential for connectivity. Murderer's Creek Roadless Areas is the largest contiguous Roadless Area in this area serving as critical core habitat for wildlife.*

C. Wild and Scenic Rivers

From Letter sent to Blue Mountains Forest Plan Revision Team: March 1, 2010

The Malheur National Forest hasn't found a river on the entire forest, over one million acres, that may have "outstandingly remarkable values" that would qualify to even be considered for potential Wild and Scenic. This is a blatantly extreme interpretation of the criteria of what qualifies as a wild and scenic river. As an example, many of our groups recommended the following rivers be inventoried as eligible Wild and Scenic Rivers on the Malhuer National Forest. These are: Big Boulder, Big Creek (Blue Mtn. Road), Granite Boulder, Big Creek/Lake Creek, the Little Malheur River, Murderer's Creek, the Middle Fork John Day River, South Fork Long Creek, Silver Creek and Vinegar Creek. According to the U.S. Forest Service, zero of these rivers were found eligible. The Umatilla and Wallowa Whitman National Forest inventories are also severely lacking, but not to the extent of the Malheur.

In conclusion, we have previously engaged in what we thought was a collaborative effort to work together in development of the plan revision. Our inventories and suggestions have been largely ignored and not seriously addressed. With so many of our proposed Wilderness areas not being recommended for Wilderness and zero rivers being found eligible on the Malheur, the disparity is so large that minor efforts to simply mend the inventory of potential and recommended wilderness would be wholly inadequate. We ask that you reconsider your inventories and do them justice with a fair and objective analysis. We urge you to slow down your forest planning process and ensure your forests have a credible roadless area inventory before basing future planning decisions on inaccurate and/or incorrect information. We also urge you to revisit your evaluations

of potential wilderness and what rivers qualify for Wild and Scenic River designation since there is such a dramatic difference in evaluations between the USFS and conservation groups. Let us make sure the stewardship of these forests is based on the best information available.

3. Old Growth Forests: Best Available Science Does Not Support Commercial Logging in Previously Unlogged Forests

Forests in their potential state are simply one of the most important ecosystems to preserve on Earth. The reasons for protecting old growth forests continue to accumulate, indicating the life-giving and supporting nature of these complex, interconnected ecosystems. Recent findings have shown the immense value of old growth forests for protecting carbon stores (Smithwick et al. 2002, Luyssaert et al. 2008, Hudiburg et al. 2009, Keith et al. 2009) and for continued accumulation of carbon in soils (Zhou et al. 2006). Unfortunately, old growth forests have been heavily targeted for logging in the Blue Mountains for over a century. Rainville et al. (2008) states:

> "From its beginning, logging preferentially removed large, old-growth ponderosa pine trees (Langston 1995). Management of the national forests emphasized efficient and productive forests capable of meeting the Nation's demands into the future. The emerging discipline of forestry at the time held that "inferior" diseased and decadent trees needed to be removed and replaced with young, healthy, rapidly growing trees."

While usually more subtle, this mindset persists in National Forests management today. The Forest Service attempts to persuade the public and itself that old growth forests need mechanical treatment, and then once in these stands are quick to apply stand density metrics derived from the industrial crop style forestry mentality. This is entirely unacceptable (*see section on Stand Density Index*). The Forest Service openly admits removing mature overstory Ponderosa Pine trees from designated old growth stands because the "canopy crown ratio is low," and "removing these trees will allow younger, more vigorous individuals to grow." It is the same mindset as expressed in the quote above, and overtime, this practice will progressively simplify stand structure and cause depletion of old growth characteristics such as snags and downed logs. Biodiversity will be systematically lost through this approach. Furthermore, the entire mentality implies subsequent entries when the "young vigorous trees" are ready to be harvested. We simply cannot maintain ecologically complete old growth forests in this manner.

The peer-reviewed literature warns that efforts at restoration of fire-adapted forests are jeopardized from economic pressure to cut larger trees than can be ecologically justified (Brown et al. 2004). The repercussions of succumbing to this economic pressure are heightened in relatively rare unlogged old growth forests that have a high value for conserving biodiversity (Noss and Cooperrider 1994; Strittholt and DellaSala 2001; Crist et al. 2009) and serve as refugia for sensitive terrestrial and aquatic species, have lower rates of invasions of non-native species, and provide reference conditions for understanding natural ecosystem processes (Crist et al. 2009). While the Forest Service wants more leeway to mechanically treat old growth forests, existing projects across the Blue Mountains indicate that less should be given. In these rare and ecologically complex unlogged old growth forests, there is no room for economic interests to corrupt restoration efforts. The peer-reviewed science repeatedly urges for a cautious approach to restoration dry forests, especially in unlogged ponderosa pine/Douglas-fir forests (Keeling et al. 2006, Noss et al. 2006).

Old Growth Forests Need a Specific Management Area Designation

All of the remaining old growth forests need to be protected and restoration efforts in dry forests should be firmly based on the best available science with no compromise. The classification of old growth forests as part of the General Forest Management Area creates a conflict of interest that will prevent this from happening. A separate designation for old growth forests in which timber production is not emphasized is a necessity. Restoration of the remaining old growth forests should not have to make money, or financially hold up other parts of a timber sale project. That's absurd. If the Forest Service's concern for old growth forests does not extend beyond the financial demands of the commercial logging program then old growth forests are best left unmanaged.

In fact the best available science tells us that previously unlogged old growth ponderosa pine/douglas fir forests have much lower tree densities than forests with a history of logging. (Naficy and Sala 2007) found that tree density in unburned, logged stands was approximately twice that in unburned, never-logged stands, and almost four times that in never-logged, fire-maintained stands. While fire exclusion increases stand density by promoting the growth of shade-tolerant trees, logging greatly compounds this effect. Relative to unlogged stands, logged stands exhibit a higher density of small trees and a higher density of small dead trees. This suggests that logging of forest stands for fuel reduction may actually create greater potential for high severity fires in the future. Keeling et al. (2006) compared forest stands exposed to different numbers of fires during the 20th century within remote sites in unlogged ponderosa pine/douglas fir forests in Idaho and Montana. While general trajectories of succession with absence of fire may be predictable, the structure and composition of unlogged ponderosa pine/douglas-fir communities across complex landscapes may be difficult to relate to specific exposure to fire or time-since-fire. This study highlights the importance of natural variability and heterogeneity in ponderosa pine/Douglas-fir forests of the inland Northwest, and supports other recent research calling for cautious approaches to restoration in these forests (Keeling et al. 2006).

Restoration of remaining unlogged lower-elevation sites should focus on the reintroduction of mixed-severity fire and protection from activities that may cause degradation or loss of existing old growth.

1) Evaluate passive opportunities for introducing fire without any mechanical treatment.
2) Use the minimal amount of mechanical treatment needed to safely reintroduce fire. This will typically include trees mostly in the 3-4" in DBH range and no larger than 8" DBH. Only hand crews should be permitted to enter existing old growth and previously unlogged forests.

Grand fir, which establishes under the shade of the other species, has notably thinner bark, and because of this feature is easily damaged by fire. With the burning of slash, grand fir will become progressively less abundant in this type, even if large diameter trees were to be left standing. (From Dr. Waring's declaration on the "Wildcat Fuels Reduction and Vegetation Management Project" EA). Once fire has been safely restored to these unlogged forests, it is the only tool needed in the future.

4. Mischaracterization of Mixed Conifer-Mixed Severity Fire regime as Low Severity Ponderosa Pine/Douglas Fir Forests

The LRMP Proposed Action makes several gross characterization errors regarding the historical condition of Blue Mountains forests. This is particularly important because to achieve

ecological restoration, as well as ecosystem-based management in general, managers need to understand how past disturbances shaped landscapes prior to permanent EuroAmerican settlement (Veblen, 2003).

The Old Forest Section states that "**The Blue Mountains were historically dominated by and well known for vast expanses of old forest single-story ponderosa pine. Frequent, low intensity wildfire is one of the dominant forces that historically created and maintained these stands** (pg 45)."

The scene described by the statement above with "vast expanses of old forest single-story ponderosa pine" dominating the Blue Mountains is a picture derived from the Ponderosa Pine forests of the southwest U.S. and applies only to limited geographical areas in the interior PNW (Keeling et al. 2006, Baker et. al 2007, Crist et al. 2009). Noss et al. 2006 states:

> Topographically complex mountain landscapes may be especially prone to mixed severity fire, because drier, south-facing slopes with lower fuel loads may burn at low severity while adjacent, moister, north-facing slopes that support higher tree densities experience high severity fire (Taylor and Skinner 2003; Spies *et al*. 2006) or escape fire due to wetter conditions. Evidence of mixed severity fire in moist ponderosa pine forests and mixed evergreen–conifer forests is accumulating (Shinneman and Baker 1997; Brown *et al*. 1999; Odion *et al*. 2004).

Since this well known publication, numerous studies have now conclusively shown that variable fire severity was the dominant fire regime and that mixed conifer forests were the dominant forest type in the Blue Mountains. Hessburg et al. (2007) used forest structure to predict pre-management era fire severity across three biogeoclimatic zones in eastern Washington State and offered the following conclusion:

> Mixed severity fires were most prevalent, regardless of forest type. The structure of mixed conifer patches, in particular, was formed by a mix of disturbance severities. In moist mixed conifer, stand replacement effects were more widespread in patches than surface fire effects, while in dry mixed conifer, surface fire effects were more widespread by nearly 2:1. However, evidence for low severity fires as the primary influence, or of abundant old park-like patches, was lacking in both the dry and moist mixed conifer forests. The relatively low abundance of old, parklike or similar forest patches, high abundance of young and intermediate-aged patches, and widespread evidence of partial stand and stand-replacing fire suggested that variable fire severity and nonequilibrium patch dynamics were primarily at work.

Hessburg et al. (2007) adds this very relevant statement:

> Our results suggest that low, mixed, and high severity fires each occurred in dry (and moist) mixed conifer forests of eastern Washington. The scope of management and restoration activities could be broadened to not only accept many such wildfire effects, but to manage for them. This should be good news for forest managers because it suggests that some contemporary wildfire effects will meet management objectives, and a broader suite of forest structural conditions and a broader range of patch sizes supported native fire regimes of mixed conifer forest.

Mounting evidence for variable fire severity

Schoennagel et al. (2004) review an extensive literature concerning pre-management era fire regimes of Rocky Mountains forests from Montana to New Mexico, including mixed conifer forests. They show strong evidence of variable fire severity in those types, but

> indicate that mixed conifer systems were probably dominated by mixed severity fires. Similarly, Baker and Ehle (2001), Ehle and Baker (2003), and Baker et al. (2007) show evidence for variable fire severity in ponderosa pine and Douglas-fir forest types.

Baker et al. (2007) in a study of ponderosa pine-Douglas fir forests in the Rocky Mountains, found the following:

> Historical sources and tree-ring reconstructions document that, near or before ad 1900, the low-severity model may apply in dry, low-elevation settings, but that fires naturally varied in severity in most of these forests. Low-severity fires were common, but high-severity fires also burned thousands of hectares. Tree regeneration increased after these high-severity fires, and often attained densities much greater than those reconstructed for Southwestern ponderosa pine forests. Exclusion of fire has not clearly and uniformly increased fuels or shifted the fire type from low- to high-severity fires. However, logging and livestock grazing have increased tree densities and risk of high-severity fires in some areas. Restoration is likely to be most effective which seeks to (1) restore variability of fire, (2) reverse changes brought about by livestock grazing and logging, and (3) modify these land uses so that degradation is not repeated.

In 2001 (Heyerdahl et al.) performed an extensive research study of a multicentury history of fire frequency, size, season, and severity from fire scars and establishment dates of 1426 trees sampled on grids in four watersheds representative of the Blue Mountains, Oregon and Washington. Heyerdahl et al. (2001) showed that fire regimes varied among and within watersheds. At the regional scale, dry forests dominated by ponderosa pine burned twice as frequently and earlier in the growing season in southern watersheds than in northern watersheds. At the local scale, fire frequency varied with different parameters of topography in watersheds with steep terrain, but not in the watershed with gentle terrain. Frequency varied with aspect in watersheds with topographic facets that acted as barriers to fire spread, and not in watersheds where the topographic facets interfinger without barriers. Frequency varied with elevation where elevation and aspect interact to create gradients in snow-cover duration and also where steep talus interrupts fuel continuity.

The best-available science does not support the following LRMP statement.

"The Blue Mountains were historically dominated by and well known for vast expanses of old forest single-story ponderosa pine. Frequent, low intensity wildfire is one of the dominant forces that historically created and maintained these stands (pg 45)."

Our intention is not to belabor this issue; however, it is going on ten years since this information has been well documented in peer-reviewed research. The LRMP is to guide management across 5.5 million acres for the next 15 to 20 years. If the Forest Service truly wants to manage on the best available science, it must openly recognize the dominance of the mixed severity fire regime in the Blue Mountains and the historical structure it created and remove this incorrect language from the document.

The Landscape Patterns Background section (pg 38) cites Langston (1995): "Wildfire of different intensities, along with storms, windthrow, and insects, created complex and shifting mosaics of forests across the landscapes of the Blue Mountains." This section also talks about patch and patch dynamics. This brief description of complex shifting mosaics of forests and patch dynamics is a more realistic picture of the historic Blue Mountains vegetative community and is incongruent with the description of "vast expanses of old forest single-story ponderosa pine maintained by frequent, low intensity wildfire."

Why does the Old Forest section fail to even mention any forest type besides old forest single-story ponderosa pine?

A. Misclassification of Forest Type and Disturbance Regime Results in Compounding Errors

The Proposed Action builds upon the incorrect starting point of "the Blue Mountains being historically dominated by vast expanses of old forest single-story ponderosa pine and a low severity fire regime" to make greatly exaggerated claims such on page 14 under Fire Adapted Ecosystems:

> "The potential for fires with uncharacteristically severe effects exists on approximately 60 percent of the three national forests."

This statement is repeated numerous times in the proposed action with no references. The Forest Service needs to disclose the peer-reviewed science that supports the claim that approximately 60 percent of the three national forests have a moderate to highly increased potential for uncharacteristically severe wildfire effects. Models and methods and the associated uncertainties should be discussed whenever such deterministic, quantitative statements are made that would drive management.

As described in the previous section, it is well documented that the mixed or variable severity fire regime is the defining fire regime of the Interior PNW including the Blue Mountains. It is simply illogical that 60% of the Blue Mountains could be at risk of uncharacteristically severe fire when the mean fire return interval of the mixed severity fire regime exceeds the period of fire suppression. The inherent variability of mixed-severity fire regimes precludes easy analysis of fire-exclusion effects, because high tree density or an abundance of shade-tolerant trees is not necessarily the result of fire exclusion (Noss et al. 2006). Past episodes of high-severity fires associated with droughts would have resulted in patchy stand ages across landscapes (Veblen et al., 2000), and therefore varying relative abundances of ponderosa pine and Douglas fir (Agee, 2003).

The following paragraph is from Baker et al. (2007):

> Under the variable-severity model, the proportions of the historical landscape that contained patches of different age and tree density would have varied substantially over time due to relatively long periods with minimal fire occurrence followed by episodes of widespread and severe burning at landscape scales (Brown et al., 1999; Veblen et al., 2000). This is an important contrast with the low-severity model in which low severity fires are believed to have occurred often enough to maintain a relatively uniform uneven-aged, old-growth landscape (Covington & Moore, 1994). For the variable-severity fire regime, more research is needed to characterize historical spatial variability in the proportions and configurations of particular categories of forest age, fuel loads and tree density across landscapes. However, any fixed restoration target (e.g. crown closure in ad 1900; Kaufmann et al., 2001) under the variable-severity model is inappropriate, as it may just be an instant when crown closure happened to be low due to preceding fires that were particularly high in severity. Instead a multi-century, landscape-scale restoration framework is needed. Although the variable-severity restoration model is incomplete at the landscape scale, it can still guide management response to severe fires. For example, the modern occurrence of extensive and severe fires in the Rocky Mountains should not be perceived as outside the historical range of variability for ponderosa pine–Douglas fir forest forests, and should not trigger efforts to create forest structures that would exclusively support low-severity fires.

5. Management Focus: Restoring and Maintaining Terrestrial Vegetation Conditions

A. Most Pressing Restoration Needs Are From Past Anthropogenic Impacts

The Management focus for **Restoring and Maintaining Terrestrial Vegetation Conditions** states on page 82:

> "The cumulative effects of a periodic and sometimes extended drought, climate change, increasing vegetative density, shifts in forest species composition, and modified landscape patterns have created vegetative conditions in many locations that are at high risk of impacts from large and uncharacteristically severe wildfires, and disturbance from insects and disease. Approximately 60 percent of the three national forests have a moderate to highly increased potential for uncharacteristically severe wildfire effects."

It is very disconcerting to see the Forest Service immediately framing the critical restoration needs across 5.5 million acres of National Forest Lands with the need for active management based on the scientifically controversial concept of "uncharacteristic disturbance." The overarching message in the peer-reviewed disturbance literature is the critically important and irreplaceable role that disturbance plays in the development and maintenance of biological systems, not that uncharacteristic disturbance is negatively impacting ecosystem function. Instead the restoration picture put forth on page 82 furthers the mindset of always looking for something wrong with the forest; too many insects, too much fire, too much severe fire, too many trees of one species and not enough of others, too much competition for resources, etc. This approach of assuming that something must be wrong with the forest is coupled with a lack of humility and little caution in approaching active restoration to ameliorate the perceived problems, and rarely incorporates opportunities based on the scientific method to learn from these experiences. Peer-reviewed science does not support this approach to restoration. Inappropriate application of restoration treatments on a landscape scale may lead to failed restoration efforts (DellaSalla et al. 2003).

Blue Mountains Forest Plan Should Place Greater Emphasis on Most Needed, Scientifically Supported Restoration Work

There are decades of pressing restoration and maintenance work needed on our National Forests that are scientifically supported. However, reducing the risk of "uncharacteristic disturbance" is not one of them. In fact the concept that we should prioritize vegetation treatments across large areas to "prepare" for climate change and reduce uncharacteristic natural disturbance is the same "command and control management approach" that has degraded and simplified vast areas across our National Forest system (Holling and Meffe, 1996).

Holling and Meffe (1996) state:

> A frequent, perhaps universal result of command and control as applied to natural resource management is reduction of the range of natural variation of systems-their structure, function, or both-in an attempt to increase their predictability or stability. That is, variation through time or space (such as system behavior over time, or spatial heterogeneity) is reduced. Thus, a common theme of many resource-management efforts is to reduce natural bounds of variation in ecological systems to make them more predictable, and thus more reliable, for human needs. We dampen extremes of ecosystem behavior or change species composition to attain a predictable flow of goods and services or to reduce destructive or undesirable behavior of those systems.

The Forest Plan should focus terrestrial Restoration on two general areas: (1) restoring the natural disturbance processes to the whole landscape, a passive approach regarded as the best way to create forest conditions more similar to those initially perceived by European settlers (McIver and Starr 2001, Wales et al. 2006) and, (2) restoration from the widespread, detrimental negative effects of a century of logging, road building, grazing, mining and fire suppression. It is well known that in the Blue Mountains previous logging has deprived the landscape of old growth forests (Rainville et al. 2008), not wildfire. Yet the Forest Service continues to plan old growth timber sales across the Blue Mountains that threaten century old trees in unlogged forests in the name of restoration. The tens of thousands of miles of roads across the National Forests have fragmented and destroyed habitat (WWNF TMP DEIS), not insects and disease. Insects and disease create habitat and are keystone species (Muller et al. 2008). Invasive weed spread is having massive global consequences including reducing biological diversity, altering ecosystem processes, and promoting extinction (Vitousek et al. 1996). The first step for limiting invasive weed spread mandated by the *Regional Invasive Plant Program EIS and ROD*, is prevention. The mineral resources desired condition (p. 63) should include language about restoration of past impacts. These are the pressing terrestrial restoration needs that should be focused on instead of baseless arm waving over reducing the risk of uncharacteristic disturbance.

Maintenance of terrestrial ecosystems should be driven by ecological sustainability, defined as maintaining the composition, structure, and processes of an ecological system (see Committee of Scientists 1999), considered the foundation upon which human social and economic systems depend (see Karr 2009). A recent letter to the Forest Service on National Forest System Land Management Planning NOI submitted on behalf of the Society for Conservation Biology makes the following recommendations that we strongly support:

> "Ecological sustainability also can be assessed with a broad suite of measures of ecosystem composition, structure, and processes (Committee of Scientists 1999, Pimentel et al. 2000). The regulations should therefore require the agency to evaluate the probability that management alternatives will maintain ecological sustainability as gauged by specific metrics such as ecological integrity (see Ulanowicz 2000, Karr 2000). Such an approach should allow the agency to integrate wildlife population viability approaches with broader ecosystem management planning efforts."

The Watershed Restoration section (page 84) states that:

" Watershed conditions in the Blue Mountains have been altered by a series of human uses over the last 150 years, including mining, logging, agriculture, water diversions, flood control, wildfire suppression, grazing, road construction and maintenance, and hydro-electric development"

These are the same factors that have had the greatest impact on the terrestrial environment. Please recognize the need to improve the clarity of direction toward restoring the conditions left by a century and a half of human use. The bullet points on page 83 do not include changes in grazing practices as a way to create more resilient and sustainable terrestrial ecosystems or as a way to create a landscape that is more resilient and better able to respond to climate change. This is a huge omission. Restoring damage from previous grazing and maintaining better grazing practices offer some of the greatest restoration opportunities on National Forests. The list needs to include reducing the road systems with meaningful decommissioning work. This should be a key ingredient of the restoration economy over the life-cycle of this Forest Plan.

Analysis of Existing versus Historic Conditions for Structural Stage and Potential Vegetation Groups within the Malheur, Umatilla, and Wallowa-Whitman National Forests

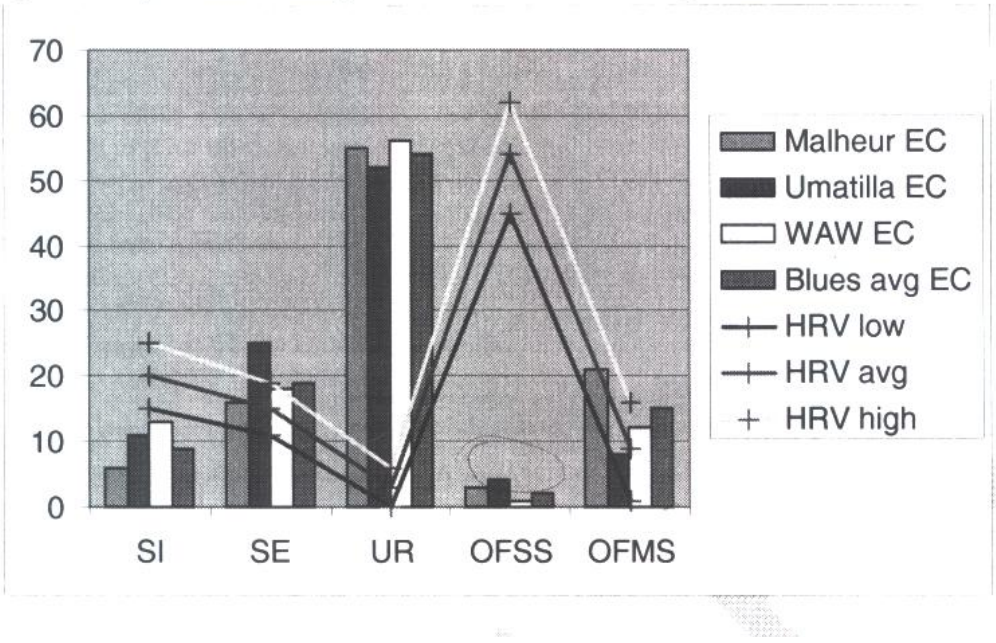
This section pertains to the above referenced report written by Bruce Countryman and Don Justice, updated Jan. 12th, 2009.

Old growth forest

The Forest Plan puts forth as a priority the restoration of open canopy old forest within the dry vegetation type (Draft Forest Plan pgs. 16, 45, 82 and 89). There are two general methodologies proposed to achieve this. First, the use of mechanical treatment to encourage accelerated development of single-story structure in previously logged sites within the appropriate biophysical environment. Second, the conversion of dry multi-story old forest (OFMS) to dry single-story old forest (OFSS). A third approach not recognized by the Draft Forest Plan is the restoration of natural disturbance processes to the landscape. It is critical that the Forest Service accounts for this factor as in some cases it will not be preventable.

Page 6 of the Countryman and Justice report states; "Dry multi-story old forest (OFMS) is within HRV at the scale of the Blue Mountains, but varies from slightly above to within HRV when viewed at the scale of the individual national forest. Dry single-story old forest (OFSS) is below HRV, both at the scale of the Blue Mountains, and for each national forest" (see figure below entitled "Figure 3. Dry Forest Existing and Historic Structural Stage Percent").

Figure 3. Dry Forest Existing and Historic Structural Stage Percent



This Figure illustrates that OFMS is right where it should be compared with historic conditions. It is imperative that the Forest Service does not take this for granted. Climate change threatens to reduce multi-story closed canopy forests more than any other forest type and when combined with fire and fuels management could rapidly reduce closed canopy forests below the Natural Range of Variability (NRV) (Wales et al. 2007, report attached). Wales et al. (2007) cautions that active management approaches that reduce closed canopy forests could overshoot reductions in NRV levels.

> *"The NRV for this landscape apparently does not support high levels of closed-canopy medium and large tree forests. Management direction to maintain these habitats should take this into*

consideration; objectives may be established to manage for more of this forest type than could be easily sustained."

Additionally "Old Forest Open Canopy" is within HRV for the moist potential vegetation group (Figure 4) and "Old Forest Closed Canopy" is within HRV for the dry potential vegetation group and at or below HRV for the moist potential vegetation group (Figure 5). All of this indicates that the Forest Service should refrain from conversion of multi-story old growth to single-story old growth, and should leave all Old Forest's in moist potential vegetation groups untreated. These conversions are not supported by the data shown here or the science and threaten to land OFMS and dependent wildlife species in the same condition as OFSS and dependent wildlife species. Applying highly experimental treatments to a forest structure that is already relatively rare and is serving a critical ecological role is unacceptable. This does not mean that reductions in small trees (approx. 8 in. DBH and less) and restoration of fire with the commensurate decrease in crown fire potential and moisture competition is not an option in OFMS stands. Those treatments may be appropriate in some cases. However, the multi-story to single-story conversions are much more heavy-handed (see section below entitled "Stand Density Index").

The lack of OFSS in Figure 3 is nearly exactly matched by the excess of forest in the understory reinitiation (UR) phase. It is a historical fact that due to the accessibility of OFSS, this forest type was logged heavily across the Blue Mountains (Rainville et al. 2008). These previously logged OFSS areas are now in the UR phase based on general succession rates in the Blue Mountains. The definition of UR is: "a second tree layer is established under an older overstory. Overstory mortality has created growing space for new understory trees" (pg 3, Countryman and Justice). Areas in the UR structural stage contain the reservoir of lands suitable for restoration to OFSS. The Forest Service would be wise to focus efforts to increase OFSS in the UR structural stage. However, it is critical that the Forest Service revisit the stand density science so that the fine line of accelerating single-story old growth structure and helping imperiled species that need this habitat can be honestly aspired too. Considering the realities and temptations associated with commercial logging, this will be a very challenging task. See Lindenmayer et al. (2006) for a checklist of strategies that should guide these efforts.

Figure 4. Old Forest Existing and Historic Structural Stage Percent for Open Canopy

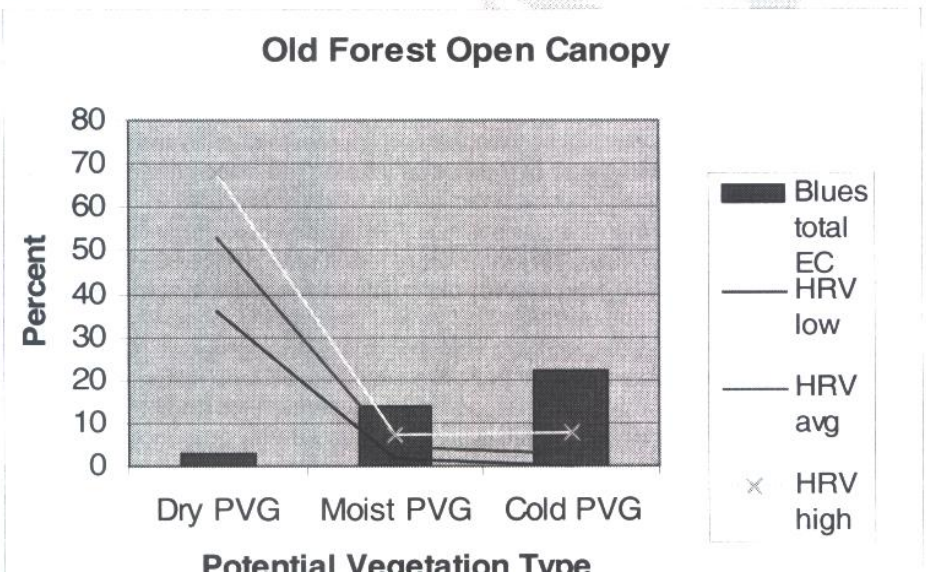
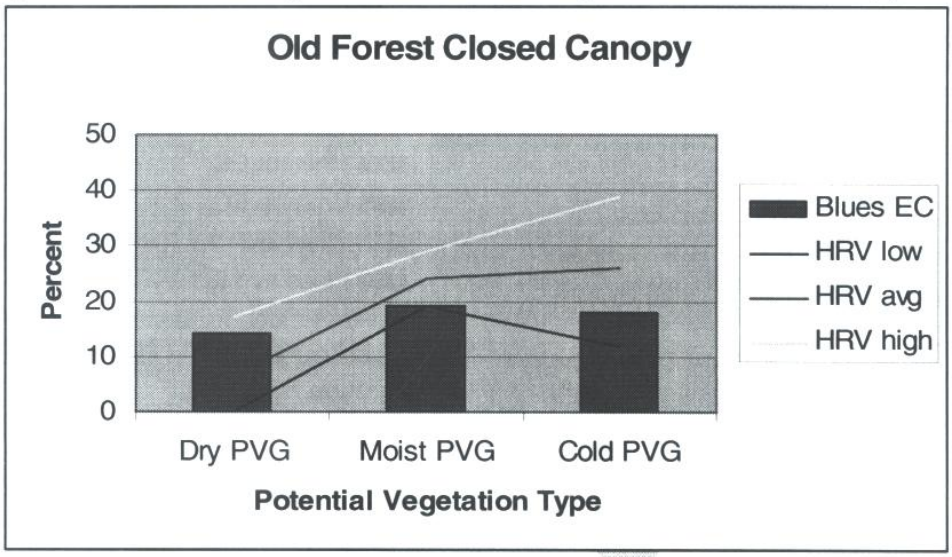


Figure 5. Old Forest Existing and Historic Structural Stage Percent for Closed Canopy



There is simply too much area in the UR phase to be mechanically treated and the best available science recommends limiting the scale of mechanized fuel treatments (Rhodes 2007, Rhodes & Baker 2007). The third methodology for increasing open canopy old forest is the restoration and allowance of natural disturbance processes across the landscape. Natural disturbance agents such as wildfire and insects are critical to restoring heterogeneity to the UR phase. Insect are nature's "thinning" agents and do so while building soil resilience instead of damaging soil structure as machinery does. Furthermore, the **natural disturbance scenario** modeled by Wales et al. (2007) for northeast Oregon **resulted in the highest amounts of all types of medium and large tree forests combined** and best emulated the Natural Range of Variability for medium and large tree forests by potential vegetation type after several decades. The Forest Service is greatly underestimating the ability of natural disturbance processes to develop old growth structure and overemphasizing high severity fire.

While the Forest Plan talks repeatedly about increases in high severity fire, please note that this is not supported by Figure 3 (above). The Stand Initiation (SI) phase, defined as "Growing space is reoccupied following fire or other stand-replacing disturbances" is second only to OFSS with regards to being "below the HRV." This phase should be much more abundant if high-severity wildfire were really occurring more frequently on the landscape. Contrary to this assertion, this critical stage of succession is dangerously low across the Blue Mountains. Please see the new report entitled "*The forgotten stage of forest succession: early-successional ecosystems on forest sites*" by Swanson et al. (2010).

B. Problems with Characterizing Disturbance as Uncharacteristic

One of the biggest problems with the Forest Plan Proposed Action for terrestrial vegetation is the heavy reliance on the concept of "uncharacteristic disturbance" and the need to "modify stand conditions to reduce the likelihood" of occurrence (Draft LRMP pg 83). Our comments describe several reasons why the Forest Service should eliminate reliance on the concept of uncharacteristic disturbance from the Forest Plan: (1) no proven methodology exists for quantifying the level of "disturbance extremeness;" (2) the concept of "uncharacteristic disturbance" is rooted in the increasingly irrelevant concept of historical baselines; (3) severe disturbance is characteristic; and (4) climatic conditions drive big fires and big fires do majority of needed ecological work (5) the

spatial scale is inconsistent with the need to direct management to previously logged dry forest type. Please address all of these points in the DEIS.

No Proven Methodology Exists for Quantifying the Level of Disturbance Extremeness

While it is clear that climate change is altering disturbance regimes (Westerling 2006, Mildrexler et al. 2009), ecosystem scientists have yet to develop a proven methodology for quantifying the level of "disturbance extremeness." In fact ecosystem scientists have yet to develop a proven methodology to even monitor and understand major disturbance events and their historical regimes at a large scale (Potter et al. 2003; Mildrexler et al. 2007). There is no scientific consensus for defining what constitutes an uncharacteristic wildfire, insect epidemic or disease outbreak across the range of vegetation communities on the landscape. Managers too often make decisions that impact natural resources on experience-based assumptions that are incorrect (Cook et al. 2010). We understand that for some issues information at the right spatial scale needed for management decisions is not available, however for other issues information is available and is simply not adhered too. For example, despite the rhetoric about insect outbreaks increasing large fires, research in various ecosystems have shown that fire risk is not increased after large insect infestations and instead is driven by other factors such as tree size classes (DBH), a factor heavily influenced by logging (Bond et al. 2009). The cool, moist, upper elevation forests of lodgepole pine, Engelmann spruce, western larch and subalpine fir are normally not highly flammable, (Schoennagel et al. 2007), even following outbreaks of bark beetles (see review by Romme et al. 2006). In general the science runs counter to using large-scale mechanical treatments to address these events (Veblen et al. 1991). Management that reacts to disturbance with mechanical modification of the post-disturbed environment has been shown to generally result in unilateral negative impacts to the ecosystem (Hutto et al. 2006; see http://cires.colorado.edu/news/features/03/logging.html and section on post-fire logging). Waring et al. (1992) showed that in the mixed conifer forest type of northeastern Oregon, nitrogen limits growth and defoliation of Douglas-fir and true firs by spruce budworm or tussock moth recycles this limiting element and foster increases in stand growth. Managing for the full range of disturbance intensities across the landscape is key to maintaining natural ecosystems that support a diversity of wildlife and is suggested as a better management approach than using the average or mean conditions for targets (Cyr, 2009; Hutto 2008).

The LRMP Proposed Action implies that managers will know where and what type of mechanical treatments to apply to the range of forest ecosystems to prevent and or minimize the risk of extreme disturbance when we have no information on what constitutes "uncharacteristic disturbance" or whether any mechanical treatment is warranted in the first place. The Forest Service does not disclose any scientific support for this plan and is making a dramatic "leap of faith" to suggest that treatments will have benefits that outweigh the collateral damage of the treatment itself; and the literature suggests otherwise (Rhodes, 2007; Rhodes & Baker, 2008). The Forest Plan should be based on established science, not untested and unproven experimental approaches.

Concept of "Uncharacteristic" is Rooted in Departure from Historical Conditions

Embedded in the concept of "uncharacteristic disturbance" is departure from historical conditions. Historical guidelines can instruct future management, but can often get used as crutches when managers begin to apply them blindly irrespective of the present conditions. In fact peer-reviewed science suggests careful attention should be given to current situations while being cognizant of the overall landscape objectives and settings, and, considering special species needs. For example, Brown et al. (2004) states:

> Past management practices may have led to development of old-growth stands with "unnatural" multiple canopy layers or accumulations of snags and logs, but these areas may provide key habitat that compensates for the loss and degradation of these habitat elements elsewhere (ICBEMP 2000; Wisdom et al. 2000). It may often be appropriate to attempt to secure such habitats from wildfire by treating adjacent areas (Agee 1996, 1998). Attention should be given to protecting large and old trees (Henjum et al. 1994, Allen et al. 2002). Large fir trees, especially those with heartwood decay, provide important habitat for many species (Bull et al. 1992, 1997; Bull & Hohman 1993), and efforts to "cleanse" the landscape of true firs should be avoided.

Using historical conditions as a baseline for management is widely regarded as a poor and unattainable target. Climatic conditions are changing and these changes are predicted to accelerate (IPCC 2007). This makes using historical conditions a questionable benchmark. Millar et al. (2007) states:

> There is no doubt that historical data have immense value in improving our understanding of ecosystem processes to environmental changes and setting management goals (e.g. Swetman et al. 1999). However, many forest managers also use the range of historical ecosystem conditions as a management target, assuming that by restoring and maintaining historical conditions they are maximizing chances of maintaining ecosystem (their goods, services, amenity values, and biodiversity sustainably into the future. This approach is often taken even as ongoing climate changes push global and regional climates beyond the bounds of the last several centuries to millennia (Intergovernmental Panel on Climate Change, 2007). As importantly, novel anthropogenic stressors such as pollution, habitat fragmentation, land-use changes, invasive plants, animals, and pathogens, and altered fire regimes interact with climate change at local to global scales. The earth has entered an era of rapid environmental changes that has resulted in conditions without precedent in the past no matter how distantly we look. Attempts to maintain or restore past conditions require increasingly greater inputs of energy from managers and could create forests that are ill adapted to current conditions and more susceptible to undesirable changes. Accepting that the future will be different from both the past and the present forces us to manage forests in new ways.

The Forest Service does not disclose or consider the mounting climatic evidence that runs counter to using a vegetation classification scheme which references conditions from the 1880's. Trends in climate observed over the past 50 years are likely to accelerate. The DEIS should disclose the mounting scientific evidence that questions the use of historical baselines as meaningful management targets and the limitations of evaluating disturbance events as departures from historical benchmarks.

Severe Disturbance IS Characteristic

The best-available science shows that one should not make the mistake of equating severe fires and insect infestations with "uncharacteristic" events. High severity fire has numerous ecological benefits and in western U.S. forests ecosystems there is less high-intensity fire now than there was historically, due to fire suppression (Hanson 2010). Patches of high-severity create the forest and montane chaparral habitats that are some of the most ecologically important, highly biodiverse, and rarest forest habitat in our western U.S. forests (Hutto 2006, Noss et al. 2006, Swanson et al. 2010). Many rare and imperiled wildlife species native to eastern Oregon, such as the Black-backed Woodpecker, depend upon unlogged patches of high-severity fire for nesting and foraging (Hutto 1995, Hutto 2006, Hanson and North 2008, Hutto 2008, Swanson et al. 2010). High-

severity fires also provide a bonanza downed wood which benefits aquatic systems (Beschta et al. 2004, Karr et al. 2004, Swanson et al. 2010).

Even in low-intensity dry Ponderosa Pine forests, scientists are calling for a re-thinking of the role of high severity fire plays. This is due in part to the understanding that restoration projects in Ponderosa pine and mixed Ponderosa pine-Douglas fir forests in the interior PNW have been heavily influenced by reports on the frequent, low-severity surface fires in the Ponderosa pine forests of the southwestern U.S. (Baker et. al 2007, Crist et al. 2009). The scientific data however, contradicts the assumptions that, prior to fire suppression, wildland fire in eastern Oregon's forests burned only at low-intensity levels and patches of high-intensity fire are somehow "uncharacteristic" or unnatural. We now know that forests of the intermountain west, including ponderosa pine forests, have burned at various severities historically, and high-severity fire is a natural part of this mix (Heyerdahl et al. 2001, Pierce et al. 2004, Sherriff and Veblen 2006, Baker et al. 2007, Hessburg et al. 2007, Sherriff and Veblen 2007, Klenner et al. 2008, Whitlock et al. 2008, Baker 2009, Crist et al. 2009). Leading avian scientist Dr. Richard Hutto has found that black-backed Woodpecker distribution patterns are extremely restricted to conditions created by high-severity fires and has called on ecologists and managers to consider the implications of high severity fire in all forest types. Hutto et al. (2008) states:

> *The implications of this distribution pattern are profound. For one, such a pattern illustrates that severe fire is not only natural, but may also be a necessary part of a wide range of forest ecosystem types in the Intermountain West and beyond. But in which forest types is severe fire well within the natural range of variation? The relatively high and statistically indistinguishable probabilities of detection among a wide range of burned forest types (Fig. 3a) would seem to suggest that severe fires occur naturally across a broad range of forest types and conditions, but it would be risky to draw such an inference from distribution data alone…. I believe the lesson best drawn from the data presented here is that perhaps we need to think more seriously about what the natural role of severe fire might have been in low- as well as high elevation forests. The woodpecker distribution patterns are certainly consistent with the idea that some level of severe fire is a natural (even if rare) occurrence in even the lowest elevation forests. This conclusion would be consistent with the conclusions of several recent studies showing that some of the low-elevation ponderosa pine systems are perhaps better characterized by mixed severity than by low-severity fire regimes (Agee 1993, Shinneman and Baker 1997, Brown et al. 1999, Veblen 2000, Schoennagel et al. 2004, Baker et al. 2007, Hessburg et al. 2007). Thus, statements claiming that severe fire in ''western'' forests is unprecedented and unnatural may be overly broad; they certainly do not apply to most conifer forests in the northern Rockies (Schoennagel et al. 2004, Noss et al. 2006).*

Climate Drives Large Wildfires

Studies of fire-climate relations in the interior PNW have found that regionally synchronous large fire years are strongly correlated with climatic conditions (i.e. warm springs, dry summers, and a positive Pacific Decadal Oscillation). Morgan et al. 2008 states: "The climate drivers of regionally synchronous fire that we inferred are congruent with those of previous centuries in this region, suggesting a strong influence of spring and summer climate on fire activity throughout the 20th century despite major land-use change and fire suppression efforts." Historical analysis from 1650-1900 in dry forests of the Northern Rockies (USA) has revealed that years with widespread fires are synchronized with significantly warmer spring-summers and significantly warm-dry summers (Heyerdahl et al. 2008). Westerling et al. (2006) in a comprehensive study of large wildfire in the western U.S. found that "the broad-scale increase in wildfire frequency across the

western United States has been driven primarily by sensitivity of fire regimes to recent changes in climate over a relatively large area." Westerling et al. (2006) concludes:

> "The overall importance of climate in wildfire activity underscores the urgency of ecological restoration and fuels management to reduce wildfire hazards to human communities and to mitigate ecological impacts of climate change in forests that have undergone substantial alterations due to past management."

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 (` et al. 2009).

When climatic conditions are right for wildfire, large blazes can and will occur irrespective of fuel loadings, fire suppression, and previous treatments. While these large wildfires may be misunderstood by the general public and are the subject of media hype, it is well known that the large, relatively rare wildfire events perform the vast majority of ecological work across the landscape. It is important that we plan for a tolerant response to some large wildfires, and to recognize that these events are part of the natural cycle. The current language of the Draft Proposed Action needs to be reworked so that these climatically driven fire events are not wrongly labeled as uncharacteristic, and therefore trigger a misguided and destructive suppression effort or post-mechanized extraction.

It is completely unrealistic for the Forest Service to have a Desired Conditions of "no smoke intrusions in smoke-sensitive receptor areas (SSRAs), which includes La Grande, Baker City, Pendleton, and John Day (pg. 36). These communities are part of the Blue Mountains and live in fire adapted ecosystems. The Forest Service should be educating people about the need to tolerate some smoke levels so that managers are more willing to let natural wildfires burn and to use prescribed fire. Please amend this desired condition to reflect the reality of living in the Blue Mountains.

Spatial Scale "Reducing" Uncharacteristic Disturbance Contradicts Other Objectives

Disturbances processes operate across all parts of the landscape and into forest types and elevations where management actions are not justifiable. The goal of reducing the risk of "uncharacteristic disturbances" with no spatial component contradicts other language in the Forest Plan Proposed Action, such as "concentrating active restoration activities (timber harvest, fire, and thinning) primarily in the dry environment" (pg 83). If the real goal is to reduce high-intensity fires in previously logged Ponderosa Pine/Douglas-fir Forests, than this is clearly covered by the Forest Plan language and we recommend that the Forest Service eliminates the use of reducing the risk of uncharacteristic disturbance as a goal or objective.

C. Stand Density Index

Where natural conditions plainly evidence higher densities and greater structural stand complexity than formulas may recommend, it is not the forests that are to be re-made to fit contrived human formulas, but rather the formulas themselves that must be revised to better match natural forest conditions, ecological patterns, and structural complexity. Such formulas are not intended to remake wild untrammeled nature, but rather form a hypothetical baseline by which to evaluate forest systems that have been significantly altered from their original natural patterns and structure by excessive logging, roads, and other management impacts.

Forests are far more than trees and presumptive "Upper Management Zone" Stand Density

Index hypotheses. Forest ecosystems are homes for a wealth of interwoven biodiversity, including numerous wildlife, avian, aquatic, botanical, fungal, and soil community species. Forest ecosystem hydrology contributes significantly to landscape aquifers and abundant clear flowing waters, as well as inherent dry season resistance and resilience to unnatural fire disturbance patterns. Forests are extensive banks of carbon sequestration critically important to helping offset and recover from the exponentially growing harms of climate change.

Old growth stands should be used *to define* the upper limit of stand density potential. In fact that is why old growth forests are referred to as being in a "potential state." Instead, the Forest Service is failing to recognize what the ecosystem is plainly demonstrating; that century old trees can co-exist in denser patterns than the combination of biophysical environment, stand density index, and upper management zone information suggest. In these stands the Forest Service is removing the most fire-resistant, early seral species while paying lip service to protecting "old growth forests" (see Sugar Appeal Appendix attached). These treatments are removing what would eventually become high quality snags and large downed logs in an already snag deprived landscape and favoring commercial characteristics such as crown ratios at the expense of verified old growth characteristics. Removal of large trees is exposing the soil to increased solar radiation thereby drying out the stands, spreading weeds, and setting the forest back centuries when it comes to the recovery of these old growth stands. Nowhere does the peer-reviewed science state that mature century and older Ponderosa Pine and Douglas fir trees should be cut down in the name of restoration.

Reliance on Non-Peer Reviewed 1994 GTR Report for Stand Density Treatments is Outdated and Creating Scientific Controversy

Page 83 of the proposed action lists lowering stand densities as a way to create a landscape that is more resilient and better able to respond to climate change. However, this is jeopardized by the faulty science currently being used to guide site-specific projects, and even with new science, depends on how and where the stand density reductions are applied. It is our understanding that the Forest Service has no current science that quantifies what stand density targets should be. The reliance on the Cochran (1994) report is completely unacceptable. The Forest Service claims that the Eastside Screens report from 1994 is out-of-date. And that report was an in-depth, comprehensive, collaborative effort, compared to the 1994 Cochran report. The Cochran paper is based upon a silvicultural tree-farm perspective where timber production is maximized and is not applicable to naturally regenerated stands. When applied to forests that have regenerated from natural conditions, simplification of the structure is guaranteed. For example, Cochran states:

> "Use of these curves cannot be expected to eliminate all insect and disease problems. Impacts of diseases, except dwarf mistletoe (*Arceuthobium campylopodum* Engelm.), and of insects, except mountain pine beetle (*Dendroctonusponderosea* Hopkins) and perhaps western pine beetle (*Dendroctonus brevicomis* LeConte), may be independent of density. Stands with mixed tree species should be managed by using the stocking level curves for the single species pre-scribing the fewest number of trees per acre."

The Forest Service is currently misusing the 1994 Cochran report to guide site specific projects. The methodology that the Cochran report is based upon is not capable of capturing even a snap-shot of the heterogeneity of the Blue Mountains Ecosystem and the complex vegetative community. Cochran et al. (1994) states for Proposed Method:

> "Values for SDIs at full stocking are not available for each species in each plant association for the Wallowa-Snake and Blue Mountain Provinces, but values for growth basal area

(GBA) (Hall 1987,1989) are given in plant association guides (Johnson and Clausnitzer 1992, Johnson and Simon 1987). We used some assumptions to relate GBA to SDI at full stocking and then created stocking level curves based on SDI values.

Despite the gross limitations and assumptions clearly stated in this report, the Forest Service is consistently applying treatments to a wide variety of forest types and conditions that systematically simplify stand structure. There is an urgent need to revisit what the ecologically appropriate stand density targets should be. Old growth stands should be used to tell us what the stand density potential, or upper limit is. The stand density science should be revisited and based upon new field studies that are more carefully planned to first, verify that the existing science is even correct, and second, develop a more realistic picture of the situation.

Tom Spies made some useful observations in the Northwest Forest Plan Monitoring Synthesis Report: "Certainly, the growth of trees into larger diameter classes will increase as stand density declines (Tappeiner and others 1997). At some point, however, the effect of thinning on tree diameter growth levels off and, if thinning is too heavy, the density of large trees later in succession may eventually be lower than what is observed in current old-growth stands. In some cases, opening the stand up too much can also create a dense layer of regeneration that could become a relatively homogenous and dominating stratum in the stand. Furthermore, if residual densities are too low, the production of dead trees may be reduced (Garman and others 2003). Thinning should allow for future mortality in the canopy trees."

Research in unlogged, fire excluded ponderosa pine/Douglas fir stands of the Northern Rockies found that trees above 8 inches DBH are well within the range of historically observed densities (Naficy and Sala 2007). This research suggests that tree cutting for restoration should focus on trees less than 8 inches in DBH, although not all of these should be taken to allow for future regeneration and dense patches as did naturally occur in some stands (see Baker et al. 2007). Passive restoration should be emphasized over active whenever possible.

Genetically modified species

No genetically modified species should be permitted on the National Forests. The genetic complexity and the intricacy with which the native tree species have evolved to the local topography, soils, and climate cannot be overstated. Science has shown that in unlogged forests, the individual trees best genetically adapted to a given micro-site will often succeed in out-competing other species. When this type of natural selection is occurring for hundreds of thousands of years, the resultant forest is incomprehensibly adapted to the local environment at multiple scales. Furthermore, the unwanted spread of genetically modified species is dangerous and examples abound of escaping modified genetic species that threaten the native gene pool. We ask the Forest Service to prohibit use of genetically engineered species. The most productive action that can be taken to help forests adapt to climate change is to let natural disturbance operate, protect all roadless areas from commercial extraction and from motorized recreation that is fragmenting these otherwise intact areas, and restore connectivity between these core habitat areas across the landscape.

6. Snags/dead wood, salvage logging, carbon storage and climate adaptation

A. Snags and dead wood

Table 10 shows that the desired future condition for down wood with maximums adjusted downward to ensure down wood levels are "sustainable." It is important to establish ecologically *optimal* amounts and size classes of dead wood for public lands. The concern about sustainability

must be tempered by the need for federal forests to mitigate for severely degraded conditions on non-federal lands.

Tables 11a and 11b show desired future condition for small and large snags. The FS needs to disclose how these figures compare to the DecAID tolerance levels for the species that need to most snags. Recognizing that wildlife population know no boundaries, and use both federal and non-federal lands, the FS need to consider the condition of down wood on the landscape as a whole, including non-federal lands. Looking at Tables 11a and 11b, it appears that far too much of the landscape will be dominated by areas with very low numbers of snags. This will perpetuate the existing deficit and fail to mitigate for past management practices and non-federal lands.

Snags are critically important for fish and wildlife habitat (many life functions), carbon storage, soil building, slope stability, and capture-store-release of water, nutrients, and sediment, etc. Current plan direction for protecting and providing snags and down wood tends to be focused on a small subset of the full spectrum of values provided by dead wood and does not ensure the continued operation of these ecosystem functions or meet the complete lifecycle needs of the many species associated with this unique and valuable habitat component. Please consider all the many values of snags and down wood presented in the scientific literature. The Blue Mountains Forest Plan Revision should review the key literature on all the functions and processes supported by snags and down wood:

1. 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 http://tinyurl.com/snagsrock
2. 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
3. Stevens, Victoria. 1997. The ecological role of coarse woody debris: an overview of the ecological importance of CWD in B.C. forests. Res. Br., B.C. Min. For., Victoria, B.C. Work. Pap. 30/1997. http://www.for.gov.bc.ca/hfd/pubs/docs/Wp/Wp30.pdf
4. Franklin, J.F., Lindenmayer, D., MacMahon, J.A., McKee, A., Magnuson, J., Perry, D.A., Waide, R., and Foster, D. 2000. Threads of Continuity. Conservation Biology in Practice. [Malden, MA] Blackwell Science, Inc. 1(1) pp9-16.
5. William F. Laudenslayer, Jr., Patrick J. Shea, Bradley E. Valentine, C. Phillip Weatherspoon, and Thomas E. Lisle *Technical Coordinators.* Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests. PSW-GTR-181. http://www.fs.fed.us/psw/publications/documents/gtr-181/
6. Hagar, Joan, 2007, Assessment and management of dead-wood habitat: USGS Administrative Report 20071054, pp. 1-32. http://pubs.usgs.gov/of/2007/1054/pdf/ofr20071054.pdf

An important and under-appreciated ecological process is the cycle of biomass accumulation (e.g., large snag and dead wood are vastly under-represented on the landscape because management is so focused on controlling and preventing mortality.) The full life-cycle of a tree starts with photosynthesis that captures carbon from the air to build a magnificent tree but it includes decades to centuries of "life" as a snag, down wood, and soil amendment before it returns to the atmosphere to begin the cycle again. The dead wood portion of this cycle needs to be re-established to enhance

biodiversity, hydrology, soil productivity, and carbon storage. The NEPA analysis needs to recognize the full life-cycle of forests including the ecological, hydrological and carbon-cycle value of both live and dead trees.

In dynamic forest ecosystems, life may be fleeting but the snags and logs that are created by density dependent mortality or by disturbance events provide important ecological functions and critical temporal links from one stand to the next. Under natural conditions, a forest hands down a large legacy of living and dead material from one stand to another even after an intense disturbance. Even non-stand-replacing disturbance creates pulses of dead material that are critical for forest ecosystems.

Many of the Forest Service's focal species rely on dead wood for important aspects of their life cycle. Pileated woodpeckers and cavity excavators use dead wood for nesting, foraging, and possibly communication. Goshawks, owls, and other raptors use dead wood for nesting, roosting, and to support a healthy prey base. Pacific fisher and American marten for denning, travel, cover, foraging, and prey base. Deer and elk use dead wood for cover and protection of bedding and fawning areas. Salmon, trout, and other aquatic species use dead wood for shade and stream cooling, hiding cover, spatial partitioning of habitat, energy dissipation, capture-storage-release of sediment and nutrients, and substrate and energy input for the food web that provides their food.

Secondary cavity nesters include numerous species of conservation concern including the Pacific fisher, American marten, bufflehead, flammulated owl, western bluebird, Vaux's swift, northern flying squirrel, and several bat species, plus bears, amphibians, invertebrates, and many others. Approximately 31% of the total bird fauna of this region use snags for nesting and denning, foraging, roosting, communicating, and as hunting and resting perches. (Raphael and White 1984), so the importance of dead wood as a habitat element cannot be over-stated. Snags and down wood also serve several crucial ecosystem functions related to site productivity, nutrient storage & cycling, hydrology, geomorphology, disturbance, and habitat (terrestrial, riparian and aquatic).

Snags are not just nice to have, they are an essential feature of old forests. A stand of big trees without snags is not a healthy forest. The ICBEMP Scientific Analysis Group (SAG) review of selected terrestrial vertebrate populations used "large snag density as a proxy for the structural quality of old-forest habitats" and they found that persistent low rates of snag recruitment are associated with several acute problems in the interior Columbia Basin.

> Key model factors contributing most strongly to low environmental index values and low population outcomes—
>
> *Families 1 and 2 (Old-forest families)—*
>
> • Low recruitment of large snags composed of shade-intolerant tree species, such as ponderosa pine, western larch, and western white pine, as indexed by moderate and high HRV (Lewis' woodpecker (migrant), pygmy nuthatch, flammulated owl), are the key factors contributing to low environmental index and low population outcomes.
>
> • Low quality of old-forest structural conditions (lack of diversity of size and decadence of large trees, large snags, and large logs), as indexed by declining large snag and/or large log trends (northern goshawk [summer], American marten, hoary bat), are the key factors. …
>
> *Long-eared myotis (Family 7)—*

• … decreasing snag trends (indexing low availability of roost sites) contribute to low environmental index and low population outcomes. …

Western bluebird (Family 8)—

• High HRV departure and declining large snag density (indexing a lack of shade-intolerant tree species recruited as snags) contribute to the low environmental index and low population outcomes.

Martin G. Raphael, Richard S. Holthausen, Bruce G. Marcot, Terrell D. Rich, Mary M. Rowland, Barbara C. Wales, Michael J. Wisdom, 2000. DRAFT Effects of SDEIS Alternatives on Selected Terrestrial Vertebrates of Conservation Concern within the Interior Columbia River Basin Ecosystem Management Project, March 2000, revised June 23 , 2000 and November 14, 2000.

The Blue Mountain Plan Revision must use best available science to establish numeric objectives (Desired Future Condition) for snags and dead wood to meet all the biophysical functions of dead wood. Recognize the Eastside Screens 100% potential population objective is no longer scientifically credible, but it does establish a clear principle that on federal lands, dead wood will be provided in sufficient amounts to support fully functional biophysical systems, and management should cause "no net loss" or slowing of natural recovery of the deficit of snag habitat. The Blue Mountains Plan Revision should not deviate from this underlying policy objective.

If the Forest Service chooses to use DecAID they should identify management indicators that have the highest need for small and large snags and down wood. Focal species, such as woodpeckers, secondary cavity users, and American marten, plus other key ecological functions, such as soil building and carbon storage.

Clear objectives for snags and dead wood must be established at multiple scales, including: subwatershed scale, focal wildlife home range scale, stream reach scale, and stand scale.

Prepare an inventory of current dead wood conditions by size and function, including both federal and non-federal lands that are used by populations of dead-wood-associated species**.**

Make a plan to meet those snag and dead wood objectives over the short- and long-term. The analysis supporting the plan revision must recognize that commercial logging treatments unavoidably "capture mortality" and reduce snag habit. Even restoration thinning intended to accelerate development of large trees reduces mortality that is another key attribute of late successional forests.[12] In the Windjammer EA, the Siuslaw NF noted that at least six times more coarse wood carries over from old-growth forests after wildfire compared to timber harvest, and the CWD left after logging is smaller and decays faster (*citing* Spies & Cline 1988)[13]. Ohmann et al (1994) found that non-federal forestlands do not retain enough snags to support viable wildlife

[12] Mortality of Douglas-fir and hardwoods was higher in controls than in thinned units. Liane R. Davis, and Klaus J. Puettmann, Gabriel F. Tucker. 2007. Overstory Response to Alternative Thinning Treatments in Young Douglas-fir Forests of Western Oregon. Northwest Science 81(1). 2007.

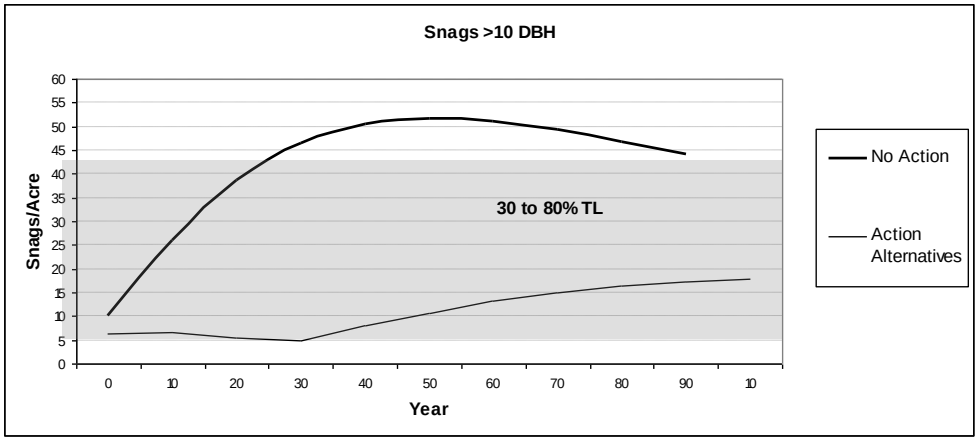
[13] Spies, T. A., and S. P. Cline. 1988. Coarse woody debris in forests and plantations of coastal Oregon. Pp. 5-23 in: C. Maser, R. F. Tarrant, J. M. Trappe, and J. F. Franklin, ed. From the forest to the sea: a story of fallen trees. Gen. Tech. Rpt. PNW- GTR-229. USDA Forest Service, Portland OR. http://www.fs.fed.us/pnw/pubs/229chpt1.pdf

populations[14], so federal managers likely need to retain more snags on federal lands to compensate. Even when snag removal is not an intentional design feature of a project, hazard tree felling normally occurs in all treatment areas, plus a safety buffer around all treatment areas, plus a safety corridor along roads, and other work areas. Furthermore, non-federal lands are not managed for snag habitat.

These are some of the reasons why Korol et al (2002) found that large snag habitat is below historic range of variability, and in the future would attain historic levels only in roadless and wilderness areas. Korol estimated that even if we apply enlightened forest management on federal lands in the Interior Columbia Basin for the next 100 years, we will still reach only 75% of the historic large snag abundance, and most of the increase in large snags will occur in roadless and wilderness areas. Jerome J. Korol, Miles A. Hemstrom, Wendel J. Hann, and Rebecca A. Gravenmier. 2002. 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 Given the current extent of the road network and the historic extent of logging, the cumulative effects analysis must recognize the inherent conflict between "forest management" (past, present and future) and snags and all their values. Protecting all unroaded areas >1,000 acres would be a good way to partially mitigate for the deficit of snag habitat and the adverse effects of management activities that "capture mortality" across the roaded landscape.

The Blue Mountains Plan Revision proposed action suggests that 60% of the three forests are at risk of uncharacteristic wildfire. The FS should compare the recent fire effects to the Desired condition in "Table 1. Severity and Frequency of Wildland Fire (Desired Condition)." Maybe fire effects are not as far out-of-whack as the FS presumes. The Forest Service plans extensive logging to address this risk. The proposed action also grants a waiver of requirements to protect old trees in the wildland urban interface which covers 20% of the three forests. The proposed action also contemplates continued regeneration harvest. All such logging will significantly reduce recruitment of snags and dead wood.

These three graphs from the Cottage Grove District's Holland Moonsalt EA clearly show the adverse effect of logging on large and small snags and down wood. This project involved more than 1,000 acres of commercial thinning of 40-50 year old stands retaining 40-90 trees per acre.



[14] Ohmann, McComb, & Zumrawi; SNAG ABUNDANCE FOR PRIMARY CAVITY-NESTING BIRDS ON NONFEDERAL FOREST LANDS IN OREGON AND WASHINGTON; *Wildl. Soc. Bull. 22:607-620,* 1994 http://www.fs.fed.us/pnw/pubs/journals/ohmann-snagabundance.pdf

Figure 18. Short and Long Term Changes to ≥10" Snags (Snags/Acre by Year)

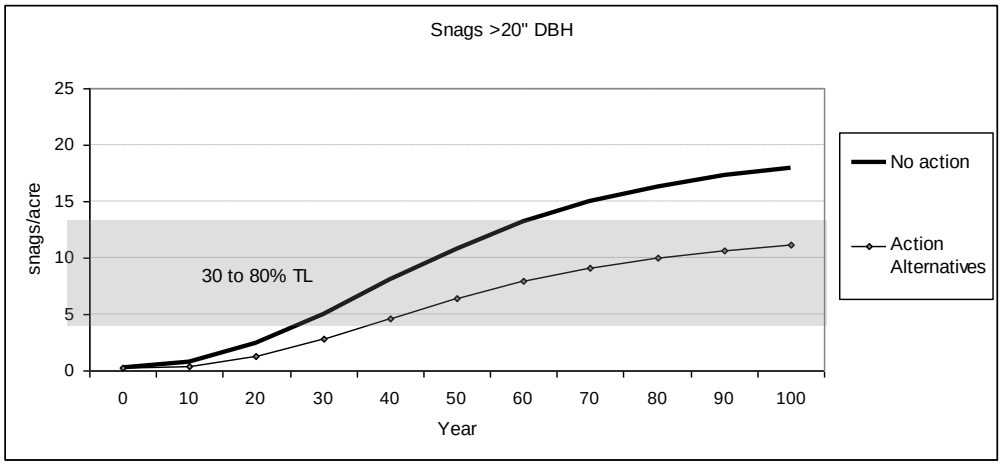


Figure 19. Short and Long Term Changes to ≥20" dbh Snags (Snags/Acre by Year)

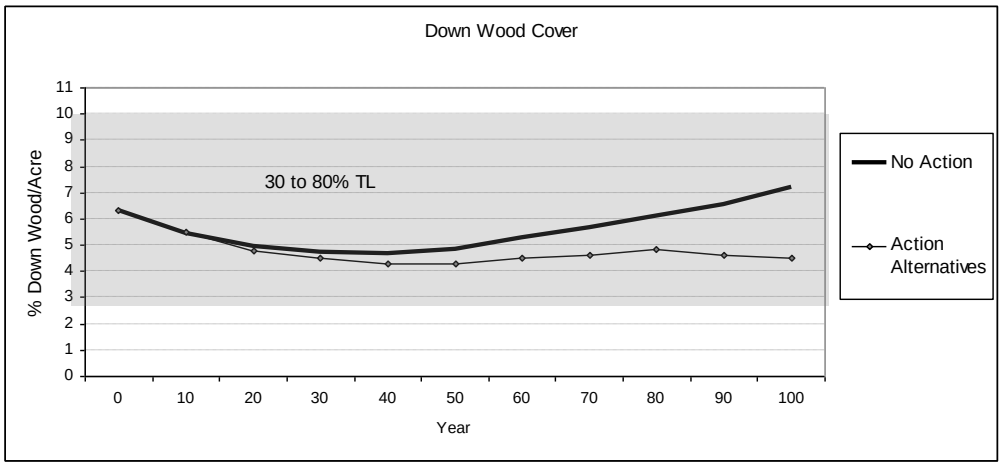


Figure 20. Short and Long Term Changes to ≥ 6" Diameter Down Wood

Umpqua NF 2009. Holland Moonsalt Timber Sale Project EA. Cottage Grove Ranger District. May 2009. http://www.fs.fed.us/r6/umpqua/projects/projectdocs/holland-moonsalt-thin/00-ea.pdf p 92.

Identify areas on the landscape where snag recruitment will be emphasized and tree removal will be limited so that natural mortality processes can fully manifest. The Blue Mountains Plan Revision must develop standards & guidelines that require significant unthinned "skips" embedded within treatments areas, so that the different habitat elements needed by wildlife, such as large trees, snags, and understory vegetation diversity are all available within close proximity, or at least within a fine scale mosaic. In addition, all unroaded areas >1,000 acres should be identified for conservation in order to maintain natural levels of snag recruitment that can help mitigate for the lack of snags in areas that acre actively managed with an emphasis on healthy vigorous trees. See above discussion of Jerome J. Korol, Miles A. Hemstrom, Wendel J. Hann, and Rebecca A. Gravenmier. 2002. 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

B. Early-Seral Post-Disturbance Habitat Management (aka "Salvage")

While we acknowledge the progress the Forest Service has made in reducing post-fire salvage logging, the practice is so ecologically devastating and consistently damaging that it should be prohibited.

> "**Any** postfire salvage logging operation that requires a consideration of the maintenance of biological diversity will have to deal with the facts associated with salvage logging, **which are unprecedented in terms of how consistently negative the ecological effects of salvage logging are…**The ecological cost of salvage logging speaks for itself, and the message is powerful. I am hard pressed to find any other example in wildlife biology where the effect of a particular land-use activity is as close to 100% negative as the typical postfire salvage-logging operation tends to be."
>
> Hutto, R.L., 2006. Toward meaningful snag-management guidelines for postfire salvage logging in North American conifer forests. Conservation Biology, 20: 984–993.

Throughout the proposed action standards & guidelines:

1. Change "should" to "shall."
2. Change "source habitat" to "potential suitable habitat that contributes to species population viability."
3. Require surveys for bats, raptors, and other focal species prior to potentially disturbing activities. Survey effort must result in a determination of presence/absence with a high degree of confidence.
4. Eliminate the WUI loophole which would allow significant degradation of ecological values across 20% of the three forests. Consider applying relaxed standards within the "structure ignition zone" in the immediate 200 feet around structures.

Black-backed woodpecker and boreal owl

G-4 Greater than 50 percent of post-fire source habitat should be retained and should not be salvage logged.

G-5 Salvage logging should not occur within burned **source habitat** areas less than 100 acres, except for the removal of danger/hazard trees. **[delete references to "source habitat." Replace with "potential suitable habitat that contributes to species population viability."]**

G-6 Where salvage logging occurs, all snags 21 inches DBH and greater and 50 percent of the snags from 12 to 21 inches DBH should be retained. except for the removal of danger/hazard trees. Snags should be retained in patches, **[Carry this through the planning process. Also, prohibit road construction. Change 21" to 20" dbh to better match the science. Use adaptive management and make it more conservative if science indicates a need. When removing small material, consider the complex tradeoffs between fuel objectives and carbon storage objectives.]**

Fringed myotis and Townsend's big-eared bat

G-7 Bat maternity and roost sites should not be disturbed.

[ADD: Prior to potentially disturbing activities potential bat sites shall be surveyed to determine presence or absence of bats with a high degree of confidence.]

Lewis's woodpecker

G-8 Where salvage logging occurs within **source habitat,** all trees and snags 21 inches DBH and greater and 50 percent of the snags from 12 to 21 inches DBH should be retained. Snags should be retained in patches, except for the removal of danger/hazard trees. **[Delete references to "source habitat." Replace with potential suitable habitat that contributes to species population viability.]**

Complex, early-seral forest habitat that is structurally rich and compositionally diverse provides some of the most biodiverse habitat in the forest but such areas are rare in the Blue Mountains. Only recently has the Forest Service begun to alter its nearly universal impulse to conduct extensive and intensive salvage logging after every fire. Salvage logging typically targeted the stands with the most, large snags and "dying" trees because they were the most economically viable, but this approach also unfortunately disproportionately degraded the most biologically rich early-seral forests as well.

Salvage logging and replanting after disturbance events will convert a structurally complex landscape into a simplified and biologically depraved landscape. 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.

The Forest Service must inventory and describe the existing condition of complex early-seral habitat, including the severe lack of such forests regionally and locally and on non-federal lands. "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

"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." 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. In review - Conservation Biology.

The Forest Service must develop a desired future condition. **That restores complex early seral forests to their place in the ecosystem, mainly through passive management of post-fire landscapes, NOT by regen harvest which does NOT mimic natural disturbance processes. The ICBEMP analysis showed that traditional salvage logging that removes large trees is not compatible with ecosystem management.**

> **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.

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

The Blue Mountain Forest Plan Revision must develop a science-based plan to restore complex early seral forest habitat and the species that depend on it. **The Forest Service must develop plans to restore early seral forest habitat, not through logging, but mostly through passive management of post-fire landscapes, which is the only sure way to create natural**

early seral habitat with abundant legacies. BLM's Western Oregon Plan Revision DEIS (p. LII) admits that structurally complex young forests develop old forest characteristics twice as fast as structurally deprived initial conditions.

The Forest Service must review and account for vast and growing base of scientific information concerning the significant adverse effects of salvage logging. The Forest Service must develop standards & guidelines to protect all large snags, and disclose the consequences if they fail to do so. The Forest Service should respect the intent to of the Eastside Screens which state "The intent [of management outside of late-old structure stands] is still to maintain and/or enhance LOS components in stands subject to timber harvest." Since large trees and snags are LOS components that will carry over from the old stand to the new stand they should not be removed after disturbance.

In particular, the analysis must recognize that one of the most significant effects of stand replacing disturbance is that it reduces or eliminates the pool of green trees from which future snags can be recruited, so stand replacing fire results in a future "snag gap" which occurs after most of the snags have fallen and until the new stand begins recruiting new large snags. Salvage logging that removes large snags (those most likely to persist into the early part of the snag gap), will exacerbate the adverse ecological consequences associated with the snag gap.

The Blue Mountains Plan Revision should consider an alternative ecological approach to post-fire management including:

- Document and inventory all the restoration "work" accomplished by the fire;
- Document the loss of green trees that would have provided future snag recruitment and identify new areas where replacement trees for future snag recruitment will be protected from logging in order to mitigate for fire effects;
- Rehabilitate fire fighting impacts (e.g. minimize erosion and block OHV use, re-establish native plant communities);
- Retain all large trees and all old trees that are either live or dead.
- Do not build any roads.
- Close roads to protect watershed values and avoid the need to remove hazard trees (except along well-travelled roads);
- Remove or resize culverts to provide for passage of fish sediment and woody debris;
- Make plans for managing *future* fire and fuels;
- Make plans to treat weeds that may become established in disturbed areas;
- Make plans to avoid as much as possible impacts from seeding (e.g. weeds and competition with native plant communities), planting (dense plantations), logging (e.g. loss of snag habitat, loss of cover, etc.); and
- Make plans for reforestation, with primary reliance on natural processes, and allowance for diverse early seral plant communities and long tree-establishment periods. Plant, if at all, in patches and at low density, not extensively and uniformly.

Additional considerations regarding salvage logging.

The analysis should consider the recommendations of the Society for Conservation Biology Scientific Panel on Fire in Western U.S. Forests. Reed F. Noss (editor), Jerry F. Franklin, William Baker, Tania 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.conbio.org/Sections/NAmerica/NAPolicy.CFM#NA20060228
http://www.conbio.org/Sections/NAmerica/FireWhitepaperExecutiveSummary.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/Sections/NAmerica/FireWhitepaper.pdf and 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

A recent article from respected scientists in one of the world's leading science journals said:

> … [N]atural disturbances are key ecosystem processes rather than ecological disasters that require human repair. Recent ecological paradigms emphasize the dynamic, nonequilibrial nature of ecological systems in which disturbance is a normal feature and how natural disturbance regimes and the maintenance of biodiversity and productivity are interrelated … Salvage harvesting activities undermine many of the ecosystem benefits of major disturbances. … [R]emoval of large quantities of biological legacies can have negative impacts on many taxa. For example, salvage harvesting removes critical habitat for species, such as cavity-nesting mammals, [and] woodpeckers, … Large-scale salvage harvesting is often begun soon after a wildfire, when resource managers make decisions rapidly, with longlasting ecological consequences….

Lindenmayer, Franklin, Hunter, Noss, et al., ECOLOGY: Salvage Harvesting Policies After Natural Disturbance, Science 2004 303: 1303

The Forest Service must consider the effect of regeneration harvest and salvage logging on young complex forests and the development of complex older forest. This analysis should consider:

a. 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.
b. 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://www.reo.gov/ecoshare/ccamp/Good_Forest_Opening.shtml

c. "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://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).

d. 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://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.")

e. 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

C. Climate Change Mitigation and Carbon Storage

The proposed action suggests that biomass energy conversion represents mitigation for climate change. However, this depends entirely on whether the feedstock is from forest exploitation or restoration. A number of scientists recently wrote to Congress urging that the climate effects of biomass energy be properly accounted for in setting future climate-energy policy:

> We write to bring to your attention the importance of accurately accounting for carbon dioxide emissions from bioenergy in any law or regulation designed to reduce greenhouse gas emissions from energy use. Proper accounting can enable bioenergy to contribute to greenhouse gas reductions; improper accounting can lead to increases in greenhouse gas emissions both domestically and internationally.
> ...
> [C]learing or cutting forests for energy, either to burn trees directly in power plants or to replace forests with bioenergy crops, has the net effect of releasing otherwise sequestered carbon into the atmosphere, just like the extraction and burning of fossil fuels. That creates a carbon debt, may reduce ongoing carbon uptake by the forest, and as a result may increase net greenhouse gas emissions for an extended time period and thereby undercut greenhouse gas reductions needed over the next several decades
> ...
> The lesson is that any legal measure to reduce greenhouse gas emissions must include a system to differentiate emissions from bioenergy based on the source of the biomass.

May 17, 2010 scientists' letter to Pelosi and Reid. http://216.250.243.12/90scientistsletter.pdf

The proposed action suggests that forest density needs to be reduced to increase climate adaptation. This proposal may be warranted in some cases but must be carefully evaluated. Any effort to increase climate resilience by reducing the density of trees must consider several factors:

- Dense forests provide rare habitat values;
- Dense forest canopy actually helps reduce fire hazard and increase stand resilience by maintaining a cool-moist microclimate with lower wind speeds under the canopy, shading and suppressing the growth of ladder fuels;
- In forests with intermediate or longer fire return intervals there is a low chance that fuel treatments will be subjected to wildfire and enjoy the benefits of modified fire behavior;
- Logging to reduce density will transfer carbon to the atmosphere thus exacerbating climate change, and
- Logging will add to the cumulative stress of climatic change (such as watershed impacts).

The Plan Revision must adopt standards to balance all of these aspects of the issue.

The proposed action erroneously asserts that logging to maintain big trees will increase carbon storage ("The desired landscape will provide a better contribution to carbon storage by reducing the uncharacteristic effects of wildfire and by storing more carbon in larger diameter trees."), but this statement is not supported by the evidence. In fact, thinning will result in a net reduction in forest carbon storage (even after considering any beneficial effect on carbon emissions from fire). See 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://ecoinformatics.oregonstate.edu/new/FuelRedux_FS_CStorage_Revision2.pdf 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." Gail Kimball, March 2009 Testimony before House Committee On Natural Resources, Subcommittee

On National Parks, Forests, And Public Lands.
http://www.fs.fed.us/fstoday/090320/02National_News/Final_USFS_Testimony.pdf

Climate change is now a global crisis that threatens many of the "ecosystem services" that support our economic systems and social systems. The Forest Service manages a significant portion of the global carbon cycle. Over the last 100 years a significant portion of the carbon that was stored on these lands has been transferred to the atmosphere. In the century preceding 1990 the conversion of old growth forests to plantation forestry in Oregon and Washington caused 100 times more carbon emissions from land use activities compared to the global average for similar sized areas. Harmon, M., Ferrell, W., and J. Franklin. 1990. Effects on Carbon Storage of Conversion of Old-Growth to Young Forests. Science. 9 February 1990. This of course accelerated changes in earth's atmosphere that threatens the stability of the climate that has fostered the birth and development of human civilization itself.

According to the US Department of Energy "Enhancing the natural processes that remove CO_2 from the atmosphere is thought to be the most cost-effective means of reducing atmospheric levels of CO_2. … R&D in this program area seeks to increase this rate while properly considering all the ecological, social, and economic implications. There are two fundamental approaches to sequestering carbon in terrestrial ecosystems: (1) protection of ecosystems that store carbon so that carbon stores can be maintained or increased; and (2) manipulation of ecosystems to increase carbon sequestration beyond current conditions."
http://www.fossil.energy.gov/programs/sequestration/terrestrial/index.html

On August 1, 2000 the US government submitted its position on land use and forestry as it related to carbon sequestration and it "Proposes strong incentives to remove carbon from the atmosphere through sound land management and to protect existing reservoirs of carbon, for example those in mature forests." The submission also: "Strongly supports rules -- including definitions of key terms such as reforestation -- that help protect forests and avoid creating "perverse incentives" (for example, to log old growth forests)."

http://www.state.gov/www/global/global_issues/climate/fs-000801_unfccc1_subm.html

A recent report from GAO finds that federal resource agencies (including the Forest Service) have not done enough to incorporate climate change mitigation and adaptation into their management. Out of 155 National Forests and 20 National Grasslands only 12 have land management plans that address climate change. GAO urged that all forest plans be amended to address climate change. GAO. 2007. CLIMATE CHANGE — Agencies Should Develop Guidance for Addressing the Effects on Federal Land and Water Resources. GAO 07-863.
http://www.gao.gov/new.items/d07863.pdf On July 10, 2007 Forest Service Chief Kimball responded to GAO asserting that —

> "Forest Service field managers address the effects of climate change by managing for resilient ecosystems that sustain the production of goods and services in the face of uncertain future conditions. … [and] Climate change mitigation and adaptation strategies will be included in future [forest plan] revisions. [and] the Four Threats emphasize two immediate consequences of climate change for land management agencies: forest fire and invasive species. [and] Forest Service researchers are firmly established as world leaders in forest-carbon measurement and carbon accounting. [and] USDA's Global Change Program Office was established to ensure that climate change issues are fully integrated into research, planning, and decision-making." http://www.gao.gov/new.items/d07863.pdf.

It's time for the agencies to walk the talk and do the things it claims to be doing. Climate change represents significant new information that should trigger immediate re-evaluation of forest plans to retain carbon stored in large old forests and limit carbon removal through logging.

The Forest Service should conduct an inventory of current carbon storage, and develop a clear and coherent plan to increase carbon storage in healthy ecosystems on the national forests. The FS must establish carbon storage targets (Desired Future Condition) based on society's urgent need to increase carbon capture and reduce carbon emissions; that means more forest growth and less forest killed by logging. Forest management should not *retard* the natural rate of carbon accumulation in the absence of management. All management scenarios must be compared to the natural rate of uptake and all management related rate reductions must be fully disclosed and mitigated.

The Blue Mountains Plan Revision must develop standards & guidelines that ensure timely progress toward the established goals. The FS must prohibit activities that continue to transfer net carbon from the land to the atmosphere, and the FS must avoid actions that would delay or retard the natural process of recapture and recovery of carbon storage. Meeting carbon storage targets will of course require that logging be appropriately limited, but these are public lands, and current priorities indicate that the public needs an increment of increased carbon storage that will contribute to climate stability, far more than they need a small increment of additional wood products.

Recommended carbon storage strategies include:

- Letting forests grow more and logging them less, by protecting all mature and old growth forests and large trees, adopting much longer harvest rotations (i.e. letting forests grow larger and longer between harvests).
- Retain more live and dead trees during harvest, so that stand level carbon stores are not depleted as dramatically during harvest. Thinning is much preferable to regeneration harvest. Oregon forests can grow for centuries without regen harvest.
- Reduce demand for wood products by recycling, using wood sparingly, and making things to last, so they do not need to be replaced as often.
- Avoid carbon losses from soil by reducing soil disturbance from roads, logging equipment, and grazing.
- In an era of global climate change, when considering traditional development scenarios that involve forest degradation, energy consumption and resource use, the "no action" alternative needs to be given more careful consideration.

Programmatic analysis as part of the Blue Mountains Plan Revision can help develop a scientifically sound framework for conducting project-level NEPA and analyzing site-specific impacts on carbon storage. In the context of logging activities, programmatic NEPA could be used to develop standards and guidelines that distinguish between:

- Logging projects that will emit unacceptable levels of GHG without any off-setting social benefits, such as logging for commodity extraction or logging in roadless areas or mature and old growth forests;

- Logging projects that may actually help reduce GHG emissions, such as removing only the smallest fuels from a small subset of forests with frequent fire regimes;[15]
- Logging projects that might cause modest net GHG emissions and high likelihood of off-setting public benefits, such as tree culturing or careful thinning of small trees in dense young stands to restore ecological health.

How the National Forests are managed has a real and substantial impact on how much carbon is stored. Management-driven deviations from business-as-usual can lead to significant increases or decreases in carbon storage. Depro, B., Murray, B., Alig, R., Shanks, A. 2008. Public land, timber harvests, and climate mitigation: quantifying carbon sequestration potential on U.S. public timberlands. Forest Ecology and Management. 255(3-4): 1122-1134. ("Our analysis found that a 'no timber harvest' scenario eliminating harvests on public lands would result in an annual increase of 17–29 million metric tonnes of carbon (MMTC) per year between 2010 and 2050—as much as a 43% increase over current sequestration levels on public timberlands and would offset up to 1.5% of total U.S. GHG emissions. In contrast, moving to a more intense harvesting policy similar to that which prevailed in the 1980s may result in annual carbon losses of 27–35 MMTC per year between 2010 and 2050.")

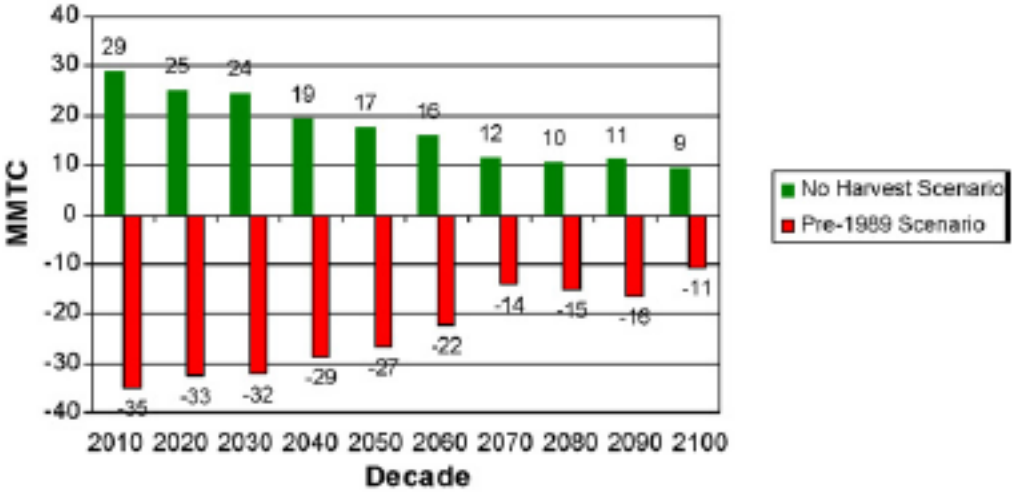


Fig. 8. Comparison of annual carbon stock changes with business-as-usual scenario.

See also: Alyssa V. Shanks. 2008. Carbon Flux Patterns on U.S. Public Timberlands Under Alternative Timber Harvest Policies. MS Thesis. March 2008. http://ir.library.oregonstate.edu/dspace/bitstream/1957/8326/1/A_Shanks_Thesis_04%2002%2008_final.pdf

We simply can't solve the climate problem without including forests in the solution. Forestry activities still cause 20% of global emissions of greenhouse gases. According to Peter

[15] 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://ecoinformatics.oregonstate.edu/new/FuelRedux_FS_CStorage_Revision2.pdf Although thinning can affect fire, in most cases the agencies are likely to remove more carbon by logging than will be saved by avoiding fire, except when the smallest fuels are removed from forests with the highest fire frequency.

Curtis, professor and chair of evolution, ecology and organismal biology at Ohio State University. "Biological carbon storage, mostly in forests, is one of those little wedges along with other ones you might think of, such as increased energy efficiency, using fluorescent light bulbs and the like. There is not one silver bullet." Ohio State Press Release, "SCIENTISTS POINT TO FORESTS FOR CARBON STORAGE SOLUTIONS" Sept 2008. http://researchnews.osu.edu/archive/forestcarb.htm "LULUCF [land use, land use change, and forestry] is part of the problem (climate change), thus must be part of solution." http://www.jopp.or.jp/CDM/doc/Shlamadinger.pdf The technical and financial barriers involved in using forests to mitigate climate change are low compared to other wedges. "In forestry and agriculture, both costs and investments are relatively low. Here the implementation challenges are technical rather than economical, namely, designing effective policy and an effective way of measuring and monitoring the abatement." McKinsey & Company. 2009. Pathway to a Low Carbon Economy - Version 2 of the Global Greenhouse Gas Abatement Cost Curve. http://globalghgcostcurve.bymckinsey.com/default.aspx

"Recent scenario analyses have shown that no single emissions-offset technology is going to solve the climate crisis (e.g., Pacala and Socolow 2004). What is needed is a wide range of approaches …" Ray, Seymour, Scott, and Keeton. 2009. Mitigating Climate Change with Managed Forests: Balancing Expectations, Opportunity, and Risk. Journal of Forestry, Jan/Fed 2009. pp 50-51. Effectively mitigating global warming will require literally millions of small changes in everyday things like land use, transportation, energy, agriculture, forestry, and recreation. This multi-sector approach to climate mitigation is highlighted by the widely recognized "stabilization wedges" framework. See Pacala and Socolow. 2004. Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies. Science 13 August 2004: Vol. 305. no. 5686, pp. 968 – 972. http://www.gpisd.net/documents/science13aug04v305pg968.pdf (Climate stabilization "[w]edges can be achieved from energy efficiency, from the decarbonization of the supply of electricity and fuels (by means of fuel shifting, carbon capture and storage, nuclear energy, and renewable energy), and from biological storage in forests and agricultural soils.") NEPA analysis must recognize that all net emissions are significant.

There is no *de minimus* contribution to the climate problem. Proper management of the global carbon cycle, especially the carbon that moves between living ecosystems and the atmosphere, will play a critical role in mitigating the effects of global climate change. Since the global carbon cycle is geographically dispersed across virtually the entire planet, managing the global carbon cycle to help solve the climate crisis will literally take millions of decisions, by millions of people, across millions of acres of the planet. we cannot assume there is any "sacrifice zone" or any *de minimus* impact on ecosystems that can be ignored as insignificant. This fact is already acknowledged by the courts. Former D.C. Circuit Judge Wald wrote in a 1990 dissenting opinion, which was recently quoted with unanimous approval by the Ninth Circuit in Center *for Biological Diversity v. NHTSA*:

> [W]e cannot afford to ignore even modest contributions to global warming. If global warming is the result of the cumulative contributions of myriad sources, any one modest in itself, is there not a danger of losing the forest by closing our eyes to the felling of the individual trees?

538 F.3d at 1217. Similarly, the U.S. Supreme Court's in *Massachusetts v. EPA*, 127 S.Ct. 1438, 1455 (2007) http://www.supremecourtus.gov/opinions/06pdf/05-1120.pdf noted that one cannot avoid responsibility to reduce and mitigate the climate problem by attempting to minimize the scale of one's contribution to the problem. ("While it may be true that regulating motor-vehicle emissions will not by itself reverse global warming, it by no means follows that we lack jurisdiction to decide whether EPA has a duty to take steps to slow or reduce it. ... In sum, … [t]he risk of

catastrophic harm, though remote, is nevertheless real. That risk would be reduced to some extent if petitioners received the relief they seek.")

Earth's living biosphere, in particular long-lived forests, will play an important role transferring carbon out of the atmosphere and into sustainable ecosystems. Forests collectively are integral parts of the global carbon cycle. Each individual logging unit might seem small, but together they contribution significantly to the overload of carbon in the atmosphere. For instance, under the Bush Administration, BLM proposed to significantly increase logging across 2.5 million acres in western Oregon. The total emissions from logging would be equivalent to adding one million cars to the road for more than 100 years, or running a large coal-fired power plant for over 100 years. This program, called the Western Oregon Plan Revision (WOPR), would be implemented through hundreds of smaller logging projects, each of which should be evaluated for carbon impacts. The global carbon cycle cannot be divided into segments, some of which can be considered *de minimus*. The Blue Mountains Plan Revision must consider the cumulative carbon consequences of all its programs. No part of the global carbon cycle, no forest, especially no long-lived public forest, should be treated as a *de minimus* contributor to the climate solution or treated as a sacrifice zone and excluded from the global effort to restore ecosystems and remove carbon from the atmosphere.

The temporal scale of analysis must be both short and long-term. A portion of the CO_2 emitted today, whether from vegetation or from fossil fuels, will not be removed from the atmosphere for over 100 years. When federal actions will remove vegetation but retain a living ecosystem, some may argue that there is little impact on the climate because the remaining vegetation will regrow and reabsorb the carbon. This is half true, but in NEPA analyses, the agencies must also account for the climate effect during the entire time period that there is "extra" GHG in the atmosphere as a result of the proposed action. This time period does not last until the site attains its previous level of carbon storage but rather last until the action alternative "catches up" to the amount of on-site carbon storage if the site would not have been manipulated. For instance, logging removes carbon and the climate effects last until the logged site reabsorbs enough carbon to match the site if it would <u>not</u> have been logged. The agency should adopt mitigation plans to address the climate effects during that entire time period.

"We show first that a single pulse of carbon released into the atmosphere increases globally averaged surface temperature by an amount that remains approximately constant for several centuries, even in the absence of additional emissions. We then show that to hold climate constant at a given global temperature requires near- zero future carbon emissions. Our results suggest that future anthropogenic emissions would need to be eliminated in order to stabilize global-mean temperatures. As a consequence, any future anthropogenic emissions will commit the climate system to warming that is essentially irreversible on centennial timescales." H. Damon Matthews and Ken Caldeira. 2009. Stabilizing climate requires near-zero emissions. Nature Vol 455 | 18 September 2008 | doi:10.1038/nature07296.

Consider complementary benefits and trade-offs of conservation. Often climate mitigation actions and climate adaptation actions are complementary, such as conservation of old growth forests which would both store carbon and maintain an ecosystem that has ecological inertia and is resistant and resilient in the face of climate change. Sometimes however, climate mitigation and climate adaptation are in conflict, such as when thinning fire prone forests to increase resilience also reduces forest carbon storage.

It is important to note a few factors that shed light on these trade-offs:

- conservation of intact ecosystems has many complementary values in addition to climate mitigation, including clean water, biodiversity, nutrient cycling, soil conservation, slope stability, recreation, etc;
- disturbance processes like fire are actually part of the adaptive process that will bring ecosystems into better alignment with the new climate.

The Forest Service should use the precautionary principle for all federal land management activities with long-term effects on the carbon cycle, such as logging long-lived trees and fossil fuel emissions, from which CO2 does not re-equilibrate for hundreds of years. The effects of global climate change are expected to be significant and long-term. Our actions today could have repercussions lasting hundreds or thousands of years. When in doubt, we should leave carbon safely stored in living ecosystems.

The Forest Service must not resort to spurious timber industry arguments such as carbon is stored in wood products and wood products are a substitute for alternative building materials that are more carbon intensive. Wood products cannot be separated from logging which has serious long-term adverse impacts on carbon storage and climate. Producing wood products always requires large quantities of carbon be transferred from the forest to the atmosphere. Consider BLM's Western Oregon Plan Revision FEIS which shows that decades of converting old-growth forests to plantations has reduced current stores of forest carbon on BLM lands in western Oregon by 149 million tons. While some of that wood was converted into wood products, most wood products do not last very long, so, of 149 million tons of carbon missing from the forest, only 11 million tons of that carbon remains stored in wood products today. This means that logging our public forests to make wood products resulted in approximately 13 times more carbon emissions than carbon storage. See WOPR FEIS Figures 3-17 (p 3-221) and Figure 3-18 (p 3-224). The so-called "substitution" argument is also flawed. In order to take credit for offsetting carbon emissions from alternative building materials, the forest-logging-wood cycle has to first make up for all the carbon transferred to the atmosphere in the process of logging and manufacturing, then wood products must capture additional market share. For more information about these issues please review this slide show clarifying many misconceptions about forests, logging, and carbon: http://www.slideshare.net/dougoh/forest-carbon-climate-myths-presentation/. And here is a more detailed foot-noted report on forests, carbon and climate change: http://tinyurl.com/2n96m5

D. Climate Change Adaptation/Preparation

Recommended climate change *adaptation* principles include:

- Reducing anthropogenic stress in anticipation of increased climate stress, which means less logging, less roads, less weeds, etc.
- Maintain diversity of native species, genes, and ecosystem composition and structure.
- Maintain self-organized ecosystem resilience and resistance.
- Maintain natural disturbance regimes such as recurrent wild fire and flood plain inundation.
- Maintain connectivity for wildlife interaction with food supply and migration to more suitable habitat under new climate conditions.
- Linking forest management with sustainable carbon-neutral energy planning.
- Complementarity captures the co-benefits that climate change preparation strategies will create by improving wildlife habitat, water quality, carbon storage, and other "ecosystem services."
- Equity should be adhered to across generations, among human communities and between human and natural systems.

- Uncertainty requires recognition that it is sometimes necessary to act on less than complete knowledge, which is the case in making climate projections.
- Humility requires recognizing that interventions to prepare ecosystems for climate change should be informed, limited, and strategic.
- Abundance and redundancy will spread the risks of habitat loss due to climate change spatially across landscapes.

The latter 10 principles are taken from: Climate Leadership Initiative. 2008. Preparing the Pacific Northwest for Climate Change — A Framework for Integrative Preparation Planning for Natural, Human, Built and Economic Systems. Institute for a Sustainable Environment. University of Oregon. February 4, 2008.
http://climlead.uoregon.edu/publicationspress/Preparing_PacNW_for_ClimateChange_4-2-08.pdf
This document also has a similar set of recommendations for increasing resiliency of aquatic systems.

These general adaptation principles can be applied to forest management through management strategies such as:

- Conserve forests with ecological inertia such as mature & old-growth forests;
- Restore and maintain biodiversity in all its dimensions: genes, populations, species, communities, etc;
- Reduce cumulative anthropogenic stress from roads, logging, fire suppression, livestock grazing, mining, OHVs;
- Conserve habitat conditions and improve watershed resilience for cold water fish;
- Rescale and storm-proof the overbuilt road system;
- Pay attention to connectivity at all scales in all management activities;
- Conserve areas with complex topography which may be important climate refugia;
- Conserve all roadless and unroaded areas >1,000 acres because this is where ecosystems' inherent adaptive capacity and natural processes are most likely to remain intact;
- Rely on self-organizing capacity of ecosystems. Don't try to be nature's savior;
- Recognize that natural disturbance is a natural mechanism of change and adaptation. As plant communities become increasingly mismatched with the new climate, fire and other disturbances will be the mechanism by which new and better adapted plant communities become established. Learn to live with fire. Make plans to reintroduce natural disturbance processes.

A respected conservation authority notes several related strategies —

> Among the land-use and management practices likely to maintain forest biodiversity and ecological functions during climate change are (1) representing forest types across environmental gradients in reserves; (2) protecting climatic refugia at multiple scales; (3) protecting primary forests; (4) avoiding fragmentation and providing connectivity, especially parallel to climatic gradients; (5) providing buffer zones for adjustment of reserve boundaries; (6) practicing low-intensity forestry and preventing conversion of natural forests to plantations; (7) maintaining natural fire regimes; (8) maintaining diverse gene pools; and (9) identifying and protecting functional groups and keystone species. Good forest management in a time of rapidly changing climate differs little from good forest management under more static conditions, but there is increased emphasis on protecting climatic refugia and providing connectivity.

Reed F. Noss (2001) Beyond Kyoto: Forest Management in a Time of Rapid Climate Change. Conservation Biology 15 (3), 578–590. http://www.sustainablenorthwest.org/wss/wssagenda/wss-web-library/making-forests-resilient-web-library/Noss_2001.pdf

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 or logging 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 Forest Service 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 Society for Conservation Biology offered some ideas to help the USDA prepare for climate change, among them —

> **USDA GOAL #2: develop knowledge and tools to enable adaptation to climate change and improve the resilience of natural and managed ecosystems**
>
> We offer specific suggestions about knowledge and tools that may enable adaptation to climate change and improve the resilience of natural and managed ecosystems.
>
> …
>
> DEVELOP METHODS TO REDUCE CURRENT ECOSYSTEM STRESSORS
>
> The greatest impacts of climate change on natural and managed systems are expected to result from synergistic relationships among climate change and other current stressors (IPCC 2001). By minimizing many of the current stressors to natural and managed systems on federal lands, the USDA may help reduce the probability of many substantial impacts of climate change. These stressors include contaminants, non-native invasive species, unsustainable levels of grazing by domestic livestock, unsustainable timber harvest practices, post-fire salvage, thinning strategies that do not mimic natural fire disturbance patterns specific to the type of forest being thinned, construction and operation of roads that results in sedimentation and fragmentation of habitat for aquatic species, and noise, pollution, and plant and soil disturbance by off-road vehicles and by oil and gas development activities. By reducing these stressors, and thereby reducing the synergistic impacts of climate change, natural and managed ecosystems will be more likely to remain resilient (able to recover after disturbance) and functional as the climate changes (Hansen et al. 2003, Joyce and Haynes 2006, Millar et al. 2007). If these stressors are not minimized, natural and managed ecosystems are likely to experience reductions in primary productivity, potential for carbon storage, richness and viability of native species, and extractive value as climate change progresses. Along with reducing greenhouse gas emissions, reducing the impacts of current stressors to natural and managed systems is the single most effective approach the federal government can take to combat the impacts of climate change. Existing knowledge and tools are sufficient to identify effective ways to reduce stressors.
>
> Researchers will need to examine which changes in management practices or restoration activities are likely to provide the greatest benefits in terms of increasing the resistance (the ability to withstand change) and resilience of natural and managed

ecosystems to climate change. For the sake of expediency, we recommend collecting data in a formal adaptive management framework (Holling 1978).

Society for Conservation Biology 2008. Letter to USDA, scoping comments on USDA's Climate Change Strategic Plan for Research, Education, and Extension. Sept 18, 2008.

http://www.conbio.org/activities/policy/docs/SCBonUSDA-CCRes.pdf

7. Protecting the Forest Ecosystem's Foundational Soil Communities

Developing the new BMFP presents a necessary NEPA required opportunity to incorporate scientific research pertaining to forest ecosystems and their many biodiverse dependent species that has occurred since the adoption of the Blue Mountain region's previous three separate Forest Plans developed over two decades ago. Forest soils represent a pioneering field of scientific research helping to understand the complex interwoven functioning of forest ecosystems occurring beneath the surface. Although people have been walking upon the earth since the dawn of human existence, contemporary research is still a relatively young field of scientific observation and understanding. Scientists involved in soil community research disclose that "in every shovelful of dirt, scientists are finding a couple hundred new species and/or subspecies." Forest soil system scientific research recommends protecting forest soils, subsurface soil communities, soil hydrology, and natural system functioning, and emphasizes the importance of protecting, maintaining, and restoring unfragmented unroaded areas of forest ecosystems to maintain and restore nature ecological functioning, including the critically important foundational role of forest soils.

Scientific research in particular notes a number of paramount roles forest soil communities play in the resilience and ecological integrity of forest ecosystems:

- Forest soils, composed of millennia of fallen and burned decomposing trees and vegetation, comprise the greatest levels of forest carbon sequestration. The capacity inherent in functioning forest ecosystems for carbon sequestration plays a significant irreplaceable role in helping offset the current levels of exponentially increasing global and localized climate change. It is imperative that the new Forest Plan provide for the protection, restoration and retention of forest and forest soil carbon sequestration capacity to contribute to the national and global societal necessity of effectively and proactively addressing, minimizing, and reducing the harmful impacts of climate change.
- Soil communities are the very foundation of forest resilience, biodiversity, and abundance. Subsurface soil community research emphasizes the critical importance of protecting and maintaining the ecological integrity, hydrology, and functioning of forest soil communities. The new Forest Plan must provide meaningful scientifically based effective standards, guidelines, and provisions protecting forest soil community integrity and functioning.
- Ecologically intact forest soils and the vegetative forest structure they support help provide for the watershed integrity of the region's salmonid watersystems. The new Forest Plan must develop effective provisions projecting forest soils, structure, hydrology, and vegetative communities.
- The BMFP must present effective management strategies and actions to restore the region's many 303(d) listed water quality impaired salmonid watersystems and their upland forest tributaries and headwaters. The Forest Plan must improve soil standards, incorporating relevant new research that better ensures forest ecosystem and watersystem functioning and integrity. The new Forest Plan should also establish soil and water system monitoring, assessing these in light of recent scientific research and cumulatively changed conditions. Recovery plans for degraded areas and waterways must be developed and effectively

conducted. The new Forest Plan should present a reasonable scientifically founded plan of action capable over both the short and long-term of restoring the area's degraded forest soils, damaged vegetation, 303(d) listed waterways, and aquatic species populations and habitat. Ensure project actions do not result in harmful impacts to aquatic species; reduce the number of stream crossings, prohibit applicable project actions during times of excessive soil dryness (airborne dusts/sediments) and during heavy moisture events (heavy rains, peak snowmelt, etc.). Employ effective restrictions and buffers as needed. Do not conduct logging and soil disturbing actions in RHCAs, on slopes above salmonid waterways and their tributary systems.

- The new Forest Plan should incorporate research on the harmful impacts of mechanized equipment on forest soils. The BMFP must develop effective standards protecting forest soil communities functioning and hydrology, including minimizing the utilization of ground disturbing management practices and requiring light on the land low impact equipment and methods for all ground/soil community disturbing actions.
- The new Forest Plan must incorporate scientific research recommendations providing for the removal of livestock from project areas that result in soil community and vegetative disturbance. Research recommends livestock be removed for a minimum of 5 to 10 years post project in affected areas to provide for vegetative and soil community recovery, biodiversity, abundance, and resilience.
- The new Forest Plan must adopt effective standards and provisions to prevent the harmful impacts of indiscriminate or difficult to control managed burning. Standards must significantly reduce or prohibit indiscriminate airborne and landscape scale broadcast burning practices to implement "controlled" burns. Such implementation results in uncontrollable widespread adverse impacts to wildlife habitat, including nests, dens, burrows, and localized resource values, such as rare plants, and special habitat features, including downed logs, squirrel middens, nest tree cavities and bowls, stream tributaries and riparian vegetation, invertebrate species, etc. The new forest Plan must develop reasonable seasonal burning restrictions (such as no or restricted burning during the spring season when many wildlife, avian, invertebrate, and newly re-emerged botanical species are especially vulnerable to seasonally unnatural disturbance events such as fire. The new BMFP must present effective standards and guidelines providing ecologically necessary burn area buffers, and/or precautions to protect neotropical and native nesting birds, rare plants, denning mammals, aquatic systems, and other significant ecological resource concerns.
- The new BMFP must develop standards that prohibit and/or significantly minimize the use of ecologically harmful so-called "temporary" new road construction, including the re-use of already closed and/or abandoned roads.
- The new BMFP must provide for the timely removal and reclamation of the region's excessive environmentally harmful extent of roads. The Forest Plan must effectively present the means to remove excessive and resource damaging roads throughout the region, bringing road density levels to within scientific recommendations for wildlife and environmental viability, as well as new scientifically founded LRMP road density standards. The new road density standards proposed must comport with recent scientific recommendations related to wildlife road density thresholds for the region's species of concern, and provide for the iterative adjustment of these standards to incorporate relevant new research as this may arise. In particular, as wolves are a listed species known to be returning to the region, and wolverines and lynx also utilize the greater region's forests. As excessive road density levels severely impact these species territorial and survival viability, the new Forest Plan must develop proactive measures to reduce road density levels in focal habitat locations for these and other species of concern (such as

areas affecting salmonid watersystems) consistent with both State and federal recovery objectives for these and other listed species and species of concern.

- Overall Forest Plan management goals of fire risk reduction and forest resiliency are inextricably connected to protecting and restoring forest hydrological and soil community functioning. Soil community biodiversity, resilience, moisture retention, and subsurface soil microbial community conditions and viability play a foundational role in determining overall forest resilience. Ecologically functioning forest soils help establish the parameters that maintain naturally variable inherent levels of disturbance, be these fire, insects, disease or natural forest pathogens and disturbance cycles. The new Forest Plan must incorporate relevant scientific research in developing effective forest standards protecting forest soil communities, hydrology, and moisture retention capacity – which are important to effectively reducing the risk levels of severe fire during the summer dry season.
- Forest Plan standards protecting forest soil fungal communities are important to restoring and maintaining forest resilience and vigor. Trees growing in healthy rich fungal soil communities generally grow two or more times faster, with greater vigor, overall resilience, bole size and bark thickness increase than trees grown in degraded compacted forest soils where fungal communities have been diminished by the harmful impacts of livestock grazing, heavy machinery, and/or vegetative removal and unnatural solar exposure of forest soils. The new BMFP must develop scientifically founded effective soil standards and guidelines, and management provisions ensuring the protection and restoration of forest soil ecological communities including subsurface fungi.
- The new Forest Plan must significantly revise forest management practices, substantially restricting and/or prohibiting the use of heavy logging machinery for the agency's many logging-thinning forest restoration projects. The new BMFP must develop provisions mandating the use of light-on-the-land machinery and minimizing the extent of forest areas where machinery is employed. Currently the agency has inconsistently and ineffectively addressed issues of mechanized harms to forest ecosystems. Some projects may require slash treatment machines to have low ground pressure while on the same or a related project failing to require similar low-ground impacts of logging skidders, tractors, and other machinery. The answer is not to remove light-on-the-land slash machinery provisions elsewhere, but instead to utilize similar protective soil community provisions for all machinery employed in the forest environment. NEPA requires scientific accuracy and professional expertise in agency projects. The new Forest Plan must correct the current disparate inconsistent analysis, methodology, and scientific awareness displayed by the Forests Service across the region on its many varied approaches to "vegetation management" and "fuels reduction" projects. At present such projects evidence a consistent systemic failure to incorporate the best available science and ecologically effective methods that are capable of effectively achieving management goals of forest restoration, resilience, and HRV goals.
- The new BMFP must develop scientifically sound effective provisions protecting forest vegetation, habitat, structure, and soils across the regions many steep slopes, ridges, and incised watersystems, including these systems upland drainages.
- The new Forest Plan must develop environmentally protective scientifically based standards that prevent harmful impacts from current management practices including grapple piling and burning slash piles across the forest landscape. The current practice of creating and burning large extensive piles of slash irreparably harms and sterilizes forest soils, the harmful impacts of which are antithetical to restoration and HRV objectives and require decades to centuries for ecological recovery. The new Forest Plan must effectively address and prevent the harmful impacts from current practices of burning slash piles, and

must do so in acknowledgement that current economic trends do not evidence the ability to feasibly remove management generated slash and debris.

- The new Forest Plan must develop provisions to address the increased fire risk to the region's forests from extensive levels of thinning and logging slash and debris that has accumulated untreated across the Blue Mountains' forests. The Forest Plan must develop prioritized plans for the reasonable timely removal of such slash, providing for needed reductions in management created increased fuel levels and severe fire risk.
- The new BMFP must develop standards that sufficiently recognize the importance of mycorrhizal fungi on forest growth and productivity. Resilient mature and old growth forest ecosystems must be protected from adverse management impacts to foundational fungal communities. Scientific evidence demonstrates that mycorrhizae and other soil organisms and processes are extremely important and are easily destroyed by ground-based mechanized management, including thinning using BMPs as well as post-project subsoiling, which devastates subsurface soil microbial communities upon which healthy functioning forests depend. Affected wildlife species, including prey species for raptors and predators also rely on the fungi, emphasizing the multiple resource importance of developing standards protect this important forest fungi and food source. The new Forest Plan must develop effective enforceable standards that prevent harmful impacts to soil mycorrhizae, including preventing the harmful impacts of current ground-based logging, subsoiling, and ineffective BMP practices in compliance with federal environmental policy laws. 30 C.F.R. §§ 219.27(a)(1), 219.14(a)(2) (prohibiting activities unless technology is available to prevent impairment of soil or water resources).

The new BMFP must meaningfully address and incorporate the following scientific information in developing Forest Plan standards, guidelines, and management focus and provisions concerning forest soil systems and the foundational importance in forest ecosystems:

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

Soil protection and restoration is critical due to the manifold importance of soils in ecosystems, coupled with the widely degraded conditions on these forests due to grazing, roads, landings, and logging (USFS and USBLM, 1997). Most soil impacts are long term (compaction) or permanent (topsoil loss) (USFS and USBLM, 1997; Beschta et al., 2004). Therefore, soils should be allowed to recover by curtailing, eliminating, and foregoing activities that maintain existing or cause additional soil damage and resulting long term ecosystem impairment.

Key soil attributes that strongly affect processes, are organic matter, structure, and composition. Key impacts are compaction, soil loss, and the loss of organic matter.

It is extremely well documented that the loss of organic matter adversely affects a variety of soil functions, including carbon sequestration (Turner et al., 1995), hydrologic properties including infiltration and water-holding capacity (Maidment, 1993), and soil productivity (CWWR, 1996; USFS and USBLM, 1997; Beschta et al., 2004). Vegetation, including wood, trees, and needles are a critically important source of organic matter (CWWR, 1996; USFS and USBLM, 1997; Beschta et al., 2004). Unless these sources of organic matter are protected, soil processes and productivity will be

impaired; the loss of organic matter sources inevitably and irretrievably degrades soils. Leaving areas undisturbed and retaining all existing and future sources of organic matter is essential to the recovery of organic matter in soils and the recovery of associated soil functions (Kattlemann 1996; USFS and USBLM, 1997; Beschta et al., 2004).

Soil compaction, which inevitably occurs with heavy machinery, roads, landings, and grazing (Kauffman et al., 2004) severely degrades a wide variety of soil functions, including loss of water storage (Kauffman et al., 2004), soil productivity, infiltration rate (USFS and USBLM, 1997; Beschta et al., 2004), and carbon sequestration. Compaction is a serious concern because it persist 50-80 years in many forest soils and even longer in areas with high clay content, which is substantially longer than the limited and patchy negative influence on soils that are occasionally associated with fire (USFS and USBLM, 1997; Beschta et al., 2004). Decreased infiltration, increased overland flow, and accelerated sedimentation following ground-based logging not only degrades forest soils (Kattlemann 1996; Beschta et al., 2004) but contributes to elevated surface runoff and erosion, which impacts aquatic systems negatively in a variety of ways, including reduced survival of salmonids and other aquatic species, reduced water quality and stream sedimentation (USFS et al., 1993; Rhodes et al. 1994; USFS and USBLM; 1997) and reductions in low flows. Compaction is a serious concern not only for foregoing reasons, but because soils have been extensively degraded from compaction by grazing, roads, landings, and logging (USFS and USBLM, 1997).

Climate change makes soil protection and recovery and even more important, because soils provide the major source of streamflow during low flow periods (Maidment, 1991). Climate change will decrease low flows, while increasing their duration (Mote et al., 2005; Elsner and Hamlet, 2009; Luce and Holden, 2009; Lee et al., 2009). This will further stress aquatic systems, which have been severely and extensively degraded by management on these national forests.

Soil compaction reduces low flows in two major ways. It greatly reduces infiltration rates (Maidment, 1991; Kauffman et al., 2004; Beschta et al., 2004; Rhodes, 2008), elevating surface runoff and, thus, shunting runoff to streams instead of soils where it can stored and released during lower flow periods. Second, compaction vastly reduces the ability of soils to store water. Kauffman et al. (2004) documented that the upper 10 cm of soils uncompacted by grazing stored about "16.6 X 10^6 L more of water than if the area were grazed by cattle. And, this estimate does not include the entire soil profile." This clearly demonstrates that grazing elimination and protection of soils from compaction can greatly increase low flows. If only 50% of the additional stored water in soils not compacted by livestock as estimated by (Kauffman et al., 2004) is released to streams over a 160-day low flow period, it equates to mean increase in flows of more than 21 cfs per day over the period, which equates to *at least* a 20-30% increase in low flows in the stream in the study.

Notably, compaction is inevitable and well-documented from livestock grazing, roads, logging, and landings (USFS et al., 1993; Rhodes et al., 1994;CWWR, 1996; USFS and USBLM, 1997; Beschta et al., 2004; Kauffman et al., 2004). Compaction from livestock grazing is particularly acute because cattle exert more pressure on soils than very heavy machinery: the pressure from the hoof of a 1,000 pound cow exerts more than five times pressure than a Caterpillar D-9 Tractor, according to the BLM (Cowley, 2002). Soil compaction also reduces the ability of soils to sequester carbon and contributes carbon to the atmosphere (Horn et al., 1995).

Topsoil loss causes the most serious and long-lasting loss of soil productivity (USFS and USBLM, 1997; Beschta et al., 2004) and is irreversible, irretrievable, and permanent. Elevated soil erosion and subsequent delivery of sediment to streams harms aquatic habitats and populations in numerous ways (USFS et al., 1993; Rhodes et al., 1994; Waters, 1995; USFS and USBLM, 1997; Beschta et al., 2004). Elevated sedimentation is one of the most pervasive problems afflicting

streams on these national forests and causes increased levels of fine sediment, elevated turbidity, increased in width/depth ratio, and the loss of pools, all of which separately, and in concert, greatly reduce the survival and production of salmonids. Soil loss also greatly reduces the ability of soils to sequester carbon (Turner et al., 1995)

Therefore, land management must ensure that soils are protected and restored. Land management should ensure that management-induced compaction, loss of organic matter, and soil erosion steadily decrease over time. This is best and most effectively accomplished by foregoing or eliminating activities that cause these impacts. For this reason, new roads and landings (whether deemed "temporary" or not) should be prohibited because their inimical to the protection of soils and have permanent irreversible and irretrievable impacts. Because roads are a major source of soil loss, as well as a major cause of aquatic degradation, annually 10% of the road network should be put to bed and allowed to recover. Roads with poor maintenance are particularly prone to high levels of erosion, therefore roads that are maintained should be closed until maintained.

Livestock grazing should also be suspended in all areas where more than 10% of soils have been compacted such that bulk density has been increased by more than 5%. It should also be suspended in watersheds sensitive to decreases in low flows

Livestock grazing should also be eliminated in all wet soils (>50% field capacity) and other soils vulnerable to compaction. Compaction is inevitable in wet soils. Notably, many national forests prohibit vehicle use on wet soils because even a single pass by vehicles result in significant compaction (Klamath National Forest, 2010) and cattle exert far greater pressure on soils than vehicles.

"Ripping" and other destructive approaches to decompacting soils should be foregone and not relied upon. These activities severely disturb soils, causing additional soil damage and do not restore treated areas (Chewaucan Biophysical Monitoring Team, 2004) such as roads, to a native state (Foltz et al., 2007).

Under all alternatives the ecological and fiscal costs of management on soils and the benefits of soil recovery by eliminating/curtailing activities that degrade soils must be properly disclosed. This requires adequately assessing the direct, indirect, and cumulative effects of livestock grazing, roads, logging, and landings on:

- soil erosion
- soil compaction
- sources of organic matter
- soil processes, including infiltration
- soil productivity
- topsoil loss
- soil carbon sequestration
- recovery time from impacts (50-80 years for compaction; permanent loss with topsoil loss and/or removal of organic matter sources)
- available water storage in soils and effects on vegetation, forest productivity, and streamflows (both high and low flows)
- sediment delivery and stream sedimentation
- channel conditions, including w/d ratio, pools, and stream channel substrate
- turbidity and water temperature
- salmonid habitats
- salmonid survival and production

- non-native vegetation and noxious weeds

In order to reasonably disclose cumulative effects, the existing effects of management on the foregoing must be disclosed, including the existing condition and trend at its causes.

The new BMFP and Forest Restoration: Addressing the Impacts of Logging-Thinning & Roads on Hydrology & Resilience

The new BMFP must address and develop standards to prevent extensive irreparable damage from management projects and associated temporary road building. Such damage has been documented in considerable detail with empirical data (e.g., Espinosa et al., 1997).

Federal land management provisions that "would commit funding to decommission all temporary roads constructed to carry out" logging thinning "restoration" projects are recipes for continued soil and watershed degradation. It has been thoroughly documented that the impacts of temp. road construction are permanent, even with decommissioning (e.g., Beschta et al., 2004; Karr et al., 2004). Such long-term damage has been acknowledged by the USFS (Rhodes, 2007). The use of "temporary roads" are far from a break-even provision concerning the achievement of ecological restoration objectives, with projects generally resulting in more environmental harm than benefit.

Significant for soils & watersheds is that most of these projects require extensive & intensive road reconstruction, which greatly increase road impacts on watershed systems, as documented, very graphically, in Karr et al (2004). Reconstruction impacts are extremely significant because the elevated sedimentation they cause is already ubiquitous water quality problem throughout the West and a major cause of the loss of aquatic biodiversity.

Notably, even the FS's own predictably optimistic analyses of fuel treatments has concluded that they are unlikely to help reduce soil erosion and the sedimentation of aquatic systems:

"Fuel management treatments generally are needed every 10 to 20 years and the associated cumulative effects occur during each access and treatment cycle. Although hill-slope erosion rates recover quickly, the road system, which is typically used and maintained between treatment activities, is a chronic source of sediment. Sediment yields from high severity wildfires are much greater than the increase in sediment yields due to fuel management activities, but the recurrence interval of such wildfires can be hundreds of years. *Over longer time scales, the cumulative impacts of fuel treatments, repeated at 10-20 year intervals, when combined with the impacts of continuous road maintenance and use, may be similar to the pulse impact from wildfires.*" Robichaud, P.R., L.H. MacDonald, and R.B. Foltz, in press. Fuel management and erosion. In *Cumulative Watershed Effects of Fuels Management: A Western Synthesis*. Gen. Tech. Rep., U.S. Department of Agriculture, Rocky Mountain Research Station

Besides the very considerable & inexorable soil & watershed impacts of logging and roads, there is also the issue of associated landings, which have impacts that are as persistent and severe as those of roads on soils, vegetation, and watershed processes. USFS cumulative effects models acknowledge this (CWWR, 1996).

Based on analyses of many "thinning" projects across the western US, landings typically affect about 2% of the area treated. This means that 500,000 ac. of logging would likely result in about 10,000 ac. of landings, which is equivalent, in terms of impact and area, as **4,125 mi of road** with an average width of 20'**.** Scientific lit. amply indicates that this amount of road would

significantly damage western ecosystems, even it were not in addition to the existing cumulative impacts of roads, which have been documented in a legion of studies.

The Southwest "model" of ecosystem functioning and restoration does not apply to the dry ponderosa pine forests in most of the rest of the country. Numerous independent data-based studies have documented this in E. WA, Montana & most of the N. Rockies (CO, MT, ID). (Baker et al., 2007; Hutto, 2008; see review in Rhodes, 2007). In these areas it's highly unlikely fuels or fire behavior have been significantly altered or that fuel treatments might be beneficial.

The Need for Scientifically Founded Effective Forest Plan Protective Standards for the Forests' Foundational Soil Communities

Overall, the new BMFP represents a necessary and legally required opportunity to develop lasting scientifically founded management provisions and focus that provide for the natural functioning, resilience, and biodiversity of ecologically foundational native vegetative, fungal, invertebrate, vertebrate, and microbial species, and their ecologically complex surface and subsurface soil communities. The new Forest Plan can benefit by meaningfully incorporating the conclusions and recommendations of emerging restoration science. Such science emphasizes the foundationally important role of soils and soil microbial communities, and demonstrates the irreparable harmful impacts of current management practices that involve excessive thinning and mechanical equipment use. The protection and restoration of forest soils, soil microbial communities, and hydrology - the foundation of resilient forest ecosystems - must fundamentally guide the development of the new Forest Plan, and its management focus.

The new BMFP presents a timely opportunity to develop effective management provisions that recognize the integral roles forests play in earth's ecological functioning. Carbon storage, oxygenation, fresh water systems, treasures of biodiversity - natural forests are irreplaceable and critically important in helping offset the harms and risks from this era of exponentially increasing "global warming" climate change.

And the new Forest Plan also represents an opportunity to begin repairing the ecological deficits of harmful past and recent management, rather than continuing to incur new deficits. Among initial management priorities the new BMFP must address are the reduction of the region's excessive forest road network; the removal of harmful unmaintained roads - returning these to natural contours and native vegetation; the monitoring of forest soil community ecological conditions and the development of effective methods of restoring degraded forest soil communities and protecting forest soil functioning and biodiversity; restoring degraded salmonid waterways; conducting new inventories on the status of the region's salmonid waterways and their upland tributaries; conducting new updated inventories of all existent roadless areas and ecologically significant areas; providing for connectivity and ecological continuity throughout the region's disparate old growth, roadless, wilderness, and refugia forest locations; the development of interagency recovery plans for the region's many listed and candidate species; the habitat protection and recovery of imperiled forest species; the designation of new MIS and focal species of concern appropriate for the region's complexly varied forest ecosystems and diverse PAGs, natural cycles and structure, and habitats; developing and implementing effective monitoring protocol and methodology to ascertain the status and population trends for MIS and regional species of concern, as well as federal and state listed species; the still needed native species re-vegetation of the region's numerous under-regenerated old clear cuts; the ecological removal of existing slash piles scattered across the region's forests; etc. Abundant opportunities and scientific foundation for ecologically effective management are inherent in the development of the new BMFP in a manner

that meets the requirements of NEPA, NFMA, and federal land management ecological restoration objectives.

Soils References

- Baker, W.L., Veblen, T.T., and Sherriff, R.L., 2007. Fire, fuels and restoration of ponderosa pine-Douglas fir forests in the Rocky Mountains, USA J. Biogeography, 34: 251-269. doi:10.1111/j.1365-2699.2006.01592.x
- 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.
- CWWR (Centers for Water and Wildland Resources), 1996. Sierra Nevada Ecosystem Project Report. Wildland Resources Center Report No. 39, University of California, Davis.
- Chewaucan Biophysical Monitoring Team, 2004. Assessing the subsoiling within the upper Chewaucan watershed.
- Cowley, E.R., 2002. Monitoring Current Year Streambank Alteration. US Bureau of Land Management, Idaho State Office, Boise, ID.
- Elsner, M.M. and A. Hamlet, 1999. Hydrologic climate change scenarios for the Pacific Northwest Columbia River Basin and coastal drainages. Center for Science of the Earth System, Climate Impacts Group, University of Washington http://www.hydro.washington.edu/2860/ Accessed Jan. 22, 2009.
- 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**: 205-230.
- Foltz, R.B., Rhee, H., Yanosek, K.A., 2007. Infiltration, erosion, and vegetation recovery following road obliteration. Trans. ASABE 50: 1937-1943.
- Horn, R., Domzal, H., Slowinska-Jurkiewicz, A., van Ouwerkerk, C., 1995. Soil compaction processes and their effects on the structure of arable soils and the environment. Soil and Tillage Research 35, 23–36.
- Richard L. Hutto (2008) The Ecological Importance of Severe Wildfires: Some Like It Hot. Ecological Applications: Vol. 18, No. 8, pp. 1827-1834.
- Karr, J.R., Rhodes, J.J., Minshall, G.W., Hauer, F.R., Beschta, R.L., Frissell,C.A. Perry, D.A, 2004. Postfire Salvage Logging's Effects on Aquatic Ecosystems in the American West. BioScience, 54: 1029-1033. http://maps.wildrockies.org/ecosystem_defense/Science_Documents/Karr_et_al_2004.pdf
- Kattlemann, R. 1996. Hydrology and Water Resources. Sierra Nevada Ecosystem Project: Final report to Congress, vol. II, Assessments and scientific basis for management options. Pages 855-920 in Wildland Resources Center Report No. 39. Centers for Water and Wildland Resources, University of California, Davis. [http://ceres.ca.gov/snep/pubs/web/PDF/VII_C30.PDF]
- Kauffman, J.B., Thorpe, A.S., Brookshire, J. and Ellingson, L., 2004. Livestock exclusion and belowground ecosystem responses in riparian meadows of eastern Oregon. Ecological Applications: 1671-1679.
- Klamath National Forest, 2010. Final Environmental Impact Statement Motorized Travel Management. USFS Pacific Southwest Region.
- Lee, S., Hamlet, A.F., Fitzgerald, C.J. and S.J. Burges, 2009. Optimized flood control in the Columbia River Basin for a global warming scenario. J. Water Resour. Plng. and Mgmt. Volume 135: 440-450.

- Luce, C.H., and Z.A. Holden, 2007. Declining annual streamflow distributions in the Pacific Northwest United States,1948–2006 Geophys. Res. Letters, doi:10.1029/2009GL039407,2009
- Mote, P.W., A.F. Hamlet, M.P. Clark, and D.P.Lettenmaier, 2005. Declining mountain snowpack in western North America. Bull. Am. Meteorol. Soc., doi:10M1175HBAMSB86B1B39M
- Maidment, D.R. [ed], 1993. Handbook of Hydrology. McGraw-Hill, New York.
- Rhodes, J.J., 2007. The Watershed Impacts of Forest Treatments to Reduce Fuels and Modify Fire Behavior. Pacific Rivers Council, Eugene, OR http://pacificrivers.org/science-research/resources-publications/the-watershed-impacts-of-forest-treatments-to-reduce-fuels-and-modify-fire-behavior
- Turner, D.P., Koerper, G.J., Harmon, M.E., and Lee, J.J., 1995 A Carbon Budget for Forests of the Conterminous United States. Ecological Applications, 5: 421-436. doi:10.2307/1942033
- USFS, NMFS, USBLM, USFWS, USNPS, USEPA, 1993. Forest Ecosystem Management: An Ecological, Economic, and Social Assessment. USFS PNW Region, Portland, OR.
- USFS and USBLM, 1997a. The Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins, Volumes I-IV. PNW-GTR-405, USFS, Walla Walla Washington.
- Thomas H. DeLuca et al, Wildfire Charcoal and Soil Processes.
- Christopher M. Briggs in Briggs, Breiner, Graham, 9 May 2005, Contributions of Pinus Ponderosa Charcoal to Soil Chemical and Physical Properties.
- E. Thiffault[1] , K. D. Hannam[2], S. A. Quideau[2], D. Paré[1], N. Bélanger[3], S.-W. Oh[4] and A. D. Munson[5] , March 2008. Chemical composition of forest floor and consequences for nutrient availability after wildfire and harvesting in the boreal forest.
- Zhanna Yermakov[1, 2] and David E. Rothstein[1], May 2006, Nitrogen mineralization and phenol accumulation along a fire chronosequence in northern Sweden.
- "Ecology, Resilience & Restoration in Eastern Oregon's Forests" Sierra Club Presentation, 2-2010.
- Nunnery and Keeton 2009, Forests and Carbon.
- Depro et al, 2007, Public land, timber harvests, and climate mitigation: quantifying carbon sequestration potential on US public timberlands.
- M. Harmon PhD, March 3, 2009; Testimony before the House Subcommittee on National Parks, Forests, and Public Lands.
- S. Mitchell, M. Harmon, K. O'Connell; Forest fuel reduction alters fire severity and long term carbon storage in three Pacific Northwest ecosystems.
- K. Karhu et al, 2010; Temperature sensitivity of soil carbon fractions in boreal forest soil.
- M.F. Jurgensen, 1996; Impacts of timber harvesting on organic matter.
- R. Horn, J. Vossbrink, S. Becker, 2004; Modern forestry vehicles and their impacts on soil physical properties.
- R. Horn, J. Vossbrinka, S. Petha and S. Beckera, Christian Albrechts Universität zu Kiel, Institute of Plant Nutrition and Soil Science, Kiel, Germany, 2007; Impact of modern forest vehicles on soil physical properties (2).
- A. Trautner, J. Arvidsson, 2003; Subsoil compaction caused by machinery traffic on a Swedish Eutric Cambisol at different soil water contents.
- Rainer Horn, 2003; Stress–strain effects in structured unsaturated soils on coupled mechanical and hydraulic processes,
- R. Horn, H. Fleige, F.-H. Richter, E.A. Czyz, A. Dexter, E. Diaz-Pereira, E. Dumitru, R. Enarche, F. Mayol, K. Rajkai, D. de la Rosa, C. Simota, 2005; SIDASS project: Part 5: Prediction of

mechanical strength of arable soils and its effects on physical properties at various map scales.

- T. Keller, J. Arvidsson, J. B. Dawidowski, A. J. Koolen, 2004; Soil precompression stress: II. A comparison of different compaction tests and stress–displacement behaviour of the soil during wheeling.

8. Management Focus: Restoring and Maintaining Watershed Conditions

A. Watershed, Stream, and Water Quality Protection

Water courses are a vital part of forest systems, utilized by most species and depended upon by many. As the Forest Service notes in the proposed action, particularly sensitive and ecologically important areas to aquatic systems are the riparian zones, headwater zones, and native fish refugia (existing or potential). In addition, we would add to this list remarkable water features (RWF), which are areas with unique habitat driven by hydrology. These include, for example, wetlands and fens, and are areas that often provide habitat for unusual species or assemblages of species.

Riparian areas are important habitats onto themselves, but also provide key functions for maintaining stream function, morphology, and health. Riparian areas provide the buffer between uplands and streams, attenuating overland water and sediment flow. They also support vegetation that stabilizes channel banks, maintains connectivity between surface and ground water tables, shades the channel helping to maintain cool water temperatures, and provides coarse woody debris to stream channels. Headwaters areas make up the majority of stream miles in a watershed, and have the highest terrestrial/aquatic interface area. Because of the latter, they "feel" the upland uses more than downstream segments; because of the former, the cumulative impact of headwater land uses is "felt" by downstream reaches.

Unfortunately, as the scoping notice articulates, the streams in the forests of the Blue Mountains have suffered impacts for over 150 years from a variety of land uses, including mining, timbering, grazing, diversions, and trapping. Perhaps two of the most significant factors affecting stream health are excessive roading (over 2.4 miles/square miles in most watersheds, scoping notice, Page 25) and the virtual extirpation of beavers, a species that has a fundamental role in maintaining aquatic habitat diversity and attenuating floods, and whose absence results in fundamental shifts in stream behavior and health.

Undisturbed watersheds (pre-settlement) are characterized by hydrologic functions and geomorphic conditions that can absorb precipitation and convey it downstream while maintaining stream channel and bank integrity, and habitat quality across the landscape. Disturbances to vegetation, channelization, disruption of riparian areas, and roading have dramatically shifted the condition, diversity and function of streams. Roads, in particular, have had a clear impact. Roads, when maintained, channelize water into structures, encouraging downcutting; when not maintained adequately, they are prone to failure and dump serious amounts of sediment into stream courses, which can have catastrophic consequences for fish and other aquatic species. (See Endicott, 2008; Gucninski et al, 2000.)

Management and Restoration Strategies.

We commend the Forest Service for making one of its management focus points watershed restoration. We also agree with the general approach – namely, set management objectives and

standards, conduct watershed assessment at various scales, identify and protect key watersheds and riparian management zones, implement restoration strategies, and monitor. We have concerns, however, with some of the desired future conditions, standards, objectives, and restoration and monitoring strategies outlined in the proposed action.

Desired Future Conditions. The watershed and restoration desired future conditions (DFC) as outlined in the proposed action on page 19 to 26 are comprehensive. However, as written, the DFCs are only aspirational. A fundamental tenet of developing an aquatic conservation strategy (see Northwest Forest Plan, Aquatic Conservation Strategy, B-9 to B-10) is to establish working goals and commit to meeting them. Therefore, if the forests in the Blue Mountains are to develop and implement a meaningful aquatic conservation strategy, the forest plans should establish the DFCs as objectives, and must specify that all forest management activities *must meet/not impede* the objectives. Region 2, in the 1990's developed and incorporated into some forest plans the Watershed Conservation Practices Handbook that included scientifically grounded standards (see http://www.fs.fed.us/r2/psicc/publications/environmental_impact_statements/eis_uspwp/WCPAppendixA.htm); similarly, the Northwest Forest Plan adopted enforceable objectives.

Standards. We are concerned that the standards related to watersheds and water quality in the Proposed Action (pages 105-6) are inadequate to ensure forward progress toward achieving the watershed DFCs. We recommend you adopt in the forest plan the following standards that are grounded in widely accepted watershed science principles: protect riparian areas and headwater areas, minimize soil disturbance in watersheds and route density, and do not further degrade water quality in impaired reaches, drinking water or key watersheds . If adopted these standards will further compliance with the National Forest Management Act (NFMA), the Endangered Species Act, and the Clean Water Act, and give the public confidence in the agency's restoration intentions.

- Viability. NFMA and its implementing regulations prescribe that the Forest Service provide for the viability of all plant and animal communities. In the Blue Mountains, according to the proposed action, 17 salmonid populations are currently extinct. In addition, the Snake River Chinook salmon and steelhead, the mid-Columbia Basin steelhead, and the Bull Trout are listed as threatened. In order to meet the statutory and regulatory requirement to provide for species viability in the Blue Mountains, the Forest Service should include in the forest plan a standard specific to aquatic species viability.

  The proposed action does not include any aquatic species in the Management Indicator Species (MIS) list. This omission is inappropriate given the distressed nature and importance of the Blue Mountain aquatic systems to imperiled fish, and the clear statutory and regulatory duty to provide for species viability. The final plan should list at least one but preferably more fish species as MIS. In addition, the Forest Service should list at least one other riparian-dependent species as a MIS, considering amphibians and macroinvertebrates as possible candidates.

- Motorized route density. The final plan should include a standard that sets an upper limit for the density of motorized routes (roads and motorized trails) in key watersheds, headwater areas, and RMAs. Where the current density exceeds the threshold, the final plan should require an annual reduction in route density until the threshold is met. The scientific literature related to route densities in watersheds containing salmonids and bull trout points to an appropriate maximum density of around 1 mile/sq mile. (See Carnefix and Frissell, 2001; McCaffery et al, 2007; Harr and Nichols, 1993).

- RMA protection. In addition to G-101, the final plan should include a standard that disallows ground disturbing activities within RMAs, unless the agency can demonstrate that such activities will improve riparian condition (e.g., stream restoration work).

- Water quality. In key watersheds or watersheds where stream segments are listed on the state 303(d) list, disallow activities that will lead to further water quality degradation. In watersheds where stream segments are listed on the state 303(d) list for sediment, disallow activities that will contribute sediment to the stream system. In watersheds where stream segments are listed on the state 303(d) list for temperature, disallow disturbance of riparian vegetation.

- Municipal Watersheds. In addition to the offered standards on page 111, the forest plan should have a standard that states, "Forest activities in municipal watersheds shall not degrade water quality."

- Remarkable Water Features. No disturbance to Remarkable Water Features will be allowed unless it is designed to and will improve the health of the aquatic resource (i.e., bring it within the historic range of variability). RWFs are areas with unique habitat driven by hydrology, including, but not limited to, wetlands, fens and areas that provide habitat for unusual species or assemblages of species.

Riparian Management Area (RMA) widths. Table 30 on page 78 lists the minimum RMA widths. Based on current literature, we are concerned that the given widths intended to protect the riparian resource are too narrow, especially in the context of warming climates characterized by more frequent storms of greater intensities resulting in widening 100 year floodplains. Also note that the goal should be to maintain, enhance *and* restore, not maintain, enhance *or* restore – see bottom of p.78.

We recommend that the minimum width for all RMAs – intermittent, perennial, headwater – should be 300', and ideally the width should increase with steeper side slopes. See Quigley and Arlbelbide, 1997, who noted that smaller, non-fish bearing perennial and intermittent streams:

> a) Are more affected by sedimentation from sediment production accelerated by upslope activities than larger streams (pp.1365 to1366).
> b) Are a primary source of sediment supplied to fish bearing streams (p. 1366)
> c) Typically comprise the majority of the channel network and "...therefore strongly influence the input of materials to the rest of the channel system." (p. 1366)
> d) Highly vulnerable to the impacts of upslope activities, because the likelihood for discernible instream effects increases with slope steepness and the erodibility of sideslopes (p. 1367); these smaller headwater streams tend to have steeper and more erodible sideslopes (p. 1371).

Quigley and Arlbelbide (1997) noted that 300 foot wide protection zones around headwater streams may not be adequate to prevent increased sediment delivery to streams in some areas. There is a greater than 25% probability of sediment delivery to streams on a 30 percent slope with a 100 foot wide fully functional RMA based on the analysis in Quigley and Arlbelbide (1997). For slopes of 50% abutting intermittent stream channels, the aquatic assessment in Quigley and Arlbelbide (1997) estimated buffer widths of more than 400 feet from each side of the stream would be needed to prevent sediment delivery in 95% of cases. The DEIS for the Interior Columbia

Ecosystem Management Project included methods to expand RMA widths in headwaters based on slope steepness, in order to provide more protection from sediment delivery to smaller streams. These methods result in RMAs with widths significantly greater than 100 feet on intermittent streams with slopes greater than about 15%.

Objectives. It is concerning that the first three objectives listed under Watershed Function on page 87 focus on forestry activities, and not watershed restoration activities. We recommend that the forest plan emphasize the importance of restoring streams and watersheds by listing at the top of the list proven and effective watershed restoration strategies such as reducing route density and soil disturbances that channelize water flow or lead to mass wasting, restoring stream channels, enabling fish passage, and reducing ground disturbing activities in riparian areas and uplands. Logging forests, even in the name of restoration, takes a toll on soils and streams.

Furthermore the acreage objectives do not respond to the pressing need with regards to treating invasive weeds or decommissioning roads. The objective of treating weeds on 3,500 acres over the next 10-15 years may not even keep up with the rate of weed spread. The road decommissioning objective of 300 miles is very low. There is substantial Congressional interest and funding available for road decommissioning. The Forest Service should set ambitious targets, work hard for funding, and recognize the incredible employment opportunities that exist here.

Monitoring. Table 34 on pages 94-95 does not list any monitoring activities related to aquatic systems or watershed health. We realize that this chart refers to legally mandated monitoring activities under NFMA. Nevertheless, the forest plan should provide an aquatic monitoring strategy that will demonstrate short and long-term condition of aquatic systems. The indicators should be such that they can discern whether goals and standards are being met.

As stated above, the proposed action does not include any aquatic species in the Management Indicator Species (MIS) list. This omission is inappropriate given the distressed nature and importance of the Blue Mountain aquatic systems, and the clear statutory and regulatory duty to provide for species viability. The final plan should list at least one but preferably more fish species as MIS. In addition, the Forest Service should list at least one other riparian-dependent species as a MIS, considering amphibians and macroinvertebrates as possible candidates.

Suitability. Page 81 of the Proposed Action contains a General Suitability Matrix for Management Areas. Areas 2k, Riparian Management Areas, and 2j, Municipal Watersheds, are listed as suitable for timber harvest. In addition Riparian Management Areas are listed as suitable for commercial use of special forest products and grazing. Given that watershed restoration is a management focus for the forests in the Blue Mountains, it is highly inappropriate to consider these areas suitable for the above listed activities, which are notorious for impacting stream health.

Cited Literature

Quigley, T.M., and S.J. Arbelbide, technical editors. 1997. An assessment of ecosystem components in the Interior Columbia Basin and portions of the Klamath and Great Basins, Volumes 1-4. General Technical Report PNW-GTR-405. USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon.

Endicott, Douglas, 2008. National Level Assessment of Water Quality Impairments Related to Forest Roads and Their Prevention by Best Management Practices, Final Report. US EPA, Office of Water. Dec. 4, 2008.

Gary Carnefix and Chris Frissell, 2009. Aquatic and Other Environmental Impacts of Roads: The Case for Road Density as Indicator of Human Disturbance and Road-Density Reduction as Restoration Target-A Concise Review. Pacific Rivers Council Science Publication 09-001. http://pacificrivers.org/science-research/resources-publications/road-density-as-indicator

Gucinski, Hermann, Michael J. Furniss, Robert R. Ziemer, and Martha H. Brookes, June 2000. Forest Roads: A Synthesis of Scientific Information, United States Department of Agriculture Forest Service.

Harr, R.D. and R.A. Nichols. 1993. Stabilizing Forest Roads to Help Restore Fish Habitats: A Northwest Washington Example. Fisheries 18(4): 18-22.

McCaffery, Magnus, T. Adam Switalski, and Lisa Eby, 2007. Effects of Road Decommissioning on Stream Habitat Characteristics in the South Fork Flathead River, Montana. Transactions of the American Fisheries Society. http://www.wildlandscpr.org/files/McCaffery%20et%20al.%202007.%20Effects%20of%20road%20decommissioning%20on%20stream%20habitat.pdf

See also the following that speak to the inadequacy of PACFISH protections with respect to grazing, roads, and roadless areas.

Erman, D.C., Erman, N.A., Costick, L., and Beckwitt, S. 1996. Appendix 3. Management and land use buffers. Sierra Nevada Ecosystem Project Final Report to Congress, Vol. III, pp. 270-273.

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. Manage. 49: 205-230.

Moyle, P. B., Zomer, R., Kattelmann, R., & Randall, P., 1996. Management of riparian areas in the Sierra Nevada. Sierra Nevada Ecosystem Project: Final Report to Congress, vol. III, report 1. Davis: University of California, Centers for Water and Wildland Resources.

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**: 205-230.

Henjum et al., 1994. Interim Protection for Late Successional Forests, Fisheries, and Watersheds: National Forests East of The Cascade Crest, Oregon and Washington. The Wildlife Soc., Bethesda, MD.

Karr, J.R., Rhodes, J.J., Minshall, G.W., Hauer, F.R., Beschta, R.L., Frissell,C.A. Perry, D.A, 2004. Postfire Salvage Logging's Effects on Aquatic Ecosystems in the American West. BioScience, 54: 1029-1033.

Rhodes, J.J. 1995. A Comparison and Evaluation of Existing Land Management Plans Affecting Spawning and Rearing Habitat of Snake River Basin Salmon Species Listed Under the Endangered Species Act. CRITFC Tech. Rept. 95-4, Portland, OR

B. PACFISH and INFISH

While we are pleased to see the inclusion of PACFISH and INFISH management standards as a floor for management activities, the best available science indicates that they are not sufficient for protecting riparian areas, for water quality protection or to recover ESA listed fish. The following sections outline defects, ways to rectify defects, and inadequacies of PACFISH and INFISH. We

strongly encourage the Forest Service to use these recommendations to bring PACFISH and INFISH in step with the best available science.

Some key defects in PACFISH/INFISH w.r.t. protection of watershed and aquatic resources (not comprehensive & in no real order):

- Inadequate RHCA widths for non-perennial and perennial non-fish-bearing streams, which typically comprise more than 70% of the stream network.
- Inadequate RHCA protections: mining and on-going grazing within RHCAs reserves are allowed to degrade RHCAs, streams, and aquatic habitats and habitat, except where individual grazing activities are determined on a case-by-case basis to adversely affect habitat. (The track record is that in practice, on-going grazing continues no matter how damaging). After watershed analysis completion, there is management discretion to construct roads in RHCAs, even when deemed inconsistent with RMO attainment.
- Carte blanche for road construction and logging outside of RHCAs, no limits on road density or increases in road density or logged area.
- Failure to require reductions in road density.
- Failure to adequately protect roadless areas > 1000 ac. in area
- Failure to prohibit post-fire salvage logging
- Failure to require retention of all larger trees

The results of these inadequacies are already manifest. Roads continue to be constructed in and outside of RHCAs. Continuation of highly damaging livestock grazing in RHCAs also is the rule rather than exception.

Notably, many of these same inadequacies afflict the ACS of the NWF, although they are slightly tempered in the NWF by key watershed and LS/OG allocations.

For much more detail, see: Rhodes, J.J. 1995. A Comparison and Evaluation of Existing Land Management Plans Affecting Spawning and Rearing Habitat of Snake River Basin Salmon Species Listed Under the Endangered Species Act. CRITFC Tech. Rept. 95-4, Portland, OR **http://www.critfc.org/tech/95-4report.htm**

Ways to rectify key defects in PACFISH/INFISH w.r.t. protection of watershed and aquatic resources (in no real order):

- RHCA widths of at least 300' on all streams (Rhodes et al., 1994; Erman et al., 1996; Moyle et al., 1996).
- Prohibit road construction and logging in RHCAs.
- Suspend livestock grazing, especially in RHCAs, until sound analysis of effects on riparian and streams is completed (Henjum et al., 1994; Rhodes et al., 1994). Continue grazing suspension in watersheds with water temperature and sediment problems and in RHCAs with vulnerable site conditions (Rhodes et al., 1994). Only re-initiate grazing in RHCAs that are not degraded concurrent with establishment of exclosures over at least 10% of RHCAs subjected to grazing. Only allow grazing in RHCAs to continue when monitoring indicates that the condition and trend in exclosures is the same as in grazed areas.
- Prohibit road construction, including "temporary" roads.
- Require annual reductions in road density, with emphasis on doing so in RHCAs and watersheds with imperiled aquatic species.

- Fully protect roadless areas greater than 1000 acres (Henjum et al., 1994; Rhodes et al., 1994; Karr et al., 2004).
- Prohibit post-fire logging (Karr et al., 2004; Beschta et al., 2004; Hutto, 2006)
- Require retention of all larger trees, e.g. ca. <15" diam.

PACFISH inadequacy for ESA listed fish:

The original '95 Biological Opinion for PACFISH by NMFS predicated its conclusion that the LRMPs as amended by PACFISH would probably not result in jeopardy for listed fish and adverse modification of their habitats, on "In part, these conclusions were based on NMFS's expectation that the interim PACFISH guidance would be in place for a period not to exceed 18 months…"

NMFS, 1995. Endangered Species Act - Section 7 Consultation BIOLOGICAL OPINION: Implementation of Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH)

Inadequacy of PACFISH RHCAs:

Under PACFISH RHCA widths are 300 ft. for fish-bearing perennial streams, but RHCA widths are far less than that on other streams that comprise the vast majority of the channel network. On non-fish-bearing streams, RHCAs will only be 150 feet from the edge of non-fish bearing perennial streams and only 100 feet wide around intermittent streams. These widths are inadequate to protect these types of streams from increased sediment delivery from upslope sediment production, as noted in the aquatic assessment for the Interior Columbia Ecosystem Management Project (Quigley and Alberide, 1997) which noted that these smaller, non-fish bearing perennial and intermittent streams:

> a) are more affected by sedimentation from sediment production accelerated by upslope activities than larger streams (pp.1365 to1366).
>
> b) are a primary source of sediment supplied to fish bearing streams (p. 1366)
>
> c) typically comprise the majority of the channel network and "...therefore strongly influence the input of materials to the rest of the channel system." (p. 1366)
>
> d) highly vulnerable to the impacts of upslope activities, because the likelihood for discernible instream effects increases with slope steepness and the erodibility of sideslopes (p. 1367); these smaller headwater streams tend to have steeper and more erodible sideslopes (p. 1371).

The PACFISH RHCAs on fish-bearing streams are not adequate to fully protect streams under all conditions. Quigley and Arbelbide (1997) noted that 300 foot wide RHCAs around streams may not be adequate to prevent increased sediment delivery to streams in some areas. There is a greater than 25% probability of sediment delivery to streams on a 30 percent slope with a 100 foot wide, fully functional, RHCA based on the analysis in Quigley and Arbelbide (1997). For slopes of 50% abutting intermittent stream channels, the aquatic assessment in Quigley and Arbelbide (1997) estimated buffer widths of more than 400 feet from each side of the stream would be needed to prevent sediment delivery in 95% of cases, although this, too, is undisclosed. The DEIS for the Interior Columbia Ecosystem Management Project (hereafter "ICBEMP") included methods to expand RHCA widths based on slope steepness, in order to provide more protection from sediment delivery to smaller streams (USFS and USBLM, 1997b). These methods result in

RHCAs with widths significantly greater than 100 feet on intermittent streams with slopes greater than about 15%.

Other applicable scientific literature has noted RHCAs wider than those of PACFISH are necessary to protect aquatic resources. Damage to headwater streams and riparian areas not only degrades habitats in headwater streams, but downstream habitats as well, because headwater streams provide most of the water and sediment for downstream reaches (Rhodes et al., 1994; Moyle et al., 1996; Erman et al., 1996). Due to their sensitivity, headwater streams need as much protection, or more, than larger downstream reaches if aquatic habitats and water quality at the watershed scale are to be protected (Rhodes et al., 1994; Moyle et al., 1996; Erman et al., 1996; Espinosa et al., 1997). Both Erman et al., (1996) and Rhodes et al., (1994) concluded, based on review of available information, that intermittent and non-fish-bearing streams should receive stream buffers significantly larger than those afforded by PACFISH.

Importantly, land management activities often significantly increase sediment loads to channelized sediment sources, which are not effectively arrested by RHCAs with a width of 300 feet (Quigley and Arbelbide, 1997). In particular, increased road traffic elevates the delivery of sediment to channelized sediment sources, especially at stream crossings and road ditches that drain into streams. This undermines the touted effectiveness of the RHCAs under PACFISH.

Last, the sediment detention abilities of areas within RHCAs within the NLF project have been severely compromised by logging and roads. It is widely recognized that the loss of vegetation in RHCAs reduces their sediment detention effectiveness (e.g., USFWS, p. 33, 2001). However, the loss of vegetation is not the only impact of logging and roads that reduce sediment detention in RHCAs. Both activities compact, bare, and disrupt soils, increasing runoff and erosion. More importantly, instead of arresting upslope sediment, logged areas and roads within RHCAs act as sources of elevated erosion and sediment delivery; roads within RHCAs are a particularly acute source of channelized and non-channelized sediment delivery to streams, as legions of studies have documented. Plainly, the outer 100 feet of an RHCA cannot trap sediment from a road constructed downslope in the inner 100 feet of an RHCA.

PACFISH/INFISH References

Erman, D.C., Erman, N.A., Costick, L., and Beckwitt, S. 1996. Appendix 3. Management and land use buffers. Sierra Nevada Ecosystem Project Final Report to Congress, Vol. III, pp. 270-273.

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. Manage. 49: 205-230.

Moyle, P. B., Zomer, R., Kattelmann, R., & Randall, P., 1996. Management of riparian areas in the Sierra Nevada. Sierra Nevada Ecosystem Project: Final Report to Congress, vol. III, report 1. Davis: University of California, Centers for Water and Wildland Resources.

Quigley, T.M., and S.J. Arbelbide, technical editors. 1997. An assessment of ecosystem components in the Interior Columbia Basin and portions of the Klamath and Great Basins, Volumes 1-4. General Technical Report PNW-GTR-405. USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon.

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.
http://www.critfc.org/text/tech_rep.htm

Inadequacy of PACFISH protections with respect to grazing, roads, and roadless areas:

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**: 205-230.

Henjum et al., 1994. Interim Protection for Late Successional Forests, Fisheries, and Watersheds: National Forests East of The Cascade Crest, Oregon and Washington. The Wildlife Soc., Bethesda, MD.

Karr, J.R., Rhodes, J.J., Minshall, G.W., Hauer, F.R., Beschta, R.L., Frissell,C.A. Perry, D.A, 2004. Postfire Salvage Logging's Effects on Aquatic Ecosystems in the American West. BioScience, 54: 1029-1033.

Rhodes, J.J. 1995. A Comparison and Evaluation of Existing Land Management Plans Affecting Spawning and Rearing Habitat of Snake River Basin Salmon Species Listed Under the Endangered Species Act. CRITFC Tech. Rept. 95-4, Portland, OR

Postfire logging:

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.

Hutto, R.L., 2006. Toward meaningful snag-management guidelines for postfire salvage logging in North American conifer forests. Conservation Biology, 20: 984–993.

Karr, J.R., Rhodes, J.J., Minshall, G.W., Hauer, F.R., Beschta, R.L., Frissell,C.A. Perry, D.A, 2004. Postfire Salvage Logging's Effects on Aquatic Ecosystems in the American West. BioScience, 54: 1029-1033.

C. General Comments Regarding Livestock Grazing

The Proposed Action unreasonably minimizes discussion of the impacts of livestock grazing in evaluating the current baseline conditions on the Blue Mountains Forests. There is almost no description of the pervasiveness of grazing impacts nor of their intensity, making it impossible for the Forest to accurately plan measures to address and minimize impacts from grazing in the future. Livestock grazing has historically been one of the major factors that has caused degradation of stream channels, fish habitat and watersheds throughout these Forests, and which, without significant changes in management practices, will prevent the restoration of damaged watersheds and aquatic/riparian conditions.

The Proposed Action must be revised to quantify and detail the detrimental effects which livestock grazing has had on the landscape and particularly on the fish habitat in these Forests, and to develop and incorporate quantitative, measurable guidelines for controlling and managing livestock grazing under the revised Forest Plans to insure that grazing's effects are minimized. Notwithstanding the inadequacy of the current PACFISH and INFISH management direction, the Proposed Action's elimination of quantitative livestock grazing standards is shocking. The Proposed Action must be revised to provide clear, quantitative objectives for fish habitat restoration and a commitment by the Forests to control the negative effects of livestock grazing. Grazing under current management has on several occasions been found to violate the Malheur National Forest's obligations under the Endangered Species Act and National Forest Management Act, and found to likely result in the destruction or adverse modification of designated critical habitat for threatened steelhead and bull trout in that Forest. Similar excessive damage to riparian areas from livestock grazing has been documented in the other Forests as well.

Livestock grazing widens channels, reduces stream shade, destroys overhanging banks, elevates erosion and consequent sedimentation, compacts soils in ways degrade riparian soil function and reduce low flows, and exacerbates seasonal water temperature extremes in streams (Platts et al. 1991; Fleischner, 1994; Rhodes et al., 1994; Lee et al., 1997; Belsky et al., 1999, Kauffman et al., 2002). Livestock grazing has caused significant degradation of salmonid habitats, water quality, riparian areas, and water quantity (Henjum et al., 1994; Lee et al., 1997). Suspension of riparian area grazing is the grazing strategy that is most compatible with re-vegetation and the recovery of water quality, riparian areas, and salmonid habitat recovery (Platts et al., 1991; Anderson et al., 1993; Rhodes et al., 1994). There is a very low likelihoood that any grazing management system will result in consistent recovery in damaged riparian systems without some significant multi-year period of rest (Platts et al., 1991; Rhodes et al., 1994; Henjum et al., 1994; Spence et al., 1996). Most widely-used grazing practices are incompatible with the protection and restoration of aquatic ecosystems. Grazing clearly retards recovery in degraded riparian systems.

Exclusion of livestock from riparian zones has been shown to increase summer baseflow (Ponce and Lindquist, 1991, Reeves et al., 1991, Rhodes et al., 1994) and is one of the most promising means for increasing/restoring low flows in streams (Ponce and Lindquist, 1991; Rhodes et al. 1994). This will be critical because all available information indicates that on-going climate change will decrease low flows and increase their duration in the Northwest (Mote et al., 2005; Elsner and Hamlet, 2009; Luce and Holden, 2009). In a regional analysis of climate impacts on streamflows in the Pacific Northwest (PNW), Elsner and Hamlet (2009) noted "…warmer temperatures in all previous assessments have led to projections of reduced snowpack, and transformation of sensitive watersheds from being fed by a mix of rain and snow to predominantly rain. Other impacts common to previous studies of hydrological impacts of climate change in the PNW include earlier spring peak flow and lower summer flows." Based on the analysis of many years of snowpack data, Mote et al. (1995) concluded, "It is therefore likely that the losses in snowpack observed to date will continue and even accelerate (Hamlet and Lettenmaier 1999a; Payne et al. 2004), with faster losses in milder climates like the Cascades…" Lower flows are decreasing regionally (Luce and Holden, 2009). Mote et al. (2005) noted: "It is becoming ever clearer that these projected declines in SWE [snow water equivalent], which are already well underway, will have profound consequences for water use in a region already contending with the clash between rising demands and increasing allocations of water for endangered fish and wildlife." Lee et al (2009) noted, "Anticipated future temperature changes in the mountainous U.S. Pacific Northwest will cause reduced spring snow pack, earlier melt, earlier spring peak flow and lower summer flow in transient rain-snow and snowmelt dominant river basins." Clearly, the river basins on these Forests will have low flows reduced by climate change, because they are dominated by runoff from snowmelt.

Sharply curtailing livestock grazing will be necessary to protect low flows and beneficial uses in the face of climate change, because livestock grazing greatly and inevitably compacts soils in ways that reduce the streamflows (Kauffman et al., 2004). This compaction is inevitable because the pressure from the hoof of a 1,000 pound cow exerts more than five times pressure than a Caterpillar D-9 Tractor, according to the BLM (Cowley, 2002), resulting in significant soil compaction (Kauffman et al., 2004). As Kauffman et al. (2004) noted:

> "The potential differences in soil water storage due to differences in soil pore space [caused by soil compaction by cattle] are not trivial. Based upon the results of this study we calculated that … the surface 10 cm of a single hectare of exclosed dry meadow would contain 61 000 L more water than an equivalent grazed hectare. …a hectare of wet meadows with the pore space measured in the exclosed communities of this study would contain 121 000 L more water than those with the pore space of

> the grazed wet-meadow communities. Based upon a GIS analysis … the 30-km riparian zone sampled in this study, there were 145 ha of dry meadows and 64 ha of wet meadows (C. Heider and J. B. Kauffman, unpublished data). Our results suggest that if the entire area was excluded from livestock, the surface 10 cm of soil in the meadows alone (about 60% of the riparian-zone cover) could potentially store 16.6 X 106 L more of water than if the area were grazed by cattle. And, this estimate does not include the entire soil profile. This increase in soil water likely influences ecosystem productivity, soil temperature, biogeochemistry, and stream flows."

This clearly demonstrates that grazing elimination can greatly increase low flows. If only 50% of the additional stored water in soils not compacted by livestock as estimated by (Kauffman et al., 2004) is released to streams over a 160-day low flow period, it equates to mean increase in flows of more than 21 cfs per day over the period, which equates to *at least* a 20-30% increase in lowflows in the stream in the study.

Forage utilization standards are an ineffective approach to restoration and protection in degraded reaches, wet meadows, seeps, and travel corridors because habitat damage stems from trampling and chiseling of banks and vegetation by livestock as well as the browsing and grazing of vegetation. A more effective approach to habitat improvement is to eliminate grazing in these areas.

Elimination of riparian grazing in degraded reaches and watersheds is the most effective approach to restoring riparian systems and realizing rapid habitat improvement in these Forests. The Forests must incorporate objective, quantitative, measurable grazing standards in the Proposed Action, including provision for the suspension or elimination of grazing if existing grazing management is not allowing rapid restoration of riparian areas. Grazing should be suspended within 300 ft of streams in watersheds where water temperature where daily maximum summer water temperatures in excess of $60^{o}F$ exist in historically usable spawning and rearing habitat for salmon, until this temperature standard is met, or a statistically significant improving trend ($p<0.05$) over at least five years is documented through monitoring (Rhodes et al., 1994). Grazing should be suspended within half a tree height from the edge of floodplains (or streams when floodplains are absent), in all reaches or watersheds where bank stability is less than 90%, until bank stability exceeds 90% or a statistically significant improving trend ($p<0.05$) over at least five years is documented through monitoring (Rhodes et al., 1994). Where the foregoing water temperature and bank stability standards habitat standards are met, riparian grazing should be tightly controlled and closely monitored. In many areas, riparian area grazing is difficult to control; in these areas it will be necessary to completely remove livestock from watersheds to prevent grazing within floodplains and riparian areas until recovery occurs or standards are met.

Livestock grazing should also be suspended in watersheds that do not meet substrate standards (<20% surface fines in spawning habitat) until the standards are met, or a statistically significant ($p<0.05$) improving trend over the course of 5 years is documented through monitoring and total sediment delivery is estimated to be less than 20% over natural levels (Rhodes et al., 1994). Grazing should also be suspended in all areas where more than 10% of soils have been compacted such that bulk density has been increased by more than 5%.

Livestock be restricted from access to spawning reaches during and after the spawning season, because livestock can trample redds when they ford streams. If livestock access to these reaches cannot be prevented during the spawning and incubation periods, they should be removed from watersheds prior to the onset of the spawning season.

Grazing should be eliminated from environments where it is clearly incompatible with the protection of watersheds, soils, and aquatic resources. Livestock grazing in seasonally-saturated meadows with fine-grained, non-cohesive soils and without woody bank vegetation is incompatible with aquatic resource protection and therefore, should be prohibited. Similar vulnerable environments should not be subjected to grazing unless completely fenced and all habitat standards are met.

Livestock grazing should also be eliminated in all wet soils (>50% field capacity) and other soils vulnerable to compaction. Compaction is inevitable in wet soils. Notably, many national forests prohibit vehicle use on wet soils because even a single pass by vehicles result in significant compaction (Klamath National Forest, 2010) and cattle exert far greater pressure on soils than vehicles.

As recommended by Henjum et al. (1994), grazing should not be allowed to continue until its ecological effects are fully analyzed. Grazing should only be continued or re-initiated after degraded conditions have improved, and in areas were at least 10% of the riparian areas with grazed areas are fenced as monitoring exclosures. Livestock use should be tightly controlled, closely monitored, and only continued if condition and trend in grazed areas is as good as in exclosures. Monitoring is required in affected riparian areas that are grazed and in downstream habitat affected by upstream grazing.

Although lowered forage utilization rates do have some utility in reducing the impacts of livestock on aquatic habitats, they should not be relied upon solely to provide adequate levels of ecosystem protection. The control of forage utilization, alone, does not adequately address many livestock impacts, including bank trampling, soil compaction, sedimentation and restoration of riparian plant assemblages and status.

At least one alternative analyzed in the EIS for the plan revision should include the elimination of livestock grazing in order to provide at least one alternative that is consistent with ecological recovery and adaption to climate change. Such an alternative is critical to establishing a reasonable baseline, as well as a reasonable range of alternatives.

Under all alternatives the ecological and fiscal costs of continued livestock grazing and the benefits of eliminated/curtailed grazing must be properly disclosed by adequately assessing the direct, indirect, and cumulative effects of no livestock vs. continued livestock grazing on the following:

- soil erosion
- soil compaction
- soil processes, including infiltration
- soil productivity
- available water storage in soils and effects on vegetation, forest productivity, and streamflows (both high and low flows)
- bank conditions, including overhanging banks, and bank erosion
- channel conditions, including w/d ratio, pools, and stream channel substrate
- riparian vegetation and riparian functions, including stream shading and bank stability
- turbidity and water temperature
- salmonid habitats
- salmonid survival and production
- non-native vegetation and noxious weeds

In order to reasonably disclose cumulative effects, the existing effects of livestock on the foregoing must be disclosed, including the existing condition and trend.

LITERATURE CITED

Anderson, J.W., Beschta, R.L., Boehne, P.L., Bryson, D., Gill, R., McIntosh, B.A., Purser, M.D., Rhodes, J.J., and Zakel, J., 1993. A comprehensive approach to restoring habitat conditions needed to protect threatened salmon species in a severely degraded river -- The Upper Grande Ronde River Anadromous Fish Habitat Protection, Restoration and Monitoring Plan. Riparian Management: Common Threads and Shared Interests, pp. 175-179, USFS Gen. Tech. Rept. RM-226, Fort Collins, Co.

Belsky, A.J., Matzke, A., and Uselman, S., 1999. Survey of livestock influences on stream and riparian ecosystems in the western United States. J. of Soil and Water Cons., 54: 419-431.

Cowley, E.R., 2002. Monitoring Current Year Streambank Alteration. Bureau of Land Management, Idaho State Office, Boise, ID

Elsner, M.M. and A. Hamlet, 1999. Hydrologic climate change scenarios for the Pacific Northwest Columbia River Basin and coastal drainages. Center for Science of the Earth System, Climate Impacts Group, University of Washington http://www.hydro.washington.edu/2860/ Accessed Jan. 22, 2009.

Fleischner, T.L., 1994. Ecological costs of livestock grazing in western North America. Cons Biol., 8: 629-644.

Henjum, M.G., Karr, J.R., Bottom, D.L., Perry, D.A., Bednarz, J.C., Wright, S.G., Beckwitt, S.A., and Beckwitt, 1994. Interim Protection for Late Successional Forests, Fisheries, and Watersheds: National Forests East of The Cascade Crest, Oregon and Washington. The Wildlife Soc., Bethesda, Md.

Kauffman, J.B., Bayley, P., Li, H., McDowell, P., and Beschta, R.L., 2002. Research/Evaluate Restoration of NE Oregon Streams: Effects of livestock exclosures (corridor fencing) on riparian vegetation, stream geomorphic features, and fish populations. Final Report to the Bonneville Power Administration, Portland, OR

Kauffman, J.B., Thorpe, A.S., Brookshire, J. and Ellingson, L., 2004. Livestock exclusion and belowground ecosystem responses in riparian meadows of eastern Oregon. Ecological Applications: 1671-1679.

Klamath National Forest, 2010. Final Environmental Impact Statement Motorized Travel Management. USFS Pacific Southwest Region.

Lee, D., Sedell, J., Reiman, B., Thurow, R, and Williams, J., 1997. Interior Columbia Basin Ecosystem Project: Scientific Assessment, Vol. 3, Chapter 4, Broadscale Assessment of Aquatic Species and Habitat, *in* An Assessment of Ecosystem Components in the Interior Columbia

Basin and Portions of the Klamath and Great Basins, PNW-GTR-405, USFS and USBLM, Portland, OR

Lee, S., Hamlet, A.F., Fitzgerald, C.J. and S.J. Burges, 2009. Optimized flood control in the Columbia River Basin for a global warming scenario. J. Water Resour. Plng. and Mgmt. Volume 135: 440-450.

Luce, C.H., and Z.A. Holden, 2007. Declining annual streamflow distributions in the Pacific Northwest United States,1948–2006 Geophys. Res. Letters, doi:10.1029/2009GL039407,2009

Mote, P.W., A.F. Hamlet, M.P. Clark, and D.P.Lettenmaier, 2005. Declining mountain snowpack in western North America. Bull. Am. Meteorol. Soc., doi:10M1175HBAMSB86B1B39M

Ponce, V.M. and Lindquist, D.S., 1990. Management of baseflow augmentation: A review. Water Resour. Bull., 26: 259-268.

Reeves, G.H., Hall, J.D., Roelofs, T.D., Hickman, T.L., and Baker, C.O., 1991. Rehabilitating and modifying stream habitats. Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats, Am. Fish. Soc. Special Publ. 19: 519-557.

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.

Spence, B.C., Lomnicky, G.A., Hughes, R.M., Novitzki, R.P., 1996. An ecosystem approach to and salmonid conservation. TR-4501-96-6057. ManTech Environmental Research Services Corp., Corvallis, OR. (Available from the National Marine Fisheries Service, Portland, Oregon.)

SPECIFIC COMMENTS ON SECTIONS RELATED TO LIVESTOCK GRAZING

1.11 (p. 37) –

The section on Water Quality must describe the effects of livestock grazing on water quality, including deposition of fecal chloroform and ammonia from cattle feces and urine in the streams of these forests and the negative effects on water quality that result from livestock damaging streambanks and stripping streamside vegetation, leading to increased sedimentation and higher stream temperatures. The forests must acknowledged that livestock grazing is responsible for the current poor quality of water and the listing of many of the forests' streams on the Clean Water Act § 303(d) list of water-quality impaired waters. See map of Oregon's water quality impaired waters at http://www.deq.state.or.us/WQ/assessment/docs/MapImpairedWaters.pdf. Although the proposed action acknowledges that the principle beneficial use of water on the Blue Mountain Forests is cold-water fish habitat, the Proposed Action does not clearly explain the negative impacts of riparian grazing on stream channel width, stream bank stability, stabilizing and shading riparian vegetation, all of which ultimately negatively impact and raise water temperatures. The alternatives must consider ways to effectively reduce livestock grazing impacts on water temperatures.

3.3.2 (p. 60) –

The section describing livestock grazing does not address whether subsidizing uneconomical grazing actually promotes economic well-being. The Proposed Action must explore whether the Forests' ecology would be enhanced by either raising the annual grazing cost per AUM to approximate market rates and whether ecological and human economic benefits could be achieved by establishing a system for retirement or buy-out of grazing permits in the most ecologically-sensitive portions of the Forests.

Management Area 2K – Riparian Management Areas (p. 78) –

The strategy for riparian management areas fails to describe that livestock grazing, in contrast to the statement that "[m]anagement activities within RMAs are designed to maintain, enhance, or restore, as applicable, the ecological processes responsible for the diversity, productivity, and sustainability of riparian habitats," in practice degrades the ecological processes within RMAs. The Proposed

Action must acknowledge in this section and elsewhere in developing the plan that grazing is destructive to riparian habitat and set appropriate guidelines for reducing that destructiveness. The chart on page 81 should accordingly be updated to reflect that grazing is an "unsuitable" activity in RMAs. Likewise, the chart on page 81 should be updated to reflect that Wild and Scenic River Corridors are "unsuitable" for grazing, since grazing is not compatible with the outstanding resource values in such corridors or with the preservation of those corridors in their natural state.

Restoring and Maintaining Watershed Conditions (p. 83) –

These Forests contain 5.5 million acres (p. 10) of which 3.4 million acres are grazed annually on 224 active allotments (p. 64). Reducing or eliminating grazing on the streams that drain the 3.4 million acres of grazed lands (not considering browsing by increasing numbers of wild ungulates) is the central issue in improving the condition of riparian areas. Many of the grazing allotments and streams on the Forests have major problems, and the Forests need to implement major grazing reform to address long-standing damage caused by grazing. Addressing only a few "key watersheds" and doing so with a strategy that is unquantified and largely aspirational will not achieve restoration of fish habitat at the level of individual streams.

The Proposed Action does not explain how you get from A to B – that is, how the essentially standardless strategy described for watershed restoration actually will achieve restoration in practice. Unlike the aquatic conservation strategies which it purports to "update[] and enhance[]," the watershed restoration strategy eliminates any quantifiable or measurable restoration parameters of good riparian health. Attempting or promising to restore "key" watersheds is not tied directly to strategies or quantitative standards for individual management actions, particularly livestock grazing. By focusing on a few watersheds, it appears that the Forests are effectively writing off all non-key watersheds as there appears there would be no effort made to restore non-key watersheds. The Proposed Action must be modified to include quantification of the watershed restoration objectives, based on measurable parameters of good stream condition, and against which both restoration efforts and site-specific actions (such as livestock grazing) can be measured. The Proposed Action does not cite a single successful key-watershed restoration that has been achieved in the region using the strategy proposed.

Instead of "updating and enhancing PACFISH and INFISH," the Forest Service is doing away with these strategies, since the Forests have been, in practice, unable to comply with them at almost all places on the Forest, and particularly in riparian areas. The Regional Aquatic Restoration Strategy, to which the Proposed Action's strategy supposedly tiers, is little more than an "approach" to restoration strategies – largely aspirational and without serious, quantified standards for what "restoration" will look like. Without some quantitative goals, not only is the management of individual projects and overall restoration efforts arbitrary, but it is almost certain to achieve little or no restoration in practice. Most importantly, it gives grazing managers no standards against which to measure the impacts of site-specific actions, which will lead to business-as-usual in grazing management at the allotment level, directly undermining any broader-scale restoration aspirations which the Forests may have. The Proposed Action must be revised to retain quantitative watershed restoration standards similar to those contained in PACFISH and INFISH.

A major weak point of the Forests' proposed "watershed restoration strategy" is found in the statement that the "key" watersheds will begin to be restored, in some cases, only within the next 10 to 15 years (p. 86). The Forests fail to appreciate and acknowledge the special extent of the grazing problem (3.5 million acres of watersheds and riparian areas they contain that are often intensively and excessively grazed year after year). Grazing is on-going, year after year, continuing

to degrade riparian areas. For example, on the Malheur National Forest, the most recent biological opinion on 13 steelhead-bearing allotments determined that the five years of proposed grazing would "maintain" streams on those allotments as "functioning as risk" or "functioning at unacceptable risk" over the life of the consultation. The Forests' unwillingness to place restrictions on site-specific actions, such as grazing, that have direct and negative effects on the long-term ecological health of riparian areas will undermine any strategy to restore watershed conditions.

The Proposed Action must be modified to include alternatives that would impose quantitative watershed restoration goals and standards for site-specific actions, such as livestock grazing, which are tied directly to the achievement of the watershed restoration goals and will result in meaningful curtailment of site-specific actions to ensure achievement of actual watershed restoration. The justification for such quantifiable standards is presented in the Proposed Action itself, where it notes the success of PACFISH and INFISH and the Riparian Management Objectives ("RMOs") contained in those strategies: "[m]odified grazing strategies and implementation of utilization standards have resulted in reduced use levels in riparian areas resulting in many of the riparian systems showing definite signs of recovery and riparian vegetation improvement." Proposed Action at 61. Elimination of quantifiable standards will result in elimination of objective management for riparian and watershed restoration. In place of the standards for good fish habitat, the stubble height and bank alteration standards—which have never been shown to be valid proxies for good fish habitat—are cemented in place (p. 113) while moving to an arbitrary, wholly discretionary "aquatic restoration strategy" in place of PACFISH/INFISH RMOs. Also eliminated is any standard for what is meant by "recovery" of riparian areas and any notion of a "near natural rate of recovery" or any concern for the recovery of a diverse age structure of shrubs and woody species. See pp. 111–13. Without measurable goals for restoration of riparian habitat and associated vegetation, the proposed strategy leaves riparian area restoration to the whims of a capricious future.

Although PACFISH and INFISH were designed as interim strategies to protect native fish, both were incorporated as amendments to the Blue Mountain Forests' Forest Plans and have provided a quantitative, readily-measurable set of standards for evaluating riparian health by setting numerical RMOs as quantifiable objectives for good fish habitat. Grazing Standard GM-1 in the current Forest Plans requires modification of grazing that retards attainment of the RMOs, or suspension of grazing if modification is not effective in attaining RMOs. The Proposed Action is deeply flawed because it contains no measurable standards for what constitutes good fish habitat.

Furthermore, PACFISH and INFISH were adopted through consultation with the National Marine Fisheries Service ("NMFS") and U.S. Fish & Wildlife Service ("FWS") and are deemed by these fish-management agencies to be essential for avoiding jeopardy and the destruction or adverse modification to the habitat of listed fish. The Forest Service cannot remove the protections in PACFISH and INFISH without consultation with the fish-management agencies under the Endangered Species Act, and the new, standard-less strategy for managing grazing is certain to result in jeopardy or the destruction or adverse modification of designated critical habitat for listed fish. The Forest Service should revise the Proposed Action, in consultation with NMFS and FWS, to incorporate quantitative standards for reducing or eliminating livestock grazing from designated critical habitat for listed fish.

Annual Anticipated Accomplishments as Related to Objectives (p. 92) –

The AUM numbers presented in this table are meaningless without historical perspective. The Forests much each provide a history of annual use (AUMs/year) for as far back as they have records, and also provide an assessment of wild ungulate populations over time since both wild and

domestic ungulates are competing for the same forage base. Without the historical data, it is impossible to know what the current or "anticipated" AUM use really means. In addition, given the flexible level of AUMs in this table (for example, from 110,000 to 194,000 AUMs for the Malheur National Forest), the Forest Service should commit to managing these Forests at the bottom end of the range, dropping AUM use to help achieve forest-wide improvement to the biodiversity and functioning of watershed conditions within the grazed allotments.

Minimum Legally Required Monitoring Items (p. 94) –

These monitoring items include no monitoring required to ensure against jeopardy or adverse modification to designated critical habitat for ESA-listed fish. There are also no monitoring requirements for plant communities or stream conditions in grazing allotments.

Management Indicator Species and Species At Risk (p. 99) –

It is a major concern of ours that the Forests have eliminated aquatic species, including ESA-listed species such as steelhead and bull trout, and other salmonids as Management Indicator Species. The Forests must replace these and other species on the list of Management Indicator Species and develop forest-wide guidelines for monitoring and ensuring the protection of these fish species.

Plant Species Guideline G-22 (p. 101) –

Two years of protection from livestock grazing after restoration of habitat for federally-listed plant species or species of risk is not nearly long enough. The vegetation systems did not fall apart in a couple of years, nor will they be fully restored in just two years. At least five years of rest from livestock grazing should be required after vegetation restoration.

Range Management and Grazing (p. 104) –

A key deficiency in the grazing section is the lack of any "standards" – "constraints placed upon project and activity decision-making and are established to help achieve the goals and desired conditions and objectives of a plan or to comply with applicable laws, regulations." (p. 98). The Proposed Action must be revised to include alternatives with grazing *standards* and not just guidelines, specifically quantitative standards that apply to grazing in listed fish habitat to comply with the requirements of the Endangered Species Act.

Guideline G-43 – One to two years is far too little time after a site is disturbed by fire to allow livestock grazing. A site burned by wildland fire should be allowed at least 5 to 10 years of recovery, free of grazing, to allow a diversity of species to become well-established. Allowing livestock to return to a burned area will result in rapid elimination of newly-reestablished palatable species.

Guideline G-44 – Designing new fences to accommodate wildlife movement is a good idea. An even better idea is to reduce grazing so that no additional fences are required at all.

Guideline G-46 – As discussed above, these and other grazing standards must incorporate quantitative terms and provision for complete cessation of grazing based on site-specific conditions.

Guideline G-47 – The 45% shrub utilization is too high. It is difficult for shrubs to reach full height at this level of use. Even worse is that existing standards for shrub use are rarely measured by the

Forest Service, and instead estimations of shrub use turn the numerical standards into meaningless, unenforced numbers in practice.

Attaining woody shrub recruitment continues to be a major problem for these three Forests since it takes several years of non-use (or sufficiently light herbivory such that young shrubs are not browsed) for shrub recruitment to occur. It is getting increasingly tough for the forests in areas where elk numbers have increased or feral horses are present. In those areas, it is even more important that the allotments and watersheds get relief from domestic ungulates, and none of the guidelines (much less standards) address this issue.

Management Area Standards and Guidelines – Riparian Management Areas (p. 111) –

Guideline G-101 – this standard is wholly discretionary, and, somewhat shockingly does not address livestock grazing, the most pervasive land use that affects Riparian Management Areas. As a completely discretionary standard, it provides no meaningful guidance for designing livestock grazing that will result in the improvement and restoration of riparian areas.

Range Management and Domestic Livestock Grazing (p. 113) –

This section is deficient and non-compliant with the Endangered Species Act with respect to grazed designated critical habitat because it provides no quantitative standards for the protection of fish-bearing streams or quantification of good fish habitat (and consequently no standards for reducing or eliminating livestock grazing effects on that habitat). The Forests must develop quantitative standards comparable to RMOs, and standards to achieve those by minimizing or eliminating livestock grazing, to comply with the ESA.

Guideline G-115 – The Forests must present the minimum stubble height and maximum bank alteration as "standards" that would actually place constraints on livestock grazing. This omission is particularly troubling because the last decade of damaging grazing practices has clearly illustrated that standards that bring about meaningful on-the-ground changes are now needed. The Proposed Action should be revised to make this greenline vegetation area guideline into a "standard" applicable to all grazing in riparian areas. In addition, the standard should be revised to eliminate highly-discretionary weasel-words and phrases such as "area with low departure from desired conditions" and "moderately confined" stream types. Use of objective, quantifiable, measurable standards to constrain grazing is the only way for the Forests to protect fish listed under the ESA from adverse effects of grazing. The Proposed Action and guideline G-115 are woefully inadequate to this task.

Guideline G-118 – Trampling of federally listed fish redds by livestock should be avoided in all instances.

9. Restoring and Maintaining Social and Economic Conditions

"A sustainable flow of social amenities depends upon sustainable ecological management practices in watersheds and with terrestrial species. Sustainability requires a symbiotic relationship between social, economic, and ecological aspects of ecosystem management (Formann 1995, Wright 2002)."

These two sentences from the Proposed Action speak volumes. The national forests must be managed for the highest level of ecological integrity in order for the forests to be able to provide quality social benefits for humanity. Social and economic considerations must be harmonious with the natural ecology in order to find the balance point that we call sustainability.

In the past, social pressures pushing for the extraction of economically-valued products from the national forests caused ecological problems. Some of these problems are the basis for much of the need for restoration today. In recent years, there have been some successes in dealing with some of these problems through both active and passive restoration. Often, these successful restoration efforts involve creative solutions and non-traditional partnerships. These restoration projects have the potential to create jobs in the local communities. Projects that are structured so that the local workforce can participate in the employment will yield the greatest social and economic benefits to the local communities. The national forests benefit from having a long-term local workforce with local knowledge and a local social investment in the local national forests.

True ecological restoration provides an opportunity to restore social and economic conditions to benefit local and tribal communities as well as the American public as a whole. A management approach that restores the ecological integrity of the national forests can provide opportunities for jobs while improving the resiliency of the ecosystems, restoring habitat for wildlife and fish, and providing habitat connectivity across the landscape.

Examples of ecological restoration projects that provide jobs and businesses while benefitting the resources:

- Restoration of degraded stream channels
- Removal of fish passage barriers and construction of new fish-friendly structures if needed
- Planting native riparian vegetation
- Inventorying and monitoring forests, grasslands, habitats, wildlife, streams and all other resources.
- Enhancing and restoring special wildlife habitats such as aspen, willow and cottonwood areas, meadows and grasslands, etc.
- Controlling invasive, non-native plants combined with the replanting of native plants to restore habitat and prevent re-colonization by weeds
- Inventorying the road systems of the national forests to determine the actual conditions on-the-ground
- Treating excess roads with heavy equipment to decommission, re-contour, or physically close in order to benefit wildlife and fish and to reduce the spread of weeds

These types of active restoration projects provide economic and social benefits while enhancing the ecological condition of the national forests. Job and business opportunities in a restoration economy provide direct social benefits to workers and local communities. A restored landscape also provides positive social results through its higher quality level of ecological integrity. Social benefits include improved quality of wildlife viewing, hunting, fishing, hiking, camping and other outdoor recreational pursuits. Humans also benefit psychologically from time spent in public wild lands with a high level of ecological integrity.

10. National Forest Management Act, Threatened and Endangered Species and Management Indicator Species

National Forest Management Act and NEPA Analysis Issues

NFMA Planning Regulations

The new Blue Mountains Forest Plan (BMFP) must incorporate scientific research of the region's federal, state, and regional listed species and species of concern and their current and historic habitat, abundance, and distribution. The new BMFP must select an adequate range of management indicator species (MIS) and focal species specific to the varied habitat types and conditions within the area's forests. The BMFP must disclose and incorporate research pertinent to listed, regional, MIS and focal species habitat needs, and present scientifically founded plans for the recovery and maintenance of the viability of these species.

The new BMFP must be developed in compliance with the 1982 NFMA planning rules. In 2009, the 2008 NFMA planning regulations were vacated by a federal court as legally noncompliant with the requirements of NFMA. *Citizens for Better Forestry v. USDA*, 2009 U.S. Dist. LEXIS 55510 (N.D. Cal. June 30, 2009). We request that the Forest Service utilize the 1982 NFMA regulations for a number of ecological, scientific, and legal rationales. While the *Citizens for Better Forestry* decision does not clearly direct the Forest Service to implement either the 1982 rule or the 2000 rule in replacement of the 2008 rule, it is clear that the substance of this judicial decision emphasizes legal analysis requirements that are more clearly met by the 1982 rule requirements regarding MIS species surveys, and population and habitat viability. We strongly caution against the utilization of the ecologically insufficient 2000 rule as a replacement for the legally invalid 2008 rule. The 2000 rule would be inadequate to achieving the level of effective management and resource protection needed to ensure the viability and biodiversity of the region's many forest dependent listed species and species of concern. The deficiencies of the 2000 rule are especially evident in comparison to the more credible requirements of the 1982 rule.

Regional Species of Concern, Management Indicator and Focal Species

NFMA requires the Forest Service to provide animal and plant diversity in the national forests. 16 U.S.C. § 1604(g)(3)(B). USFS regulations implementing this requirement direct the Service to manage forests for viable populations of native vertebrate and desired non-native species. 36 C.F.R. § 219.19. The regulations define viable populations as a population that has "the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area." *Id*.

To ensure that viable populations are maintained, the Forest Service regulations also require that the Service identify management indicator species (MIS) and that "[p]opulation trends of the management indicator species will be monitored and relationships to habitat change determined." 36 C.F.R. § 219.19(a)(6). This monitoring is "essential to verify and, if necessary, modify the forest plan's assumptions about the effects of timber harvesting and other management activities on wildlife…In order to meet the monitoring requirement, planners will need to obtain adequate inventories of wildlife populations and distribution." Charles F. Wilkinson and H. Michael Anderson, *Land and Resource Planning in the National Forests*, 304 (1987).

Pertaining to NFMA based Forest Plan objectives the draft BMFP states:

- *Species Diversity:* "Providing for the appropriate amount, distribution, and quality of habitat for native and desired non-native aquatic and terrestrial species (plants and animals, vertebrates and invertebrates) within the Blue Mountains is an integral component of ecological function. The ability to sustain this habitat over time, as well as the connectivity of habitat patches, is also important to the maintenance of ecological function."

- "The National Forest Management Act requires land and resource management plans to contribute to the diversity of plant and animal communities;"
- "The overall goal… is to provide the ecological conditions that support a diversity of native plant and animal species within a planning area."
- "Natural ecosystems are only sustainable when the native biodiversity (the variety of life and its processes) and the functional basis of productivity are maintained (Johnson and O'Neil 2001)."
- In general, comparing the existing vegetative communities to a set of reference conditions (presettlement, natural range of variability, etc.) allows the evaluation of changes in disturbance regimes and acts as a check on the adequate representation of ecological communities (Samson 2002), which in turn should support species diversity."
- "The Blue Mountains are relatively intact, being dominated by natural or semi-natural vegetation, and are home to more than 250 wildlife species."
- "A total of 175 species were identified as being of local and/or regional conservation concern for the planning area."
- The Pacific Northwest Region of the Forest Service adopted processes to guide identifying these terrestrial (Mellen-McLean and Mohoric 2006) and aquatic species (Reiss et al. 2009), as well as for assessing plant species (Homes et al. 2006)."
- "Terrestrial species were grouped by potential vegetation group (PVG); risks and threats were identified for the group and a representative species (focal species) was selected for the group."
- "The majority of focal species were determined to have well distributed source habitats that were reasonably connected and similar to what would have been on the landscape historically."
- "There were some species (e.g., white-headed woodpecker); however, where source habitats were far diminished from what probably occurred historically and those existing habitats had poor connectivity."
- "Aquatic focal species were also identified. Based on areas where strong populations of these species are thought to occur, it appears that the majority of subwatersheds are in poor condition, with very few containing population strongholds of fish focal species."

Selecting Management Indicator Species and Associated Focal Species of Concern Representative of Regional Species at Risk

The draft Forest Plan above discloses that "175 species were identified as being of local and/or regional conservation concern for the planning area." We herein request that the draft BMFP DEIS fully disclose all of these 175 species, their current status and trends, the reasons they are considered species of concern, and the management provisions for their recovery and viability maintenance. (Disclosure within an appendix may be sufficient providing adequate representative MIS and focal species of these are addressed directly in the EIS). Of these undisclosed species, the BMFP proposes only the following wildlife and avian MIS/focal species: American Marten, Bald Eagle, Bighorn Sheep, Fringed Myotis, Townsend's Big-eared Bat, Northern Goshawk, Pileated Woodpecker, White-headed Woodpecker, Black-backed Woodpecker, Lewis' Woodpecker, Boreal Owl, Fox Sparrow, Cassin's Finch, Water Vole, and Rocky Mountain Elk. While the species disclosed in the initial draft BMFP are indeed deserving of MIS/focal species status; these species do not adequately represent the sufficient range of species necessary to achieving NFMA's viability requirements.

Terrestrial and avian federal and state listed species that the new BMFP must address in ensuring its management provisions are in accord with scientific research and recovery plan

objectives include: Gray Wolf, Lynx, Wolverine, MacFarlane's Four-O'Clock, Spalding's Catchfly, Steelhead (Mid-Columbia, Puget Sound, and Snake River), Sockeye Salmon, Chinook Salmon, and Bull Trout.

In addition to federal and state listed species (including terrestrial, aquatic, and botanical species), which are addressed more fully later herein, there are a number of terrestrial and avian species of concern that also warrant inclusion as MIS/focal species in the new BMFP.

Avian species in addition to those already proposed in the draft BMFP include: Great Gray Owl, Pygmy Owl, Flammulated Owl, Western Screech Owl, Northern Three-toed Woodpecker, Pygmy Nuthatch, Red-breasted Nuthatch, White-breasted Nuthatch, Williamson's Sapsucker, Red-naped Sapsucker, Chipping Sparrow, Brown Creeper, Hermit Thrush, Band-Tailed Pigeon, Rufous Hummingbird, Olive-Sided Flycatcher, Winter Wren, Song Sparrow, Golden-Crowned Kinglet, Pine Siskin, Solitary Vireo, Willow Flycatcher, Hammond's Flycatcher, Tree Swallow, Red-Eyed Vireo, Veery, Vesper Sparrow, Yellow Warbler, Townsend's Warbler, MacGillivray's Warbler, Yellow-Breasted Chat, Vaux's Swift, Swainson's Thrush, Gray-crowned Rosy Finch, Blue Grouse, Ruffed Grouse, Upland Sandpiper, Sandhill Crane, Long-billed Curlew, and others.

Terrestrial Species in addition to those already proposed in the BMFP, and state and federal listed species (noted above), include: Fisher, Long-eared Myotis, Long-legged Myotis, Yuma Myotis, Black Bear, White-tailed Deer, Moose (recently returned to NE Oregon), Cougar, Beaver, and others. Terrestrial prey species – whose sufficient abundance and distribution may be indicative of species of concern presence and viability potential - include: Red-backed Voles, Snowshoe Hare, Flying Squirrel, Douglas Squirrel, Columbia Ground Squirrel, and others.

Concerning indicator species management, it is important to note cautions raised in the "Interim Protection for Late Successional Forests, Fisheries, and Watersheds" "National Forests East of the Cascade Crest…" Wildlife Society Technical Review 94-2 (page 181-182):

- "…an indicator species framework is inadequate for achieving the broad goal of protecting ecological integrity. (Karr 1987, Morison and Marcot 1994);"
- "Too often, the indicator concept translates into management narrowly focused on a single species or single resource…. Management activities can ignore other critical associated species, ecological interactions, and other resources (Landres et al. 1988)."

BMFP Provisions for MIS and Focal Species of Concern Monitoring

The new BMFP must incorporate the clear intent of the NFMA in developing its MIS species lists and monitoring protocol. The Ninth Circuit has stated that the duty to ensure viable or self-sustaining populations "applies with special force to "sensitive" species." *Inland Empire Public Lands Council v. United States Forest Serv.*, 88 F.3d 754 (9th Cir. 1996) citing *Oregon Natural Resources Council v. Lowe,* 836 F.Supp 727, 733 (D.Or. 1993). NFMA clearly directs the Forest Service to create regulations to "insure research on and (based on continuous monitoring and assessment in the field) evaluation of the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land." 16 U.S.C. § 1604(g)(3)(C); *Sierra Club v. Martin*, 168 F.3d 1 (11th Cir. 1999).

In light of this direction, NFMA's regulations require inventorying and monitoring on the National Forests under 36 C.F.R. §§ 219.12(d) and (k) as well as 36 C.F.R. §§ 219.19(a)(6), 219.26, and 219.19(a)(2). The regulations state "each Forest Supervisor shall obtain and keep current inventory data appropriate for planning and managing the resources under his or her

administrative jurisdiction." *Id*. § 219.12(d). The regulations further require that "at intervals established in the plan, implementation shall be evaluated on a sample basis to determine how well objectives have been met and how closely management standards and guidelines have been applied." *Id*. § 219.12(k). To ensure biological diversity, the regulations specifically require that "[i]nventories shall include quantitative data making possible the evaluation of diversity in terms of its prior and present condition." *Id*. § 219.26.

Although NFMA clearly requires the monitoring of MIS populations, the Forest Service has traditionally relied upon the availability of suitable MIS habitat, rather than population surveys, to meet NFMA's viable populations requirement. *Inland Empire Public Lands Council v. United States Forest Serv.*, 88 F.3d 754 (9th Cir. 1996). However, in 2002 the Ninth Circuit revisited its holding in *Inland Empire*, and held that if the Forest Service utilizes a "proxy-on-proxy" approach to meeting the agency's NFMA obligations, any habitat models must be grounded in fact and field verified. *Idaho Sporting Congress v. Rittenhouse*, 2002 U.S. App. LEXIS 19108 (9th Cir. 2002). The court also acknowledged that other courts have expressly disavowed the holding in *Inland Empire*, casting additional doubt on the validity of that case. *See generally*, *Sierra Club v. Martin*, 168 F.3d 1 (11th Cir. 1999), *Utah Environmental Congress v. Zieroth*, 190 F. Supp. 2d 1265, 1272 (D. Utah 2002) (holding that § 219.19 unambiguously requires collection of population data), *Forest Guardians v. U.S. Forest Service*, 180 F. Supp. 2d 1273 (D.N.M. 2001) (same).

Given this developing reinterpretation of the legal requirements attendant to management indicator species, it is clear that the multiple mandates in NFMA and its implementing regulations requiring population monitoring and surveying must be incorporated in the new BMFP.

In particular the BMFP must address past and ongoing cumulative effects to a number of terrestrial and avian Management Indicator Species, listed species, and regional species of concern. It is important that the new BMFP provide for accurate verifiable monitoring data that would inform whether the cumulative effects of past, present, and future management might be pushing certain species of concern, listed species, and/or indicator species toward a threshold of concern for population viability.

This is especially important in the region's fragmented rare LOS forest habitat. Given the widespread levels of management degradation to old forest habitat throughout the Blue Mountains region, it is highly likely that the remaining LOS forest habitat and connective habitat provides irreplaceable core territory, refugia, and connectivity for numerous listed and regional species of concern that depend in whole or part on large areas of little disturbed mature and old growth forest.

USDA policy does not allow the Forest Service to take actions that would cause trends toward listing species under the Endangered Species Act. Relevant policy directs the Forest Service to: "1. Manage 'habitats for all existing native and desired non-native plants, fish, and wildlife species in order to maintain at least viable populations of such species.' 2. Habitat must be provided for the number and distribution of reproductive individuals to ensure the continued existence of a species generally throughout its current geographic range." FSM 2620.1 and USDA Department Regulation 9500-4 (August 22, 1983. Forest Service objectives are to "provide a sound base of information to support management decision-making affecting wildlife and fish, including endangered, threatened, and sensitive animal and plant species, and their habitats." FSM 2620.2. Forest Service policy is to "use management indicators to address . . . species habitat through all planning levels." FSM 2620.3. The USDA also requires that the Forest Service "avoid actions which may cause a species to become threatened or endangered." DR 9500-4(3)(d).

The Forest Service manages Management Indicator Species as surrogates for habitats that were likely to be limiting in the future (in short supply either in total acreage or in distribution). There is an inherent assumption that MIS are "vulnerable" or represent a class of species that are vulnerable due to current or future habitat limitations. Id. The impacts of management activities on these vulnerable species is likely to be significant in a NEPA context, especially in the absence of clear monitoring information indicating that these populations are healthy and/or have an increasing trend.

The Forest Service generally has a choice to either monitor actual populations of Management Indicator Species, OR to develop and rigorously validate habitat models that allow the Forest Service to use habitat as a proxy for populations of these species. There are considerable inherent flaws and well-founded scientific objection to the use of proxy-on-proxy approach to wildlife management where the agency uses crude and unverified habitat modeling rather than actual population surveys as a means to ensure the viability of Management Indicator Species ("MIS"). Generally, there exists a lack of sound scientific substantiation that any forest in the Pacific Northwest region is currently using a credible and validated habitat model for MIS. In instances where the Forest Service proposes not to monitor MIS populations directly, the agency must demonstrate the accuracy and comprehensive scope of the management models the Forest Service proposes to use to correlate populations and habitat.

MIS are chosen to represent a suite of other species, narrowing the field of species to enable feasible monitoring. The new BMFP must provide for the programmatic MIS population monitoring necessary to soundly meet the requirements of the NFMA in its LRMP management direction. NFMA and its implementing regulations require the forest service to manage forests for viable populations of native vertebrate and desired non-native species. Diversity is assessed by identifying MIS, monitoring MIS, gathering inventory data on MIS, and analyzing the impacts of management activities on MIS, because MIS are an indicator of the overall diversity of the forest. *36 CFR § 219.19 et seq.* NFMA regulation 219.19 requires that, "fish and wildlife habitat shall be managed to maintain viable population of existing native and desired non-native vertebrate species in the planning area." Further, the Forest Service Manual states the agency must manage "habitats for all existing native and desired nonnative plants, fish, and wildlife species in order to maintain at least viable populations of such species." *FSM at 2670.12.* In order to maintain viable populations of wildlife, "habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area." *36 CFR § 219.19.*

NFMA, its implementing regulations, and subsequent case law require the Forest Service to know what the viable populations of MIS located in the project area are before management prescriptions are applied. As such it is important that the new BMFP incorporate effective management direction ensuring current and future projects capably meet NFMA requirements.

As noted, both scientific research and federal caselaw generally do not approve of the "proxy on proxy" MIS management approach that has been largely utilized to date by the Forest Service. Such an approach, using indicator species chosen to represent a suite of other species, generally requires that indicator species populations are effectively monitored. However, to date the Forest Service instead has generally monitored habitat levels, which may or may not accurately reflect population levels. The Forest Service new BMFP must develop scientifically sound MIS, focal species, listed and species of concern population monitoring; enabling the new LRMP and its management projects to better ensure the recovery and maintenance of viable populations of native species. See *Idaho Sporting Congress and Alliance for the Wild Rockies v. Rittenhouse.* In 2004, the 10th Circuit affirmed the Forest Service's duty to quantitatively measure changes in MIS

populations and not just habitat trends. UEC v. Bosworth, 10th Circ. June 23, 2004 (http://www.kscourts.org/ca10/cases/2004/06/03-4080.htm):

In keeping with the reasoning of the Eleventh Circuit and the district courts of this circuit, it has been well founded both legally and scientifically that § 219.19 requires the Forest Service to use actual, quantitative population data to effectuate its MIS monitoring obligations. Section 219.19 mandates that as part of forest planning, "[f]ish and wildlife habitat shall be managed to maintain viable populations of existing native and desired nonnative vertebrate species." Further, forest management "[p]lanning alternatives shall be stated and evaluated in terms of both amount and quality of habitat and of animal population trends of the management indicator species," § 219.19(a)(2); similarly, "[p]opulation trends of the management indicator species will be monitored and relationships to habitat changes determined," § 219.19(a)(6). Plainly the regulations require that the Forest Service monitor population trends of the MIS in order to evaluate the effects of forest management activities on the MIS and the viability of desired fish and wildlife populations in the forest more generally.

A related case, UEC II, elaborated on the MIS requirements: UEC I makes clear that "the regulations anticipate application of § 219.19 to project level *as well as plan level* management actions." 372 F.3d at 1225. As we noted in UEC I, this approach is consistent with other circuits. See Sierra Club v. Martin, 168 F.3d 1, 6 (11th Cir. 1999) (recognizing "that the regulations *refer to the formulation of Forest Plans* rather than to specific projects proposed under already enacted Forest Plan" but that "the planning process does not end with the Forest Service's approval" and "*continue[s] throughout the Plan's existence*"); Inland Empire Pub. Lands Council, 88 F.3d at 760 n.6 ("Because any district contained within the boundaries of a forest having a plan would be an 'area . . . covered by a . . . forest plan,' it would [] also be a planning area governed by Regulation 219.19.") (quoting 36 C.F.R. § 219.3). Thus, the Forest Service's obligations under § 219.19 apply specifically to the development of this new BMFP, and the management direction of its current and future projects.

Second, the court decided in UEC I that the Forest Service must use "actual, quantitative population data" to meet MIS monitoring obligations under § 219.19. 372 F.3d at 1226. "[T]o effectuate its MIS monitoring duties under the language of its regulations, the Forest Service must gather quantitative data on actual MIS populations that allows it to estimate the effects of any forest management activities on the animal population trends, and determine the relationship between management activities and population trend changes." Id. at 1227; see also Martin, 168 F.3d at 6 (examining § 219.19(a)(6) and concluding that "[i]t is implicit that population data must be collected before it can be monitored and its relationship determined")....

Under a plain reading of § 219.19 and UEC I, the court concluded that the Forest Service must select an MIS with some evidence that it is "present in the [project] area." The Forest Service must then collect "actual, quantitative population data," id. at 1226, to monitor population trends and to determine relationships to habitat changes. See 36 C.F.R. § 219.19(a)(6). It must also confirm, with "good faith efforts," the presence of the selected MIS within a project area. UEC I, 372 F.3d at 1230. If no MIS representative is "present in the [project] area," the Forest Service must show good-faith efforts to confirm and explain the absence of selected MIS. It may be that the Forest Service selected an improper guild, or actions previously taken may have had a significant deleterious effect on the chosen MIS. "[W]here impossible, the Forest Service is not required by the applicable statutes and regulations to collect population data." Id. at 1229. To avoid such an impossibility, the agency must provide for an adequate range of MIS species representative of the varied habitats and species of concern throughout the forest. The Forest Service must select within each guild appropriate MIS that are present in the region's varied forest habitat. Selecting only one

or two (or a few) acceptable MIS actually present cannot satisfy the overall monitoring obligations of § 219.19. See Martin, 168 F.3d at 7 (concluding that the Forest Service violated §§ 219.19 and 219.26 because it "ha[d] no population data for half of the MIS in the Forest and thus [could not] reliably gauge the impact of [its management projects] on these species"). UEC v. Bosworth, Tenth Circuit No. 03-4251, Aug 17, 2005. http://www.kscourts.org/ca10/cases/2005/08/03-4251.htm

Determining effects on species viability, and the best species to select for MIS and focal species of concern status, requires consideration of the overall cumulative effects on species populations, including identification of risk factors, species limiting factors, current threats, the relative contribution of private lands and federal lands to species conservation, monitoring results that elucidate the effectiveness of current and proposed management direction, and disclosure and response to diverse views, adverse opinions, and inconsistent data in developing the new BMFP. The NEPA analysis concerning the development of new Forest Plan MIS species, monitoring protocol, and related standards and guidelines must address the short-comings of the habitat monitoring approach and the risks of relying on habitat monitoring to fulfill NFMA's wildlife conservation mandates.

Habitat monitoring alone has limited usefulness in predicting wildlife populations for several reasons:

• Current understanding of wildlife-habitat relationships is poor for most species.

• Wildlife species may be affected by properties of the larger landscape, outside the area being measured.

• The habitat variables measured may be chosen for logistical reasons rather than because they are the best indicators of ecological conditions for targeted species. For instance, woodpecker associated cavity nesting species populations are known to be strongly influenced by the availability of nest cavities, yet nest cavities are not likely to be assessed in a general habitat monitoring scheme.

• The disturbance history (e.g. fire, management) of an area may influence population size, especially where wildlife species are not mobile and/or where populations are fragmented.

• Current disturbances across a greater area, such as recreational use, may not affect the physical features of an area but can limit or exclude occupancy by species sensitive to human presence.

• The wildlife species of concern may be influenced by population size of other prey, predator, mutualistic, or competitor wildlife species.

• Population-limiting processes may occur elsewhere for migratory or seasonally mobile species.

• Intrinsic factors, such as disease or parasites, may cause declines in wildlife species that are not predicted by habitat. The general neotropical avian species decline and the amphibian decline of the past several decades are good examples in which the extent and level of population changes would have been poorly predicted by project focused habitat monitoring alone.

- As an example for the new BMFP to learn from, the continuing serious population declining trends of spotted owls was not foreseen in the adoption of the Northwest Forest Plan, and its provisions for habitat protection. By only relying on the presence of habitat features identified by the USFS in the plan, assumptions of expected recovery initially masked continuing population declines for spotted owls and their associated forest species.

Experience with this species emphasizes the irreplaceable need for direct monitoring of the populations of MIS species and regional species of concern, and the inherent folly of substituting habitat as proxy.

For the many reasons noted above, a more informed understanding requires that the new BMFP effectively provide for MIS protocol that soundly correlates population data from direct monitoring to habitat data. Where habitat and population data are being collected to refine the understanding of their relationship, several factors must be considered:

• Effects of external influences on populations, such as those mentioned above, are likely to introduce variability into the habitat/population relationship.

• Collection of habitat data must be consistent with the spatial scale at which species respond to habitat.

• Different levels of habitat data specificity may be needed for collection with different population measures:

- Predictions of presence/absence for wildlife can be based on broad and correlative habitat variables;
- Predictions of population change should be based on variables closely tied to factors inducing population change; and
- Predictions for survival and reproduction should be based on habitat attributes thought to directly influence survival and reproduction, e.g., food availability. Holthausen, Richard; Czaplewski, Raymond L.; DeLorenzo, Don; Hayward, Greg; Kessler, Winifred B.; Manley, Pat; McKelvey, Kevin S.; Powell, Douglas S.; Ruggiero, Leonard F.; Schwartz, Michael K.; Van Horne, Bea; Vojta, Christina D. 2005. Strategies for monitoring terrestrial animals and habitats. Gen. Tech. Rep. RMRS-GTR-161. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 34 p. http://www.fs.fed.us/rm/pubs/rmrs_gtr161.pdf

Development of Scientifically Based BMFP Standards and Guidelines for MIS Species

The new BMFP proposes standards and guidelines for a limited select set of MIS species, which "are applicable across the entire national forest." As noted above, it is imperative that this limited list of MIS species be expanded to include a reasonable range of the region's many species of concern that can better guide and gauge overall management direction and specific project actions. The initial draft BMFP differentiates between the affects of standards and guidelines, disclosing:

- "Standards are constraints placed upon project and activity decision-making and are established to help achieve the goals and desired conditions and objectives of a plan or to comply with applicable laws, regulations, Executive orders, and directives. A standard is a requirement to be met in the design of projects and activities."
- Guidelines provide guidance and information for carrying out projects and activities to help achieve the goals and desired conditions and objectives.
- Neither standards nor guidelines are commitments or final decisions approving projects and activities.
- Standards and guidelines do not compel or force action; they apply only when an action is being taken.

It is important that the new BMFP adopt the more stringent "standards" where scientific research recommendations clearly conclude certain management actions result in direct and/or

cumulative harm to the region's listed species, species of concern, MIS and/or focal species. Standards as such better ensure the Forest Service's ability to comply with NFMA requirements.

Conversely, guidelines more appropriately apply where a significant level of scientific uncertainty exists. These may also apply where population recovery and maintenance objectives have greater latitude due to a specific species' relative abundance and viability compared to more critically imperiled species experiencing declining population abundance and distribution trends.

As presently proposed however, the draft BMFP utilizes ineffective "guidelines" where multiple conclusions of scientific research pertinent to proposed indicator species clearly establishes the need for more stringent standards as a minimum towards NFMA compliance and species population and habitat goals. Furthermore, the provisions proposed in the draft BMFP fail to incorporate the necessary extent of research recommendations essential for species recovery and viability.

The following addresses the science relevant to the proposed MIS:

Terrestrial Species

American Marten

Despite this species documented rarity across the forest, and regional habitat and population viability recovery goals, the BMFP proposes only the following weak guidelines, with no standards proposed at all:

- "G-1 Management activities that limit the ability of American marten to disperse between patches of source habitat should be avoided; area and patch size of old forest should be maintained and road density within and between old forest patches should be maintained or reduced.
- G-2 Areal extent of existing stands within the moist and cold old forest type that are 300 acres or larger should not be reduced.
- G-3 Improve riparian corridors connecting moist and cold old forest type."

Concerning American (Pine) Marten and the related Pacific Fisher (this latter reportedly has habitat in Washington portions of the Umatilla NF and historic habitat reported in old records throughout the region), the proposed BMFP does not adequately incorporate the relevant scientific recommendations, or sufficiently consider the overall cumulative management effects on American marten and Pacific fisher. The Blue Mountains forests have historically provided marten and/or fisher habitat. Considerable remaining LOS forest areas still provide marten and/or fisher habitat—both for denning and foraging, as well as dispersal and travel corridors. Recent scientific research confirms that old forest dependent wildlife species are well adapted to the cyclic natural disturbance changes in the region's fire ecology forests ever changing mosaic patterns. Research has also documented that martens, fishers, and other forest-dependent species are not adapted to logging and road disturbance however, and that these management actions can extirpate and harm marten populations and habitat. The new BMFP standards and management provisions must adequately incorporate scientific recommendations pertinent to these and associated LOS and prey species. The agency has an obligation under NEPA to assess the direct, indirect, and cumulative impacts to all species that will be affected by the new BMFP's varied management actions. 40 C.F.R. §§ 1502.16.

Both Fisher and American Marten rely on LOS forest, high canopy cover, and complex forest structure near the ground, such as down wood. The BMFP must accurately and objectively utilize research on the habitat and viability requirements of these species in developing its standards and guidelines management provisions. Given the regional level of concern of these species, the new

BMFP must prevent the degradation of marten and fisher habitat, including preventing the potential loss of marten and/or fisher foraging and denning opportunities.

The new BMFP must provide standards and guidelines sufficient to achieve regional recovery and viability goals for these species, including protecting existent denning, foraging, dispersal, and travel corridor habitat suitable for marten and fisher. Provisions must address the dynamic nature of these species habitat and localized presence, providing for the re-habitation of effectively protected and/or restored areas as these may manifest in the present or foreseeable future. The BMFP management provisions must address and incorporate research relevant to the prevention of adverse management impacts upon the prey species necessary for fisher and marten viability. Overall, for marten and other MIS species, the new BMFP must address the range of direct, indirect, and cumulative management impacts to these and associated species, including prey species, that will be affected by the new Forest Plan and its associated management actions. 40 C.F.R. §§ 1502.16. In developing standards and guidelines for this and other MIS species, the Forest Service also has an obligation to obtain missing information or state why it could not be obtained if that information is necessary to make informed management decisions. *Id*. § 1502.22. And as scientific research, like the forest ecosystems and species they study, are dynamic – the new BMFP standards and guidelines must allow for the incorporation of new research recommendations as these arise, and must acknowledge where there unknown risks to the environment—and its current level of information may be deficient in addressing management issues. *Id*. § 1508.27.

In developing standards and guidelines for marten, provisions should effectively incorporate the following research conclusions:

- Martens dependent upon dense, mature and old growth conifer forests. Raphael and Jones, 1991; Koehler, 1990; Buskirk, 1989; Meslow, 1981; M. White, 1992.
- Martens occur in smaller numbers in middle and later successional forest stages, and in some small meadows and non-snow season, but winter survival of viable populations is usually dependent upon readily available mature and old growth forest and its extent and quality. Raphael and Jones, 1991, Koehler, 1990; M. White, 1992.
- Important habitats include lodgepole pine, mountain hemlock, mixed conifer and ponderosa pine, usually at elevations above 4,000 feet but some important habitat and populations are lowland. Schempf and White, 1977; White, 1992.
- Martens avoid large clearcuts and burns and other openings. Buskirk and Powell, 1991; Grinnel, 1937; White, 92.
- Martens require an abundance of dead wood and structural diversity. Corn and Raphael, 1991; Clark, 1987; Allen, 1984; White, 1992.
- Hollow snags must be present as well as hollow logs and stumps, for rearing young and resting, especially in winter. Clark, 1987; Strickland and Douglas, 1987; Martin and Barrett, 1991, Spencer, 1983; White, 1992.
- Dead wood should cover 20% to 50% of the forest floor. Allen, 1984; White, 1992.
- Snag, stump and log density and diameter:
    - 19 snags, 27 stumps, 16 logs all over 30" dbh per acre. Marten and Barrett, 1991;
    - 41 stumps, 121 logs, and 52 sq. ft. basal area snags per acre. Spencer, 1983.
- In winter martens select dense cover extending 9 ft. or more above the snow. OR Dept. of Fish and Wildlife, Marten Report; Forest et al, 1989; Jones and Raphael, 1990; Martin, 1987.
- Typical snag requirements include old growth fir snags of 40" dbh (+/- 9" dbh) in summer and winter. Mistletoe clumps selected for nesting also. OR Dept. Fish and Wildlife, Marten Report; Spencer, 1981.

- Riparian corridors or other travel corridors are necessary to martens to provide safe and frequent movement through poor habitat areas and between habitats. Travelways should be dense, multi-storied stands, have a minimum canopy closure of 50% to 60%, and if not riparian should be located through saddles, passes, and along ridges. Maser et al, 1981; Freel, 1991.
- Long-term viability rate is low if marten areas are spaced as distant as 2 miles apart. Freel, 1991; Soule, 1986; Burke, 1982; Franklin, 1980.
- Recommends over 60% canopy closure for travel corridors and widths of 300 ft. when within mature forest stands an over 600 ft. when adjacent to open areas or those with little canopy. Freel, 1991.
- Management by small stands and patches fails. Harris, 1982; Fisher, 1989; Bissonette, 1989; Irwin, 1987; Clark, 1987.
- Martens require dense forest with 50% canopy in winter and 30% to 50% canopy in the non-snow season. However, they use the areas with less canopy in lower densities (population). These areas are important when they occur adjacent to mature and old growth stands. Clark, 1987; Strickland and Douglas, 1987.
- Martens select towards areas or stands with 40% to 60% canopy. OR Dept.of Fish and Wildlife, Marten Report; Hargis, 1982; Spencer, 1981; Barrett and Zielenski, 1983.
- Male home ranges average about twice the size of female ranges. Buskirk and McDonald, 1989.
- Home ranges of individual adult males usually overlap little if at all, while female ranges frequently overlap with one or more female. Female ranges overlap with male ranges. Strickland, 1982.
- Home range size expands if habitat deteriorates or prey numbers fall. Harlow, 1991; Zielenski, 1991.
- Home range estimates:
    - 1,312 acres male, 808 acres female; Freel, 1991.
    - 500 to 700 acres male, 250 acres female (estimated by a literature review of a few catch and release studies); Clark, 1987.
    - 2,400 to 4,900 acres male, 750-1500 acres female (estimated by a review of telemetry studies); Clark, 1987.
    - 300 to 4,000 acres male, 250 to 3,000 acres female; Buskirk and McDonald.
    - 2,288 to 5,386 acres male in WA; Washington Dept. of Wildlife, Marten Report; Jones and Raphael, 1990.
    - 160 acres is too small for female survival year to year. White, 1992.
- There are limits to a small fixed habitat area, such as long-term population viability not being successful. Irwin, 1987.
- Martens rarely select sites more than 1,300 ft. from meadows. ODFW, Marten Report; Hargis, 1982; Spencer, 1981; Barrett and Zielenski, 1983.
- The Coast Range and North Cascades may no longer support viable populations. Marten are the most common in the South Cascades and the Blue Mountains. ODFW, 1991.
- Grazing by livestock has caused a serious depletion of marten habitat…impacting native vegetation, thus reducing prey species. Strickland et al., 1987.

The research conclusions above are well-established. These address a range of habitat components, including forest PAGs, structure, size, LOS conditions, connectivity, and sources of

impact harms that need to be incorporated into effective standards and guidelines for species recovery and habitat protections, and for management actions in marten habitat. Similar research must be incorporated for fisher and other species of concern in the Blue Mountains forest ecosystems.

Bald Eagle

The draft BMFP proposes just one standard concerning Bald Eagles: "S-1 New activities that have potential to cause abandonment or destruction of known bald eagle nest or roost sites shall be prohibited within 1,200 feet of those sites."

While this is a needed management provision in a helpful direction towards species viability, there exists research on this and related species that should be utilized in the new BMFP to develop a more effective range of standard and guideline management provisions.

Eagles utilize the greater Blue Mountains region, and may at times be found throughout much of the forest. As these and other raptors rotate their roost and nest locations over time, and utilize varied fledging territories related to the availability of prey and level of disturbance, it is possible that a significant extent of the region's forest lands could be used by eagles at times for roosting and hunting territory. Surveys throughout the region's forests over the past two or more decades have frequently found eagle nests within interior forest areas, generally within LOS forest locations where disturbance has been minimal. Often these have been found several miles from eagle's traditionally assumed hunting and roosting sites. The new BMFP must develop an effective range of standards and guidelines for this species based upon relevant scientific research that addresses the dynamic nature and extent of eagle territories.

Northern Goshawk

The new BMFP only proposes two guidelines and no standards concerning management that affects or may affect goshawk, despite an abundance of scientific research and clear recommendations for management actions affecting this regionally sensitive species. The proposed guidelines are:

- "G-9 Management activities should not alter stand structure within a radius of 660 feet from known goshawk nests.
- G-10 Nest disturbing management activities should not occur within a radius of 1,320 feet from known active goshawk nests between April 1 and August 1."

Overall, the draft BMFP proposals fail to accurately address and prevent adverse impacts to Northern Goshawks, other forest raptors, and their associated prey species. Goshawks currently are utilizing forests across the region as home territories for nesting, fledgling, and foraging. Overall population trends have not been effectively established through consistent protocol monitoring, nor have current estimates been made of population abundance and distribution in comparison to the occupied historic range and population fluctuations of this species.

We have several concerns regarding Northern Goshawk, and related concerns to other forest raptors as well as owls that are known to be existent in the region, including Sharp-shinned and Cooper's Hawks; Bald and Golden Eagles; Peregrine Falcons; Merlins; Pygmy, Flammulated, Great-horned, and Great-gray owls; and others regional species of concern. Many of these warrant MIS designation as well.

The proposed guidelines appear to be based upon erroneous information regarding

Goshawks, and in general appear to arbitrarily select segments of scientific research pertaining to Goshawks out-of-context and/or contrary to the actual research findings and management recommendations – in particular in their inference to management actions such as logging alteration and other mechanized disturbance within goshawk territory, which research confirms generally extirpates goshawks and/or results in increased mortality to goshawk young and adults. NEPA requires agency planning be well-founded in professional accuracy, expert advice, and scientific research.

BMFP provisions for goshawk and other species of concern must be consistent with credible contemporary Goshawk scientific research. Goshawk research that finds "the consistency of results demonstrates goshawk selection for late successional forest structures (e.g. high canopy closure, large tree for forest type, canopy layering, abundant course woody debris) when using areas within their studies home ranges. …" Greenwald, Crocker-Bedford, Broberg, Suckling, and Tibbitts. 2005. Standards and guidelines for this species must accurately and effectively incorporate this and other relevant research, including in particular conclusions that emphasize Goshawk dependence upon unlogged old and mature forest habitat. Research has conclusively and repeatedly emphasized that Goshawks select for intact old and mature forest territories, and generally will avoid logging impacted areas, or structural stages that are not mature and old forest. As such, management provisions protecting adequate extent of LOS forest habitat, such as dedicated old growth areas and connective forest habitats, are critically important to maintaining this species viability over both the short and long-term.

Further, research assessing the survival of Goshawk young notes that when available nesting and fledging territory has been degraded and fragmented by logging, and is of marginal or poor quality, Goshawk young have a significantly higher mortality rate. In general the conclusions of Goshawk research studies significantly differ from the proposed guidelines, which appear to infer that Goshawk viability would be unaffected if such guidelines were generally followed (note – these are merely guidelines, and do not have the constraints of more stringent standards). The proposed guidelines are insufficient to provide for goshawk viability and territorial habitat quality, and as such are in contravention with credible Goshawk research, which instead notes:

- "Canopy closure averaged 76% in a study of 36 nest areas. No nests were found with canopy closure less than 60%." (Crocker-Bedford, and Chaney, 1988.)
- Requires mature to old growth with 60 to 65% canopy closure for nesting sites." (Fleming, 1987.)
- "…canopy closure exceeded 60% for all nests and averaged 88%." (Hall, 1984.)
- "Canopy cover was 72% for Douglas fir and 67% for lodgepole pine." (Patla, 1991.)

The greater Blue Mountains region contains extensive known and potential Goshawk territories, including core nesting, fledging, and foraging habitat. Much of this habitat is already fragmented, and population trends for goshawk in the region have not been accurately ascertained. Absent foundational region-wide protocol based survey and monitoring information, the guidelines as proposed would allow logging and other mechanized disturbance activities across the region's remaining critically important goshawk habitat, reducing the habitat quality of available foraging habitat and potential nesting habitat. Such deficient standards and guidelines fail to establish the necessary provisions to achieve the population recovery and protection mandates for this regionally sensitive species of concern.

Deficient BMFP provisions that would unreasonably allow the potential for widespread logging and other management degradation of goshawk habitat fails to clearly incorporate the conclusions

of a wealth of scientific research documenting the irrefutable serious harms of logging upon Goshawks. We herein refer the agency again to Greenwald, Crocker-Bedford, Broberg, Suckling, and Tibbitts. 2005. A review of Northern goshawk habitat selection in the home range and implications for forest management in the western United States. Wildlife Society Bulletin 33(1):120-129. This comprehensive review of telemetry studies does not find support for the apparent BMFP management hypothesis that thinning improves or even sustains goshawk foraging habitat. NEPA requires Forest Plan provisions be based upon sound scientific support, it does not make allowance for management provisions based upon unsupported hypothesis – especially where clear research already exists. Scientific research studies pertaining to Goshawk habitat needs and the significant detrimental impacts of logging-thinning upon Goshawks include: Bloxton, 2002; Boal et al, 2001; Reynolds et al, 1982, 1983, 1989, 1991; Moore and Henny, 1983; Fleming, 1987; Hall, 1984; Saunders, 1982; Crocker Bedford et al, 1988, 1990, 1991; Patla, 1990/91; Hayward and Escano, 1989; Kennedy, 1988; Shuster, 1980; Speiser and Bosakoski, 1987; Woodbridge et al, 1988; Bendire, 1892, Bull, 1988; Hargis et al, 1991; Bryan and Forsman, 1987; Andeson and Shommer; Bloom et al, 1986; Reynolds and Wright, 1982; etc. – with the findings of these studies being reconfirmed and in many cases more strongly emphasized by Greenwald, Crocker-Bedford, Broberg, Suckling, and Tibbitts, 2005. Some of these studies were conducted for the agency, with research spanning from the 1980's to the present noting the detrimental impacts to Goshawks from logging-thinning and mechanized management actions.

Among research information that must be incorporate in developing effective standards and guidelines for management affecting goshawk recovery and territory are:

- Goshawk genetic diversity and long-term species viability requires there be a few Goshawk pairs scattered over a forest watershed area. Research shows that Goshawks need approximately 6,000 acres of mature and old structure forest habitat for their home range territory; and that Goshawk pairs are generally a minimum of two miles apart;
- "Only by restricting timber harvesting within the entire nesting and feeding areas can we assure continued reproduction of goshawk pairs – exceeding 5,000 acres per pair." (Crocker-Bedford, 1990.)
- "2,224 acres around the nest be protected." (Hargis et al, 1991.)
- "retaining single 50 to 100 acre habitat patches will not succeed because it does not account for use of alternate sites." (Woodbridge et al, 1988.)
- "In harvested forest goshawks could be out-competed and preyed upon by great horned owls and red-tailed hawks." (Moore and Henny, 1983.)
- Even with large nest buffers [from logging-thinning], reproduction nearly ceased, indicating that factors other than nesting habitat are critical for goshawk reproduction." (Crocker-Bedford, 1990.)
- "selectively logged goshawk nesting areas found the re-occupancy rate dropped by 80% and nestlings dropped by 94% in these logged areas." (Ibid.)

Yet the proposed BMFP guidelines would allow logging and other mechanized disturbance within important goshawk territories, including within and adjacent to PFA buffers (which research clearly concludes are inadequate) in areas with known and potential active Goshawk nests. The guidelines fail to adequately prevent adverse impacts to this species from such region wide logging and management disturbance.

Among substantive research the BMFP needs to incorporate are the range of scientific reports affirming detrimental impacts to goshawks from logging and other mechanized management actions, including preventing the logging removal of forest canopy cover and further

fragmentation of the area's forests that would harmfully affect adult and juvenile Goshawks and other raptors. Additionally, the BMFP would need to address where the region's displaced goshawk would locate suitable territory capable of sustaining young given the extensive levels of past logging degradation throughout the Blue Mountains forests? Instead of developing ineffective guidelines that permit widespread loss of habitat for goshawks and other species of regional concern, the BMFP must uphold its legal and environmental responsibilities to provide for the recovery and viability of goshawks and other raptor species. Standards must be developed that effectively prevent harmful impacts to Goshawk nesting areas, provide for the recovery of historic territory and goshawk nesting areas, protect PFA areas, and provide for new dispersal territories for goshawk young across the region. Provisions must address and prevent potential direct and cumulative impact harms to existing goshawk and other raptor nests in the region. The new BMFP must uphold its foundational responsibility to develop a scientifically sound forest plan that can effective guide management actions through the next 10 to 15 or more years of its authority, as required by the NEPA, the NFMA, and President Obama's Scientific Integrity directive. In developing management provisions, the BMFP must address the cumulative impacts of proposed management direction along with past, present, and reasonably foreseeable future actions, as required by NEPA, 40 C.F.R. § 1508.7.

BMFP provisions must recognize that displacing goshawks from occupied territory due to management disturbance and/or habitat alteration is not an acceptable option. Finding new territory would be difficult at best, given the extensive existent habitat degradation throughout the forest landscape. Displaced goshawks (and other affected species) are vulnerable to significant levels of risk of injury and/or mortality. The region's forests already have insufficient suitable quality nesting and foraging habitat territory for goshawk viability – and likely at present are not sufficiently capable of providing the requisite extent of contiguous mature and old forest structure habitat to sustain the recommended number of pairs of goshawks needed for genetic viability over time across the Blue Mountains forests. As such, based upon regional cumulative site-specific conditions of goshawk territory, the region's forests likely at present are unable to meet the "minimum habitat needs of Goshawk" – including adequate distribution and sustained genetic viability - throughout much of the Blue Mountains.

Effective recovery of goshawks and other mature and old forest dependent species requires a significantly higher level of habitat retention and protection provisions than the BMFP's guidelines provide, especially given the plan's levels of potential management actions and focus across the greater forest landscape. Many of the above cited Goshawk research reports strongly recommend protecting entire goshawk territories in addition to nesting and fledging areas from extensive logging-thinning and other management intrusions such as proposed by the new BMFP. The new Forest Plan represents an opportunity to begin to better incorporate scientific research relevant to overall NFMA viability and recovery objectives for the region's many species of concern. The new Forest Plan should disclose the optimum habitat requirements of MIS and focal species, as well as listed species and species of concern, including goshawks. The new BMFP should make effective provisions to substantiate population trends for goshawks and other species of concern, providing for the region-wide protocol monitoring of these species.

Recovering species of concern populations, including goshawks, requires protecting viable habitat, so eventual rising goshawk and other populations have viable core home territories, including adequate interconnected nesting and foraging territories. Overall, we are concerned about the affect of the planned region-wide transformation of the mature and old mixed-conifer multi-storied forests, to more open forest areas preferred by other raptors such as red-tailed hawks, which could extirpate goshawks from extensive areas of the forest, and further fragment

and degrade already diminished habitat. It is known that suitable goshawk habitat contains a mix of dense multi-storied stands for nesting – such as currently exists in fragmented portions of the region's forest landscape. The proposed BMFP management focus would irretrievably alter essential foraging, fledgling, and nesting habitat, which may result in the loss of potential goshawk nesting habitat, as these features are inextricably linked within the greater region's goshawk territories, thus resulting in fewer pairs of successfully nesting birds within the region, with an increased trend towards the loss of fledgling juveniles as well as goshawk adults to predation or other mortality associated with logging and mechanized management impacts. The current insufficient standards and guidelines for goshawks and other species of regional concern fail to protect goshawk and their habitat. As proposed the BMFP would further reduce potential nesting and foraging habitat across the Blue Mountains region, and thus violate NFMA's requirement to maintain viable populations of these and many other forest canopy-dependent species, 36 C.F.R. § 219.19.

The BMFP as proposed would reduce canopy cover and dead wood habitat across the forest landscape, both of which are essential for goshawks and their prey. The draft analysis relies on unsupported assertions and implications that such widespread alteration of forest habitat is somehow warranted. A thorough review of goshawk telemetry data reveals that goshawks may live within and use habitat with a variety of structural stages, but they clearly select for dense late successional forest with high canopy closure. This study also reveals that goshawks are not generalists that seek prey wherever it may occur, but they seek and find prey predominantly in their preferred dense forest habitat. The proposed BMFP must be revised to better incorporate scientific conclusions pertaining to goshawk in effective standards that protect and retain suitable goshawk habitat throughout the entirety of the region's goshawk territories. Outside of these territories, the BMFP must develop provisions that retain appropriate natural forest structure where goshawks, including dispersing goshawks in search of available territory, and their prey species can find more suitable habitat and essential habitat connectivity.

Additional research information that the BMFP needs to incorporate in developing goshawk standards and guidelines includes:

- A recent review (Greenwald et al, 2005) of the most accurate information on goshawk habitat selection confirms that goshawks select late successional forest structure (e.g. high canopy closure, large tree for forest type, canopy layering, abundant course woody debris). This review re-affirms Reynolds' 1992 recommendations to manage nest core areas and post-fledging areas for late successional forest characteristics.

However, this review does not support a few of the assumptions underlying Reynolds' 1992 management recommendations; finding instead:

(1) Goshawks are habitat generalists only in the sense of using forests with a variety of tree species, but they are not habitat generalists in terms of selecting forest structure. They disproportionately select for late successional forest.
(2) Goshawks are not opportunistic foragers. Rather they appear to select for prey availability as determined by late successional forest structure.
(3) Goshawk are not limited by prey abundance. They select for prey availability, with absolute prey abundance being only a component of availability, late successional forest structure being an important determinant factor.

- Boal et al (2001) found that stands used by goshawks contained 1.6 to 2.4 km of down woody debris per hectare with an average diameter of 17-19 cm, depending on forest type,
- Bloxton (2002) documented that goshawk kill sites have greater numbers of snags $\geq$12.5 cm dbh/ha (u=77) than random sites.

- … the consistency of results demonstrates goshawk selection for late successional forest structures (e.g. high canopy closure, large tree for forest type, canopy layering, abundant course woody debris) when using areas within their studies home ranges. …
- A majority of recent research studies found selection for stands with >40% canopy closure and greater densities of trees over 40 cm dbh. …
- … goshawks may be broad habitat generalists in terms of tree species but are habitat specialists with respect to forest structure. …
- … prey abundance is not the most important factor is selecting foraging sites ...
- Several studies determined that goshawks select foraging habitat based not on prey abundance but rather prey availability as determined by habitat structure. …
- [R]ecommendations focusing on increasing prey abundance at the expense of forest structure within occupied home ranges are not likely to improve goshawk occupancy rates.
- …goshawks avoided open areas, particularly logged open areas, and none found selection for openings. … current information does not conclusively support a contention that creating openings through logging will benefit the goshawk.
- Occupancy rates were reduced by removing forest cover in the home range…
- Continuing declining population trends for goshawks, and related research strongly indicates that having only 40% or less of the landscape in mature and old-growth forests is insufficient to sustain goshawks.
- … it is essential to protect existing mature and old-growth forest characteristics and ensure that such forests naturally recover and ecologically function in proportions similar to pre-settlement conditions. Effective management towards forest resilience and species biodiversity, abundance and viability can best be accomplished by restricting cutting to small trees in strategically limited, already management impacted areas, and prohibiting reductions in canopy closure. (*A similar proposal was recently adopted by Region 5 of the United States Forest Service for the Sierra Nevada.)*

In conclusion concerning goshawk (and by implication a host of other MIS and regional species of concern) the BMFP must develop more comprehensive effective standards and guidelines, as well as habitat protection provisions, to provide for goshawk viability and recovery across the region's forest landscape, upholding NFMA's requirement to maintain viable populations of these and many other forest canopy dependent species, 36 C.F.R. § 219.19.

Pileated Woodpecker, Black-backed Woodpecker, White-headed woodpecker, Pygmy Nuthatch, Three-toed woodpecker, Lewis' Woodpecker, Williamson's Sapsucker, and other cavity excavators

The BMFP makes insufficient standard and guidelines provisions and protections for cavity excavator and nesting species population viability and habitat. Despite a wealth of research recommendations pertaining to these species, the draft BMFP only weakly offers the following provisions:

Pileated woodpecker

"G-11 To the extent practical, known cavity or nest trees should be preserved when conducting prescribed burning activities, mechanical fuel treatments, and silvicultural treatments."

White-headed woodpecker

"S-6 Where silvicultural and prescribed burning activities occur within source habitat, all live trees and snags 21 inches DBH and greater and 50 percent of the snags from 12 to 21 inches DBH shall be retained, except for the removal of danger/hazard trees. Snags shall be retained in patches.

S-7 Where management activities occur within source habitat, all snags 21 inches DBH and greater and 50 percent of the snags from 12 to 21 inches DBH shall be retained, except for the removal of danger/hazard trees. Snags shall be retained in patches."

Black-backed woodpecker and boreal owl

"G-4 Greater than 50 percent of post-fire source habitat should be retained and should not be salvage logged.

G-5 Salvage logging should not occur within burned source habitat areas less than 100 acres, except for the removal of danger/hazard trees.

G-6 Where salvage logging occurs, all snags 21 inches DBH and greater and 50 percent of the snags from 12 to 21 inches DBH should be retained. except for the removal of danger/hazard trees. Snags should be retained in patches."

Lewis's Woodpecker

"S-5 Salvage logging shall not occur within burned source habitat areas that are less than 100 acres in size, except for the removal of danger/hazard trees.

"G-8 Where salvage logging occurs within source habitat, all trees and snags 21 inches DBH and greater and 50 percent of the snags from 12 to 21 inches DBH should be retained. Snags should be retained in patches, except for the removal of danger/hazard trees."

Overall, there exists scientific concern that the Blue Mountains forests do not currently support viable populations of Pileated, Black-backed, White-headed, Three-toed, Lewis' and other woodpeckers, Williamson's sapsuckers, Pygmy and other nuthatches, and other woodpeckers and cavity excavators. The draft BMFP fails to provide for substantive protocol surveys and fails to base management plans and provisions on relevant comprehensive scientific research on these and related species of concern, their habitat, and forest ecological functioning. The development of the BMFP provides a much-needed opportunity for a "harder look" and more effective level of compliance with NFMA's population monitoring protocol.

Absent direct monitoring, similar Northwest Forest Plan assumptions concerning population recovery and status estimates for the northern Spotted Owl have soundly-evidenced that basing species viability assumptions and management actions on select habitat features has proven to be highly erroneous, to the detriment of owl protection and recovery goals.

The plans expressed in the BMFP fail to be cognizant of the extensive cumulative degradation to the forest habitat types needed by the region's cavity excavating and nesting species and their associated species throughout the region's forest landscape. The BMFP fails to acknowledge the overall rare status of the region's remaining multi-storied and other LOS habitat comparative to HRV levels. Management focus and actions as planned, including extensive logging alteration of LOS forest structure, would result in greatly compounding already extensive adverse impacts to these and other species populations and habitat. The implementation of the BMFP as proposed would result in the irretrievable forest landscape degradation of rare essential LOS forest habitat, compounding such harms with an overall failure to provide for the necessary surveys and

monitoring for these regional species of concern and MIS focal species in violation of the NFMA. 16 U.S.C § 1604(i); 36 C.F.R. § 219.10(e).

It is well known that logging significant areas of interior old growth and mature forest adversely affects Pileated, Williamson's, Northern Three-toed, White-headed, Lewis', Black-backed, and numerous other woodpeckers and cavity excavators. Given the fact that a great deal of timber harvest has taken place throughout the region that has diminished and degraded the availability of these species habitat, and that throughout much of the greater forest landscape habitat elements either do not exist or are largely marginal quality at best, it is entirely feasible that most or all of these species are in decline. Removing even more of this habitat through widespread commercial logging and mechanized management actions will have a significant detrimental impact on the region's MIS cavity excavator species. The proposed BMFP fails to adequately address or fully disclose the likely adverse impacts to cavity excavator species of its proposed management provisions. Federal law requires that when wildlife and indicator species populations evidence downward trends, the agency must act in order to stop such declines. 36 C.F.R. § 219.19. The BMFP's proposed region-wide commercial logging of rare remaining LOS forest habitat in the area's over-logged and recovering forests will further exacerbate habitat availability and population trend problems for these and other forest-dependent wildlife species.

Research Conclusions and Recommendations for Pileated Woodpecker and Related Species

- Pileated excavate large rectangular holes during nesting that may be used by smaller birds for nesting and roosting. WA. Dept. of Wildlife, Management Recommendations for Priority Species.
- Recent studies from western Oregon show lower densities and a mean home range that is twice the size found in northeast Oregon. Minimum management recommendations should be changed to reflect these regional differences. Mannan, 1984; Mellen, 1987.
- Managing for minimum habitat components may cause gradual population declines. Instead, research suggests average values should be used in forest habitat management – using mean values instead of minimum values. Conner, 1979.
- Research questions the suitability of pileated as an indicator species that may need less than other snag dependent species, and as well for old growth community since pileated also use riparian hardwoods and forage in immature stands. Mannan, '84; Mellen, '87.
- Woodpeckers, along with other insectivores, play an important role in reducing insect populations at endemic levels. Biological control of insects is preferred over insecticides. It has a longer term effect to regulate future insect outbreaks and is less costly and non-toxic. Management to increase woodpecker populations should have the secondary benefits of increasing other insectivores (birds) and controlling insect outbreaks. Takekawa et al. '82.
- Pileated abundance increased as the amount of forests with no logging, 60% or greater canopy closure, and old growth increased. E. Bull, Population Density, Home Range Size, and Habitat Use of Pileated Woodpeckers in Eastern Oregon.
- Density of snags 51 cm dbh or greater (20.07 inches) was the best predictor of density of pileateds… The regressions on logging activity, canopy closure, and successional stage also were significant. Ibid.
- Home range size of 7 pairs: home ranges averaged 407 hectares (1,006 acres), of which 364 hectare were forested (899 acres) and the rest were openings. Ibid.

- Of nine birds whose mates had died: averaged 597 hectares (1,475 acres); an average of 540 ha were forested (1,334 acres); one of these birds had a home range of 1,646 hectares (4,067 acres), which was more than double that of any other bird. Excluding that bird, home ranges averaged 489 hectares (1,208 acres), of which 442 ha were forested (1,092 acres). Observed little or no overlap in home range area between pairs, except where the mate of one bird had died. Ibid.
- Habitat available within the home ranges was variable with size of home range. Smaller home ranges tended to have a higher percentage of area in grand fir, old growth, unlogged stands with greater or equal to 60% canopy closure. Ibid.
- Pileated did not use habitat within their home ranges at random. Ibid.
- They used stands with canopy closure 60% or greater, old growth, grand fir, and no logging more than expected based upon availability, and all other types of stands less than expected. Ibid.
- Of the foraging observations, 53% were excavating, 32% were pecking in the bark, 10% were gleaning, and 5% were a combination of these. For all foraging observations 38% were pileated feeding on logs, 38% were pileated on snags, 18% on living trees, and 6% on stumps. Ibid.
- Douglas fir and western larch were favored, lodgepole was avoided, and other tree species were used in proportion to their availability. Both logs equal to and greater than 38 cm dbh and long dead logs were preferred. Snags greater than or equal to 38 cm dbh were preferred. Use of dead standing trees and logs for foraging changed with the onset of snow, increasing the use of live trees (from 17% to 22%) and in dead trees (from 35% to 55%) and a decreased in the use of logs (from 41% to 18%) and stumps (from 7% to 5%). Ibid.
- Pairs in areas with mean snag densities of 3.1 snags/ha (greater than 20 cm dbh) did not successfully reproduce. Bull does not consider these low snag densities capable of supporting a self-sufficient population. Areas with snag density of 9.9 snags/ha (23% of which were 51 cm dbh or greater) were self-sustaining and capable of acting as sources for other areas because of high density of pairs (5 and 7 pairs in the two areas studied). Ibid.
- From our findings we now know that 121 ha areas are much smaller than observed pair home ranges and habitat components other than snags are important for managing for pileated in eastern Oregon. Management plans need to be revised to incorporate this information. Ibid.
- We recommend using an average home range size of 364 ha of forest more than three times the size of prescribed management areas. Within those home ranges we recommend that 75% be in grand fir type, at least 25% be old growth and the remainder be mature; at least 50% of the area have 60% or greater canopy closure; at least 40% of the area be unlogged and the remainder have mature stands. Ibid.
- Log density in 12 home ranges averaged 290/ha. 170/ha showed evidence of pileated feeding, with a preference for logs greater than 38 cm dbh, for long dead logs, and for all species except lodgepole pine. Ibid.
- The existing pileated management areas (121 ha) on national forests are about 8 km apart. If only 1 pair of pileateds occurs in each management area for every 4,860 ha, then only 2% of the total forest is being managed for pileated woodpeckers. In addition, observations in Spring and Wallowa (study areas) indicate that isolated pairs in marginal (i.e. minimum standard) habitats are unlikely to sustain a population. This information suggests that larger blocks of habitat (for more than

one pair) and in closer proximity should be managed for pileateds to provide self-sustaining populations. Ibid.

- Conner, '80, reported that pileated woodpeckers in Virginia used the oldest stands with the highest basal area and density of stems available for foraging. Journal Field Ornithology 51:119-12.
- Managing for minimum levels of a species is risky. Consequences can be unfortunate when new data reveal that current recommendations are inadequate to provide the population levels desired because options have often been eliminated. Therefore, we recommend managing clusters of 3 or more pairs in one block of habitat and blocks distributed across the landscape through time. This management should include the appropriate forest types, successional stages, logging activities, canopy closures, snag densities, large diameter live trees and log densities with the larger home range area. Conner, Wild. Soc. Bulletin 7:293-296.
- Agency plans call for retention of standing dead and large material to meet "100% of pileated population potential levels." Yet current USFS research demonstrates that snags need 40% or greater canopy closure within the surrounding forest to be utilized by canopy dependent forest indicator species such as pileated woodpeckers. Research also shows that these and other canopy dependent species need:
    - Separate but overlapping territories such as with predator and prey species – e.g. canopy dependent goshawk separate yet overlapping pileated and/or marten to avoid over predation and ensure species viability.
    - 900 or more acres canopied late old structure (LOS) forest per pair for pileated woodpecker (with over 50% of this area being higher than 60% canopy closure), and maintaining a minimum of three or more nesting pileated pairs per watershed/subwatershed to ensure species viability. A pairs of pileated have little overlap, based on E. Bull's research, managing for the minimum viability of this species would require 2,693.2 acres of mature and old growth forest habitat with over 1,346.6 acres of this consisting of greater than 60% canopy cover. (In addition, both Bull et al. '92 and Conner '79 caution "managing for minimum levels of a species is risky. Consequences can be unfortunate when new data reveal that current recommendations are inadequate to provide the population levels desired because options have often been eliminated.")
    - American Marten require mature and old growth conifer habitat with 40% to 60% canopy closure or greater. Home ranges of marten males can be from 2,300 to over 5,000 acres; and for females from 750 to 3,000 acres. Male marten home ranges overlap little if at all, and long-term viability rate is low if marten habitat areas are spaced as distant as two miles apart. Clark '87, Buskirk and McDonald, Jones and Raphael '90, Freel '91, Soule '86, Burke '82, Franklin '80, Koehler '90, Buskirk '89, Meslow '81.
    - 956 acres of mature and old growth forest with greater than 40% canopy closure per pair of black-backed woodpeckers, and 528 or more acres of similar habitat for three-toed woodpeckers per pair (Goggan et al. '87 and '88, Bull et al. '86 – note these are minimum requirements for single nesting pairs only – and need to be multiplied by three or more pairs to ensure minimum species viability).
    - Goshawk home ranges are generally from 5,000 to 8,000 acres, but can be as high as 10,000 to 17,000 acres or more in fragmented habitat. Goshawks require old growth forest nesting habitat with greater than 60% canopy closure. Studies of goshawk populations have found them to require a

minimum of two miles between territorial goshawk pairs. Reynold '83, Crocker-Bedford '90, Austin '92, Flemming '97, Crocker-Bedford and Chaney '88, Hall '84, etc.

- Overall, when managing for multiple species that include territorial and predator prey species, sufficient habitat extent, quality, and territorial exclusivity needs to be maintained to provide for long-term self sustaining species populations and genetic viability of these and associated differing species.

Concerning pileated woodpecker, and similarly with goshawk, eagles, marten and other MIS species and species of regional concern, the new BMFP must incorporate the varied habitat and population recommendations of relevant scientific research, developing effective standards and guidelines, as well as protections, which help recover and maintain viable well-distributed populations of these species across the Blue Mountains forest landscape.

Neotropical Migrant and Native Birds

The BMFP only proposes just two species of birds as MIS focal species, despite the wide variations of habitat types and affected species of concern across the Blue Mountains forests. The two species selected by the draft Forest Plan, and the Forest Plan's rather weak guideline provisions, are as follows"

"Fox Sparrow

G-12 Where management activities occur within riparian habitat, the quantity and health of shrubs should be increased and improved."

"Cassin's Finch

G-13 Vigor and areal extent of seed producing grasses and forbs should not be reduced in source habitats."

Neo-tropical migrant and native forest-dependent birds (as well as numerous other forest species) are in serious decades-long population declines due to the adverse cumulative impacts from over a century of commercial logging in Oregon (see "Avian Population Trends" by Brian Sharp). The BMFP fails to adequately address the current population status and trends of native forest dependent Neotropical migrant and native avian species. Compliance with both the NFMA and the MBTA requires that the new Forest Plan must be capable of protecting forest habitat for these many native forest species, and of reversing any current downward population trends. Such a course of proactive protective action is also required by the ESA and the NEPA, Presidential and USFS directives, and the Migratory Bird treaty Act, as well as credible conservation science and ethical integrity. However, in violation of these legal and ethical requirements, the draft BMFP presents a range of focused management objectives and action plans that would degrade habitat and further imperil neotropical and native avian species populations throughout the extensive forest landscape. The BMFP would result in both widespread levels of individual mortality to these species as well as irreparable habitat and population level harms.

The proposed BMFP management focus and provisions would significantly adversely impact migratory birds in violation of the Migratory Bird Treaty Act, 16 U.S.C. §§ 703—712 (1994). It is well known amongst the conservation-science community that many migratory birds which are currently experiencing severe population decline trends are "strongly associated" with old and mature interior forest and related habitat. The BMFP's proposed management focus involving

extensive commercial logging, including mechanized actions in old growth and mature forest habitat, would directly kill untold numbers of nesting and fledgling migratory and native birds. The BMFP's extensive actions would significantly alter and diminish existing mature and old forest-dependent migratory bird habitat, which has already been significantly diminished due to the cumulative impacts of past management throughout much of the Blue Mountains region.

The BMFP's proposed management focus would irreparably fragment migratory bird habitat. Areas that were not altered by management actions would also be negatively impacted by generalist bird species favored by the environmental conditions created in highly fragmented logged forests. Other avian and predator species more adapted to more open logging-thinned forests would move into affected landscapes, further adversely impacting interior mature and old forest dependent neotropical migrant and native avian species. The BMFP must be revised to incorporate scientific research relevant to the harmful impact these abundant and highly competitive bird species would have on sensitive bird species dependent on less fragmented forests. The adverse impacts that the BMFP's proposed management focus would have on migratory birds are supported by multiple scientific studies.

Forest fragmentation, including loss of viable nesting habitat within central and eastern Oregon's national forests, is considered to be a primary cause behind declines observed in many forest songbird species. Further loss or fragmentation of habitat could lead to a collapse of regional populations of some forest birds (Robinson et al. 1995). As landscapes become increasingly fragmented, regional declines of migrant populations may result (Id). In the Pacific Northwest, researchers have found that old growth forests and natural forest processes (including natural fire cycles) are integral to the survival of migratory birds. The past and continuing logging-oriented management of the forests of Oregon and Washington, which provide nesting and fledgling habitat for numerous migratory birds, has resulted in severe ongoing population declines in forest canopy-dependent migratory and native birds. ("Avian Population Trends in the Pacific Northwest" by Brian Sharp).

Among the many avian species experiencing population declines due to widespread Forest Service management are: pygmy nuthatch, chipping sparrow, fox sparrow, brown creeper, hermit thrush, band-tailed pigeon, rufous hummingbird, olive-sided flycatcher, winter wren, song sparrow, golden-crowned kinglet, pine siskin, solitary vireo, willow flycatcher, tree swallow, red-eyed vireo, yellow warbler, yellow-breasted chat, and others as well. The draft BMFP management proposals fails to responsibly incorporate scientific research concerning the direct and cumulative adverse impacts to many migratory and native bird species that would result from its proposed region-wide emphasis on the removal of forest canopy cover and multi-storied LOS forest structural continuity.

The BMFP standards and guidelines fail to effectively protect the region's numerous species of concern during vulnerable nesting and fledging seasons. The BMFP fails to develop stringent standards prohibiting management implementation that would jeopardize numerous imperiled species. Adoption of the BMFP as proposed would violate both NFMA and the Migratory Bird Treaty Act.

In August 1999, the FWS outlined what it perceived to be the agency's legal obligation in terms of migratory birds and management planning. FWS stated that agencies should take "an extremely cautious position with respect to the intentional take of migratory birds by federal agencies." Letter from Acting Director, United States Fish and Wildlife Service, to Regional Directors, Regions 1–7 and Assistant Director, Refuges and Wildlife (August 17, 1999), 3. FWS also cautioned that "the Service should not assert in any communication or correspondence that federal agencies are not covered by the prohibitions of the MBTA [Migratory Bird Treaty Act]." Id.

In July 2000, the Eighth Circuit Court of Appeals held that federal agencies are required to obtain a take permit from FWS prior to implementing any project that will result in take of migratory birds. *Humane Soc'y of the United States v. Glickman*, 217 F.3d 882 (8th Cir. 2000). Due to this litigation, the FWS is operating under the assumption that the Migratory Bird Treaty Act applies to the Forest Service and its activities. 16 U.S.C. § 703 et seq. The Act states that "it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill . . . any migratory bird." 16 U.S.C. § 703.

In January 2001, President Clinton signed Executive Order 13,186 that outlined the federal government's responsibility to comply with the Migratory Bird Treaty Act. Exec. Order No. 13,186, 66 Fed. Reg. 3,853 (2001). President Bush did not rescinded this Order, and it is likely President Obama will continue to honor, and may even strengthen it.

Recent legal analysis confirms that the Forest Service must actively prevent the take of migratory birds, or obtain a permit for incidental take of individual species. Helen M. Kim, Chopping Down the Birds: Logging and the Migratory Bird Treaty Act, 31 Envtl. L. 125 (2001).

The Forest Service proposed new BMFP fails to incorporate the requisite level of management plans and protective standards necessary to comply with these legal and scientific obligations. The proposed BMFP must be fundamentally revised to comply with the requirements of the Migratory Bird Treaty Act, the NFMA, and the NEPA pertaining to management plans that directly and cumulative adversely affect neotropical migrant and native avian species.

The new BMFP must develop provisions and overall plans that effectively prevent harmful direct, indirect and cumulative impacts on neotropical migratory and native birds. The USFS has on record a study by Brian Sharp ("Avian Population Trends in the Pacific Northwest" as cited above), which concludes that commercial logging in public forest lands in Oregon plays a significant role in the continuing population declines of several neotropical migrant bird species. The new BMFP must incorporate the conclusions and implications of this study in its developed standards and guidelines, especially as the study was done for Region 6 Forest Service on Central and Eastern Oregon forests. The BMFP must utilize appropriate scientific recommendations concerning its management plans in accordance with NEPA's requirement for high quality scientific analysis that would satisfy the "hard look" standard. *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 353 (1989); *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208 (9th Cir. 1998) cert. denied, *Ochoco Lumber Co. v. Blue Mountains Biodiversity Project*, 119 S.Ct. 2337 (1999). As noted above, the new BMFP must develop a more comprehensive range of MIS and focal species of concern appropriate to the varied PAGs, habitat types, and species ranges in the region's forests.

Additional MIS Species

The BMFP lists a select few additional species for MIS focal species designation. Among these are:

- ***Bighorn sheep***
    - "S-2 Effective separation between bighorn sheep and domestic sheep and goats shall be maintained.
    - S-3 The use of domestic goats for noxious weed control shall not be authorized or allowed within or adjacent to source habitat for bighorn sheep."
    - "S-4 The use of domestic pack goats shall not be authorized or allowed within or adjacent to source habitat for bighorn sheep.
- **Fringed Myotis and Townsend's big-eared bat**

- "G-7 Bat maternity and roost sites should not be disturbed."

- **Water Vole**
  - "G-14 Roads and trails should not be constructed within high elevation riparian areas.
  - G-15 Residual herbaceous vegetation within high elevation riparian areas should be maintained at a level adequate to prevent stream bank degradation."
- **Rocky Mountain elk (winter range)**
  - "G-16 Motor vehicle use within crucial winter range should not be authorized or allowed between December 1 and April 30."
- **Rocky Mountain elk (summer range)**
  - "G-17 Management activities that disrupt areas identified by state fish and wildlife agencies as important elk calving areas should be avoided (from May 1 to June 30).
  - G-18 Management activities that disturb elk wallows should be avoided.
  - G-19 Management activities should not have more than a minimal short-term detrimental effect on the habitat of plant species or on individual plants that are either federally listed or are species at risk.
  - G-20 The commercial or non-commercial collection of seed or other vegetative materials (permitted or otherwise authorized) should not have more than a minimal short-term detrimental effect to plant species that are either federally listed or are species at risk.
  - G-21 Pesticide and/or herbicide application near botanical species at risk should include provisions to minimize short-term detrimental effects on non-target plants and pollinators and show a demonstrably greater long term benefit.
  - G-22 After the restoration of habitat for plant species that are federally listed or are species at risk, two years of rest from livestock grazing should be allowed.
  - G-23 When authorizing mineral withdrawals in areas of essential habitat for federally listed plant species or plant species at risk, particularly in areas with limestone or calcareous scabs and outcrops and where mineral development is a real threat, management actions should be planned to achieve the sustainability of these plants.
  - G-24 New and existing leases, permits, rights-of-way, and easements should include provisions to maintain, restore, or enhance the habitat of plant species that are federally listed or are species at risk.
  - G-25 Land acquisitions and conservation easements should include provisions to maintain, restore, or enhance the habitat of plant species that are federally listed or are species at risk.
  - G-26 Land exchanges should avoid the disposition of the occupied habitat of plant species that are federally listed or are species at risk."

As addressed herein, the draft BMFP must be revised to develop a more reasonable and effective range of Management Indicator Species and Focal Species; to develop scientifically founded effective Forest Plan standards ensuring the viability and abundant distribution of species of concern; develop management provisions and focus protecting and restoring MIS and species of concern habitat and populations; and develop effective protocol providing for the survey and monitoring of MIS and species of concern populations, habitat, and status and distribution trends.

Federal and State Listed Threatened, Endangered, Sensitive, and Proposed Candidate Species

The new BMFP must provide for the recovery and viability of listed species populations and habitat. The draft Forest Plan states: "Within the planning area, there are nine species (one mammal, two plants, one snail, and five fishes) that are listed under the Endangered Species Act by either the U.S. Fish and Wildlife Service or the National Marine Fisheries Service." Additionally, there are state listed species in Oregon and Washington. The new Blue Mountains Forest Plan notes the following federal and/or state listed species:

- Gray Wolf, Lynx, Spalding's Catchfly, MacFarlane's Four O'Clock, Steelhead, Sockeye Salmon, Chinook Salmon, and Bull Trout.
- Additionally the previous Forest Plan also lists the Blue Mountain Cryptochian, Preeble's Shrew, Peregrine Falcon, Bald Eagle, Ferruginous Hawk, Long-billed Curlew, Townsend's Big-eared Bat, California Wolverine, Big Horn Sheep, and Redband Trout as also listed.
- Oregon State lists Wolverine.
- And Inland Tailed Frog, Lewis' Woodpecker, and White-headed Woodpecker are also noted as species of concern.
- And lastly the Bliss Rapids snail, which the BMFP discloses only occurs "within the Hells Canyon National Recreation Area."

The BMFP, in apparent conflict with ESA protection and recovery requirements, discloses the following:

- "There are instances where maintaining ecosystem diversity might not provide the ecological conditions necessary to sustain populations of certain species, in which case a species-specific approach is warranted. This is often the case for those species that are listed under the Endangered Species Act by either the U.S. Fish and Wildlife Service or the National Marine Fisheries Service."

The development of the new BMFP provides a much needed opportunity to incorporate meaningful consultation and coordination with the USFWS, NOAA, and Fish and Wildlife Departments of both Oregon and Washington to develop effective recovery plans and management provisions for federal and state listed species, and candidate species of concern. It also provides a proactive opportunity for monitoring of previously listed species status to ensure their recovery remains ongoing and their status trends are acceptable. Yet the BMFP makes no mention of such opportunities or management needs. We strongly recommend the USFS initiate the development of recovery plans and management provisions in consultation with appropriate federal and state agencies, and include the provisions of such plans, standards, and guidelines in the draft EIS for the BMFP.

Additionally concerning the recovery and management protection of specific terrestrial species, the BMFP must incorporate the following:

Lynx – Among our many concerns is that of this proposed Forest Plan's effect on lynx. Based on data from the U.S. Fish and Wildlife Service's (USFWS) Portland office, there exists documented occurrence of lynx across Oregon's Blue Mountains region. Historic evidence of lynx include positive occurrence records, lynx bounty claims, and Forest Service Wildlife Statistical Reports. Positive reports of lynx occur as far south as Modoc County, California. A few years ago, the Forest Service Malheur Prairie City RD wildlife biologist stated that he grew up in the area, had seen lynx in area forests frequently during his younger years, and felt that while their numbers had diminished they were still in the area. The BEs for a number of previous Forest Service regional projects note that lynx may be found within the greater eastside forest region. As such it is reasonable to assume that lynx could be present in the region's public lands forests, and historically

transited and/or established territory within the region. It is plausible that lynx are rare in the region (and in Oregon on the whole) due to past bounties, poisonings, and other efforts to eliminate them (and other predators) that were performed systematically for decades, and not due to a lack of habitat, as is the current situation with wolves as well.

The BMFP should have developed effective standards and guidelines to prevent negative impacts to lynx and their habitat from further fragmentation of the region's forests. It is clear that lynx habitat is very fragmented, and that large blocks of intact forest are required to maintain viable populations of the species. Without these large blocks, lynx may need larger ranges to survive. The BMFP's proposed management focus has high probability to adversely affect whatever lynx recovery is occurring, as lynx may use portions of the region's forest landscape for both nocturnal foraging as well as migratory and dispersal routes and refuge. Continuing to squeeze lynx out of their habitat range by intensively managing the forest landscape runs afoul of NFMA's requirement that the agency maintain viable populations of wildlife that are well distributed across the landscape. 36 C.F.R. § 219.19. The USFS has an obligation to accurately assess the impacts of its proposed BMFP on lynx, and to develop effective protective standards and guidelines concerning lynx and associated species, including prey species.

Next, it is clear that data is lacking on the food habits of lynx in Oregon's forests, which represents a critical research need. Ruggiero, 1999b; Aubry, 1999. It is well accepted that lynx are dependent on snowshoe hares as a prey base, but in the southern portions of lynx range squirrels, other rabbits, small rodents, birds and other wildlife may always be an important part of lynx diet. It is critical to understanding how proposed BMFP management focus may impact lynx to examine how it this may impact lynx prey.

Snowshoe hares, squirrels, and other mammals have different habitat needs, but many of these species could be negatively impacted by the extensive forest fragmentation, logging, road building, and other actions associated with the proposed ne Forest Plan. Most of these prey species require adequate cover (USFWS, 1999), especially conifer cover in winter (GTR-RM-254), and foliage that is accessible during winter snowpack conditions. Hares, squirrels, and forest-dependent species are typically associated with dense forest cover, including shrubs and "dog hair" thickets of small trees. McKelevey, 1999a. Many of these prey species also perform important roles in the recovery of forest habitat, helping to spread seeds of forest plants and trees, distributing nutrients throughout area soils, and loosening compacted soil areas—none of which have yet been adequately addressed and incorporated in this initial draft BMFP. Edge areas within and adjacent to over-logged forests provide viable habitat for many species, including potential prey species for lynx. The region's unroaded areas area also provide potential habitat; whether this be refugia, dispersal, temporary, or more established territory. Over time, with possible lynx recovery, the region's forests may again function as dispersal and migration corridors, as well as both core and supplemental habitat for lynx which may occur within, or traverse through, the Blue Mountains region. The BMFP proposed management focus would excessively thin essential forest habitat, resulting in significantly further reducing needed cover for wildlife. Such Forest Plan actions jeopardize both lynx and their prey species viability across the region—and as currently planned would violate the NEPA, NFMA, and the ESA.

Different management plans and logging-thinning methods can have detrimental impacts on many of these species, including squirrels, rabbits, rodents, and birds, as well as snowshoe hares. Koehler and Brittell (1988) predict that it may take up to seven years after logging an area for hares to recolonize the site and up to 25 years before they reach their highest densities. Bull (1999) examined the results of a variety of harvest prescriptions on hares and found that in lodgepole stands, the number of snowshoe hares decreased in all types of harvest. She reports that mixed

conifer stands appear to be "no longer suitable for hares after harvesting." This same is also true for many of the other forest-dependent species which comprise the lynx's diet.

Squirrels have different habitat needs than snowshoe hares and are associated with mature, cone-producing forests. Ruggiero, 1999a; Buskirk, 1999b; McKelvey, 1999a. They tend to reach their highest densities in late-successional, closed-canopy forests with substantial quantities of course woody debris. The BMFP must incorporate such research to prevent adverse impacts to lynx and their prey species, which are important components of lynx diet and overall viability.

The BMFP must also provide reasoned standards and guidelines to prevent adverse impacts to prey species in addition to hares and squirrels, including other wildlife species which are potential lynx prey. Without meaningful standards effectively addressing how prey species may be impacted, it is impossible to quantify and qualify either short or long-term Forest Plan impacts to lynx. The new BMFP must address and prevent adverse cumulative impacts of its management plans on lynx and their prey species in association with other projects on the region's other public and private surrounding lands.

In sum, The Lynx Conservation Assessment and Strategy (LCAS) clearly asks that the Forest Service perform project specific analysis for each project. The lack of effectively scientifically founded Forest Plan standards guiding project specific analysis has been a long-standing problem with the Forest Service. The USDA Office of the Inspector General in its January 1999 report (No. 088001-10-At.) tries to correct this problem but the Forest Service has ignored the recommendations of this report. The LCAS executive summary states:

"Plans that incorporate the conservation measures, and projects that implement them, are not generally expected to have adverse effects on lynx…."

Clearly, the development of the new BMFP requires that relevant scientific research on lynx, their habitat and sustenance needs, and status and trends must be incorporated in presenting effective standards and guidelines for lynx and associated species. The Forest Service must include such analysis as required by the LCAS, as well as the ESA and NFMA. The USFS must supply consultation agencies, in particular the FWS, with the necessary information to make a comprehensive determination regarding the proposed BMFP's potential impacts to lynx and other listed species. At present the BMFP's programmatic assumptions concerning lynx and other ESA and state listed species are largely unfounded. The BMFP must provide scientific basis for its management conclusions and provisions regarding lynx. The Forest Plan must develop survey protocol, methodology, focal areas and monitoring plans concerning lynx, lynx habitat, and associated species.

Lastly, during the Bush administration's tenure species deserving of effective ESA protection and recovery plans were precluded from warranted protective actions and status. The USFWS and USFS attempt to ignore historic records and sightings, minimizing lynx concerns, recovery focus and habitat evidence need to be reassessed in light of other malfeasance conducted by these agencies in the course of the past 10 or more years. In developing the BMFP, it is essential that historic records and sightings take precedence over politically contrived determinations, and that lynx be granted the proactive protection and recovery provisions and emphasis needed.

Wolverine - Confirmed presence of wolverines across the Blue Mountains region into Idaho as well as the southeastern Washington Cascades in the Mount Adams area has been well documented. Winter season surveys over the past decade have found likely wolverine snow tracks within the greater region's forest areas, including possible tracks in the Ochoco, Umatilla, Wallowa-Whitman,

and Malheur forests. Wolverine are known to have a 150 square mile or more winter range, and are also known to utilize remote little disturbed LOS, roadless, unroaded, and wilderness areas—including connective refugia nearby these preferred places. It is also well known that human disturbance related to the Forest Plan management activities would be likely to alter the movement patterns of wolverine and other wildlife species. The BMFP must adequately address the likely direct and cumulative impacts to wolverine by its proposed management focus and activities in compliance with both NEPA and NFMA. The Forest Plan's proposals for widespread removal of forest cover needed by wolverines for foraging and refugia would further degrade overall habitat quality across the greater region. Diminished cover subjects wolverines to vulnerability, both from humans and other carnivore competitors, due to decreased foraging quality and reduced presence of prey species.

The BMFP's must address the proposed plan's management focus, and present standards that prevent otherwise likely adverse impacts to wolverine. The new BMFP must address its incremental management impacts that – absent effective standards and protections – would likely result in trends pushing this species towards uplisting under the ESA. Forest Plan development must comply with the applicable mandates of NEPA and NFMA. 40 C.F.R. § 1502.16 (environmental consequences); 36 C.F.R. § 219.19 (fish and wildlife resources).

Given the sensitive and far-ranging nature of this species, it is likely that the proposed Forest Plan management focus will decrease Wolverine viability through the actual loss of connective travel, nocturnal, and seasonal foraging habitat and cover, as well as the degradation and diminishment of preferred little disturbed LOS area habitat, resulting in increased levels of vulnerability contributing to the possible loss of individual and/or family groupings of wolverines. This is inconsistent with the NFMA's Forest Planning directives to prevent management actions and programs that may contribute incrementally to trends towards listing Wolverine populations, 36 C.F.R. § 219.19.

Wolverine are already listed as in Oregon by the Oregon Department of Fish and Wildlife; yet the implications and importance of wolverine recovery have not been adequately disclosed and incorporated in the BMFP analysis provisions and management standards. The BMFP does not as yet acknowledge consultation with ODF&W regarding wolverine recovery objectives. Significant portions of the proposed BMFP at present appear to be in contravention to the necessary protection and recovery efforts needed wolverine and its required habitat.

Wolf - The BMFP does not as yet adequately address the potential current and future impacts of proposed management activities to wolves, including to the area's historic wolf habitat and to wolves which are known to be reclaiming historic territory in the Blue Mountains region. Wolves are documented as heading south and westward across Oregon's Blue Mountains in search of suitable territory, with new sightings being reported in portions of the Malheur and Umatilla forests. Eventually returning wolves will continue to discover their former historic Blue Mountain territories, and seek refuge and forage in the region's more intact LOS forests where levels of cover and prey are adequate. The USFS must join with the USFWS in developing Forest Plan standards and protections founded in scientific research and a comprehensive long-term recovery plan for wolf populations returning to Oregon. Future options providing for wolf re-habitation of Oregon's Blue Mountains forests, including remote LOS, unroaded, and wilderness areas must not be precluded by unaddressed omissions in the current draft BMFP. Absent effective long term protective provisions, the 10 to 15 or more year duration of the Forest Plan could jeopardize current and future returning wolves' ability to safely transit the region and establish viable refuge and territory in suitable LOS forest wildlands and adjoining unroaded, roadless, and wilderness locations.

The BMFP must objectively include scientific research that can better inform and provide for wolf and other federal and state listed species recovery goals in its criteria and monitoring methods, with emphasis on protecting potential habitat, needed cover, and connectivity in accordance with NEPA. 5 U.S.C. § 706(2)(A).]

The National Forest Management Act's (NFMA) regulations require the objective consideration of the "best available science" for all management planning, including foundational Forest Plans. 36 C.F.R. § 219.11 (2008); 36 C.F.R. § 219.35(d)(2000). Under the 2008 NFMA regulations, this requires documenting "how the best available science was taken into account in the planning process within the context of the issues being considered;" and "that the science was appropriately interpreted and applied." 36 C.F.R. § 219.11(a). It is important that the BMFP objectively demonstrate its reliance on the "best available science" in developing the Forest Plan's management focus and provisions.

In instances where the USFS has failed to sufficiently and accurately demonstrate how the "best available science" standard was objectively considered and employed, federal courts have held Forest Service management to be arbitrary and capricious when there is insufficient information in the record that objectively and accurately explained what the "best available science" entails or how it was considered in developing agency plans. *Bark*, 2007 U.S. Dist. LEXIS 21272 at *19-20; *Forest Watch v. U.S. Forest Serv.*, 410 F.3d 115, 117 (2nd Cir. 2005); *Ecology Ctr., Inc. v. U.S. Forest Serv.*, 451 F.3d 1153, 1191, 1195 (10th Cir. 2006).

Develop Management Goals for the Protection and Recovery of Wolves

A fledgling population of gray wolves is now in Oregon for the first time in nearly 60 years, and their numbers in the Blue Mountains are expected to increase dramatically during the life of the proposed Forest Plan. Wolves are protected in Oregon by both the state and federal Endangered Species Acts, and they should be fully considered and analyzed in the EIS for the Blue Mountains Forest Plan Revision. This analysis should include a full and candid discussion about wolves' habitat and prey needs, the threats and obstacles that stand in the way of wolf recovery, and how the Blue Mountains region can contribute to the recovery process. The Blue Mountains Forest Plan Revision should identify management goals for the protection and recovery of wolves, and establish specific standards and guidelines to ensure that those goals will be met.

a. Consider the Importance of Corridors

The Blue Mountains Forest Plan Revision covers nearly all of the federal forestland between the source population of wolves in Idaho the Cascade and Coast Ranges of Oregon. The Blue Mountains thus have an immediate and integral role to play in the east-to-west dispersal of wolves in Oregon. In the longer term, but certainly within the life of the proposed Forest Plan, the Blue Mountains will be an important avenue for genetic exchange between the Cascades and the Northern Rocky Mountains. The EIS for the Blue Mountains Forest Plan Revision should consider and disclose the ecological importance of the Blue Mountains as a corridor for wolf dispersal and genetic exchange.

b. Consider the Impacts of Road Densities on Wolves

While wolves may be adaptable to many different types of habitat, they are nearly universally impacted by high road densities. The EIS for the Blue Mountains Forest Plan Revision should analyze and disclose the impacts that road densities have on wolves. This analysis should include a discussion about (1) the existing road densities in the planning area, (2) the tolerance threshold

that wolves have toward roads, (3) the impacts that roads have on wolf mortality, reproduction, and other behavior, and (4) the opportunities that the Forest Service has to reduce road densities in the planning area. If the Forest Plan Revision allows for any new roads to be constructed in the planning area, including temporary roads, there should be a frank analysis about the impact that these new roads will have on wolves.

11. Wildlife Corridors and Ecological Connectivity Is Top Priority

One of our top concerns is to ensure that wildlife connectivity data on important movement corridors and core habitat areas is incorporated into the new Forest Plan. The need to reduce habitat fragmentation and increase wildlife connectivity calls for a big-picture landscape level approach and thus would be most effectively addressed during the Land Management Planning process, rather than at the project level. The present opportunity to promote large landscape connectivity is amplified by the three Blue Mountain forests combined forest plan revision, covering roughly 5.3 million acres of public lands.

As you likely know, for many of our native wildlife species, survival depends on movement – whether it be day-to-day movements, seasonal migration, gene flow, dispersal of offspring to new homes, recolonizing an area after a local extirpation, or the shift of a species' geographic range in response to changing climate conditions. For most animals and plants, all of these types of movement require a well-connected natural landscape. *See* Western Governors' Association's, Wildlife Corridors Initiative (June 2008 report), p.2. There is abundant scientific evidence that loss of habitat connectivity has profound negative impacts on fish, wildlife and plant populations. Id. at 3 (*citing* Wilcove et al. 1998, Crooks and Sanjayan 2006). Alarmingly, habitat loss and fragmentation is a cause of decline for about 83% of U.S. species that are becoming more rare. Id. at 4 (*citing* NatureServe and TNC 2000). Climate change is accelerating and increasing connectivity is widely recognized as one of the best adaptation measures managers can take. This vital role that habitat connectivity plays in ensuring long-term species' viability and the disastrous effects of habitat fragmentation has inspired a growing call to action to address these issues through big-picture collaborative efforts. A primary example is the Western Governors' Association's (WGA) recent adoption of Policy Resolution 07-01 (adopted February 27, 2007), Protecting Wildlife Migration Corridors and Crucial Habitat in the West and preparation of the Wildlife Corridors Initiative (June 2008 report).

Direction for moving forward with developing increased connectivity and core habitat protection also exists within the National Forest Management Act's current implementing regulations. The 2000 planning rule directs the Forest Service to use the plan revision process to "[i] Identify new proposals for special areas, special designation, or for recommendation as wilderness." 36 C.F.R. § 219.9(b)(5); *see also* § 219.27(b) (requiring that "all undeveloped areas that are of sufficient size as to make practicable their preservation and use in an unimpaired condition must be evaluated for recommended wilderness designation during the plan revision process.") and § 219.27(c) (regarding the Forest Service's authority to administratively designate important resource areas for heightened protection status).

Moreover, the push for greater national direction on connectivity planning is well underway. Secretary Vilsack has already directed the Forest Service to deal assertively and

collaboratively with climate change. Wildlife connectivity planning is a critical component to furthering this national direction and the agency's Strategic Framework for Responding to Climate Change.

Collaborative efforts have already laid the foundation for integrating connectivity data into the new Blue Mountains Forest Plan. Hells Canyon Preservation Council is working with state and federal agency wildlife experts and habitat modeling experts to use cutting edge GIS based technology to produce maps identifying key wildlife connectivity corridors and core habitats throughout the Blue Mountains ecoregion. Specifically, we began this process by selecting potential focal species from diverse taxonomic groups that would collectively represent a wide range of habitat requirements and movement needs, as well as species sensitive to connectivity barriers or climate change. This process was started by cross-referencing several different leading sources on wildlife that are native to the Blue Mountains ecoregion, such as Oregon's Natural Heritage Information Center, Oregon's State Wildlife Action Plan (the "Oregon Conservation Strategy"), and federal agency lists of rare, threatened, and endangered species by region (e.g. Region 6's Sensitive Species List). We then circulated a draft list of regional focal species to state and federal agency wildlife experts and other interested parties for review and feedback. This expert feedback was used to narrow and refine the focal species list.

This past April, 2010 HCPC hosted a Blue Mountains Connectivity workshop in conjunction with the Washington Wildlife Connectivity Working Group's (WWHCWG) Transboundary Connectivity Smmit in Richland, Washington. The Transboundary Summit and Blue Mountains Connectivity workshop brought together a diverse spectrum of individuals and entities involved in regional connectivity efforts, including: the Western Governor's Association's Pilot Project, leading connectivity scientists, GIS and habitat modeling specialists, federal and state agency wildlife experts, Native American tribes, conservation NGOs, academic scientists, and members of both the Baker BLM and Blue Mountains Forest Plan Revision Teams. The spring workshop helped build scientific consensus for the selection of focal species that collectively represent the movement needs and habitat requirements of all native, terrestrial species throughout the Blue Mountains Ecoregion. This list now includes wide-ranging carnivores (gray wolves and wolverine), native ungulates (elk and bighorn sheep), old-growth dependent species (American marten, pileated woodpecker), Greater Sage Grouse (an umbrella species for sagebrush habitat), and species that rely on riparian areas, serve as indicators of water quality, and also help address connectivity barriers at a smaller-scale, such as the Columbia spotted frog and Western toad.

As you know, the Obama Administration is also in the process of developing new forest planning regulations. The conservation community is working hard to ensure that those new planning regulations uphold the Obama Administration's desire to look to the future and the best science currently available for ensuring long-term species viability. We are hopeful that identifying and protecting wildlife corridors will be a key component to the new forest planning regulations and that the new regulations are consistent with what was stated in the scoping notice: that "a new planning rule provides an opportunity to protect, reconnect, and restore national forests and national grasslands for the benefit of human communities and natural resources."

There are different definitions and perceptions of what wildlife corridors are, so it is important that we define this term for our comments. The definition used in Section 481 of H.R. 2454, passed by the U.S House of Representatives on 26 June 2009 is a good starting point: "the term 'corridors' means areas that provide connectivity, over different time scales (including seasonal or longer), of habitat or potential habitat and that facilitate the ability of terrestrial and freshwater fish, wildlife, and plants to move within a landscape as needed for migration, gene flow, or dispersal, or in response to the impacts of climate change and ocean acidification or impacts." Therefore, we submit that the term wildlife corridors be integrated into the Revised Forest Plan and similarly defined to mean the functional connectivity needed for fish, wildlife and plants throughout a landscape, not just a narrow linear habitat connection.

It is appropriate to manage for a diversity of species by ensuring the viability of select species, but past habitat loss and fragmentation has threatened viable populations. Climate change poses a grave additional threat to National Forest System lands, waters and wildlife. Habitat loss and fragmentation disrupt natural patterns of species' migration, dispersal and other interactions, undermining the health of populations and the likelihood that they will persist into the future. Natural processes such as stream flows and seasonal patterns of precipitation and temperature are being affected by climate change. In the face of climate change many species will need to shift their range but may find it impossible if fragmentation is not overcome and if other suitable habitat does not remain intact.

Upon review of 22 years of scientific recommendations it was found that the most frequently cited climate change adaptation strategy for biodiversity management is to increase connectivity ("design corridors, remove barriers for dispersal, locate reserves close to each other, reforestation").[16] This allows species to adapt through migration, dispersal and movement, but also requires reduction of stressors. Effective NFS planning and management of lands and waters should incorporate measures for identifying and protecting wildlife corridors while simultaneously reducing stressors.

Conservationists are collaboratively working to insist that the new planning regulations include regulatory provisions for identifying and maintaining wildlife corridors across NFS planning units. To address wildlife corridors both within and beyond NFS planning units, to address surrounding landscapes and to look at other processes, the Forest Service should already be informed by an effort that the USDA has been engaged in, and committed to - the Western Governors Association's Wildlife Corridors Initiative. As you hopefully already know, the USDA signed a Memorandum of Understanding (MOU) on June 15, 2009 regarding wildlife corridors and crucial habitats with the 19 western states as well as territories.[17] Two key areas of agreement in the MOU that should guide the Forest Plan Revision Process and any new Forest Planning rule include:

---

[16] Heller, N.E. and Zavelata, E.S. 2009. Biodiversity management in the face of climate change: A review of 22 Years of recommendations. Biological Conservation, 142(2009): 14-32.

[17] Memorandum of Understanding regarding Wildlife Corridors and Crucial Habitats. Departments of Agriculture, Energy and Interior and the Western Governors' Association. 15 June 2009. [on-line at: www.westgov.org/wga/initiatives/corridors/wildlifeMOU.pdf]

"1. DOI, DOE and USDA will endeavor to assist the WGA in the efforts of the Western Governors' Wildlife Council, working in coordination with their member states, to create state-based decision support systems that develop, coordinate, make consistent and integrate quality data about wildlife, corridors, and crucial habitat across landscapes...
3. The Parties will endeavor to develop, use and make available the various decision support systems to inform relevant decision-makers at all levels of government, and the private sector engaged in land use decisions, and to evaluate a variety of land uses while providing healthy and productive landscapes."

The Revised Forest Plan should explicitly include identifying and protecting wildlife corridors as an effective strategy that provides the means to:

- meet the Forest Service's species viability mandate
- enhance ecosystem resiliency
- address climate change mitigation
- provide flexibility to allow for species' adaptation to climate change
- provide for diversity
- protect at-risk species
- manage at the landscape level; and
- cooperate with states, tribes, local governments and landowners on joint land and water management.

Detailed recommendations for achieving these goals through the land management planning process include:

PRE-PLANNING: Delineate and Assess Geographic Areas of Interest under the Current Management Regime.

1. Identify terrestrial and aquatic target species (i.e., focal species, climate change sensitive species, TES species) and determine the ability of these wildlife and plants to move under current conditions and their ability to adapt to climate change based on the available potential core habitats and corridors.

2. Identify potential core habitats on and adjacent to the public lands planning unit. Assess current impacts and the likely impacts of climate change on these core areas.

3. Identify the areas providing connectivity between identified potential core habitats from Step 1. Assess current impacts and the likely impacts of climate change on these corridor areas.

4. Identify any other ecological connectivity needs not captured by the coarse scale analyses of potential cores and corridors identified in Steps 2 and 3.

PLAN DEVELOPMENT: Determine Species Requirements and Describe the Desired Future Condition on the Public Lands Involved.

1. Based on the assessment, establish areas to be maintained as core areas on public lands and ways to cooperatively protect core areas on adjacent lands, and then delineate areas needed to provide connectivity between them.

a. ensure coarse scale requirements for ecological connectivity are met for the planning unit by a network of cores and corridors;
b. ensure any other requirements for ecological connectivity are met for the planning unit not captured in the cores and corridors;
c. ensure latitudinal connectivity is maintained under climate change scenarios for at least two decades across the planning area;
d. ensure elevational connectivity is maintained under climate change scenarios for at least two decades across the planning area;

2. Develop the desired future condition for the cores and corridors identified in the planning unit.

3. Describe management objectives, guidelines and standards to meet the desired future condition. Include any restrictions on human use or development that are needed.

4. Identify extraordinary ecologically and/or culturally important corridors and provide them with a special administrative designation available in the agency's planning process, so that their primary management direction is to maintain ecological connectivity.

5. Provide a monitoring plan to evaluate the condition of the cores and corridors and adjust management when necessary.

PROJECT DEVELOPMENT and IMPLEMENTATION: Adhere to management plan direction and requirements.

1. Evaluate the effects of agency actions taken pursuant to management plans on core areas and connectivity, and the effects of the project on wildlife and plants.

2. Consider alternative means of achieving project goals and objectives.

3. Ensure projects adhere to desired future conditions, management objectives, guidelines and standards for cores and corridors.

4. Develop a monitoring and reporting plan with clearly defined thresholds to assess whether the implemented project meets the plan's goals and objectives to protect ecological connectivity.

Each stage of the connectivity planning process encourages working across political boundaries and cross-jurisdictional coordination. As discussed, regional connectivity efforts are well underway and the foundation for this work has already been established. We strongly encourage the Blue Mountains Forest Plan Revision Team to increase its involvement with the collaborative efforts already initiated by HCPC and our connectivity partners and to use the precedent set by collaborative connectivity efforts in neighboring jurisdictions, such as the WWHCWG, as guidance for how to integrate existing connectivity and best accomplish these goals.

12. Roads

The Forest Service should complete a travel analysis of all maintenance level roads, identify a minimum necessary system, and identify unneeded roads for decommissioning for each of the three National Forests prior to developing alternatives for the Forest Plans.

The Forest Service must address and take steps to right-size its roads system in the context of the forest plan revision. The Forest Service travel system causes significant harm to the environment, including detrimental effects on water quality, harm to aquatic species and ecosystems, fragmentation of terrestrial wildlife habitat, and alteration of natural hydrological regimes, among other problems. The system also constitutes an enormous drain on limited agency budgets—budgets that can never satisfy the maintenance needs of the out-sized and crumbling road and trail systems that currently exist on National Forest lands. While the Forest Service missed an enormous opportunity to right-size its travel system by ignoring its obligations under the 2001 Roads Rule during travel management planning, we believe the agency has the chance to make up for lost ground by, at long last, completing travel analysis, identifying its minimum necessary road system, and identifying unneeded roads for decommissioning prior to developing alternatives for or releasing the DEIS for the Blue Mountains Forests Revised Land and Resource Management Plans.[18] We stress that it would be imprudent to give up this opportunity by setting up management areas for the forests and defining goals/desired conditions, management areas, suitable uses and activities, objectives, monitoring and evaluation schemes, standards, and guidelines for these LRMPs without the benefit of an analysis of what the forests actually need for their transportation systems. This is so particularly in light of the fact that these Forest Plans will guide management for up to 15 years, longer if one takes the historic forest plan revision schedule into account.

Adverse Effects Associated with Roads and the Need to Right-Size the System

The adverse environmental and fiscal impacts of the Forest Service's transportation system are well-documented and well-known. In this forest planning process, we recommend the Forest Service revisit its report entitled "Forest Roads: A Synthesis of Scientific Information," which summarized and described the science up until that point regarding the effects of roads on the landscape. USDA, Forest Service, *Forest Roads: A Synthesis of Scientific Information* (May 2001), *available at* http://www.fs.fed.us/pnw/pubs/gtr509.pdf. We suggest the Forest Service examine the entire report, but sections of the executive summary provide a good, basic introduction to the environmental impacts of roads:

Direct Physical and Ecological Effects

[18] The three National Forests covered by this project are at different stages of travel management planning. In 2005, the Forest Service promulgated the Travel Management Rule (TMR), 36 C.F.R. Part 212, and set a deadline of 2009 for closing all National Forests to motorized cross country travel and moving to a system of designated routes, a deadline that was later extended through the end of 2010. The Umatilla NF has completed its travel management plan (TMP) and released its MVUM. The Wallowa-Whitman NF is currently finalizing its TMP EIS and developing the ROD, which we expect to be released in summer of 2010, long before the forest plan revision DEIS is released. The Malheur NF has failed even to scope on its TMP, likely constituting the last national forest in the country to end cross-country travel.

Geomorphic effects of roads range from chronic and long-term contributions of fine sediment into streams to catastrophic mass failures of road cuts and fills during large storms. Roads may alter channel morphology directly or may modify channel flowpaths and extend the drainage network into previously unchannelized portions of the hillslope. The magnitude of road-related geomorphic effects varies by climate, geology, road age, construction practices, and storm history. Improvements in designing, constructing and maintaining roads can reduce road-related erosion at the scale of individual road segments, but few studies have evaluated long-term and watershed-scale changes to sediment yields as roads are abandoned or obliterated.

Roads have three primary effects on **hydrologic processes**. They intercept rainfall directly on the road surface, road cutbanks, and subsurface water moving down the hillslope; they concentrate flow, either on the surface or in an adjacent ditch or channel; and they divert or reroute water from flowpaths that it would otherwise take if the road were not present. Problems of road drainage and transport of water and debris--especially during floods--are a primary reason roads fail, often with major structural, ecologic, economic, or other social consequences. The effect of roads on peak streamflow depends strongly on the size of the watershed. For example, capture and re-routing of water can dewater one small stream while causing major channel adjustments in the stream receiving the additional water. In large watersheds, roads constitute a small proportion of the land surface and have relatively insignificant effects on peak flow. Roads do not appear to change annual water yields, and no studies have evaluated their effect on low flows.

Forest roads can significantly affect **site productivity** by removing and displacing topsoil, altering soil properties, changing microclimate, and accelerating erosion. The direct effect of roads on soil productivity has been estimated to range from 1 to 30 percent of the landscape area in managed forest lands. Losses of productivity associated with road-caused accelerated erosion are site-specific and highly variable in extent.

Natural populations of animal species are affected by **habitat fragmentation** caused by the presence of roads and by avoidance of areas near roads by some species and attractiveness to them by others. Fragmented populations can produce increased demographic fluctuation, inbreeding, loss of genetic variability, and local extinctions. Roads fragment habitat by changing landscape structure, dissecting vegetation patches, increasing the amount of edge, decreasing interior area, and increasing the uniformity of patch characteristics. For example, road-avoidance behavior is characteristic of large mammals such as elk, bighorn sheep, grizzly bear, caribou, and wolf. Some studies have shown that the existence of a few large areas of low road-density, even in a landscape of high average road-density, may be the best indicator of suitable habitat for large vertebrates.

On the other hand, roads and their adjacent environment qualify as a distinct **habitat** and result in changes at the species, population, and landscape scales. Some species are associated with edges, including those that use roads as corridors to find food. Roads facilitate **biological invasion** where disturbed roadside habitats are invaded by exotic (non-native) plant and animal species, dispersed by wind, water, vehicles, and other human activities. Roads may be the first points of entry for exotic species into a new landscape, and the road can serve as a corridor for plants and animals moving farther into the landscape. Invasion by exotic species may have significant biological and ecological effects if they are able to displace natives or disrupt the structure and function of an ecosystem.

Indirect and Landscape-Scale Effects

The effects of roads on **aquatic habitat** are believed to be widespread, although direct, quantitative cause-effect linkages are difficult to document. At the landscape scale, correlative evidence suggests that roads are likely to influence the frequency, timing, and magnitude of disturbance to aquatic habitat. Increased fine-sediment composition in stream gravel—a common consequence of road-derived sediments entering streams--has been linked to decreased fry emergence, decreased juvenile densities, loss of winter carrying capacity, and increased predation of fishes, and can reduce benthic organism populations and algal production. Roads can act as barriers to migration, lead to water temperature changes, and alter streamflow regimes. Improper culvert placement at road-stream crossings can limit or eliminate fish passage. Roads greatly increase the frequency of landslides, debris flow, and other mass movement. At the landscape scale, increasing road densities and their attendant effects have been correlated with declines in the status of some non-anadromous salmonid species.

Roads can cause a wide variety of effects to **terrestrial wildlife**. Species, such as gray wolf and grizzly bear, are adversely affected by repeated encounters with people. Roads can increase harassment, poaching, collisions with vehicles, and displacement of terrestrial vertebrates, affecting a variety of large mammals such as caribou, bighorn sheep, mountain goat, pronghorn antelope, grizzly bear and gray wolf. One million vertebrates are estimated killed annually on roads in the United States. Direct mortality of large mammals on forest roads is usually low, except for those with a home range that straddles a road. Forest roads pose a greater hazard to slow-moving migratory amphibians than to mammals. Nearly all species of reptiles seek roads for cooling and heating. Vehicles kill many of them, making well-used roads a population sink.

Chemicals applied to and adjacent to roads can enter streams by a various pathways. The effect on **water quality** depends on how much chemical is applied, the proximity of the road to a stream, and the weather and runoff events that move chemicals and sediments. Dust produced by vehicles moving on unpaved roads reduces **visibility** and generates airborne particulates that can pose health hazards, such as in areas with soils containing asbestiform minerals.

Id. at 5-7. The Forest Service should examine this report and the references cited therein as it attempts to analyze the effects of the existing road system on the Blue Mountains landscape.

Many important studies and reports have been released within the decade since this report's publication, as well. A report released in 2008 describes in detail the water quality impacts of Forest Service roads, as well as the ineffectiveness of the Best Management Practices (BMPs) currently used by the agency in order to achieve compliance with water quality standards under the Clean Water Act. *See generally* Endicott, Douglas, 2008. National Level Assessment of Water Quality Impairments Related to Forest Roads and Their Prevention by Best Management Practices, Final Report. US EPA, Office of Water. Dec. 4, 2008. Wildlands CPR has put together an informative report entitled *Managing the Miles: A Review of Forest Service Policies and Practices*, which summarizes the findings of several more recent, seminal studies regarding roads' impacts to natural resources:

How Roads Impact the Landscape

In 2001, the Pacific Northwest Research Station published General Technical Report 529, Forest Roads: A Synthesis of Scientific Information, which consolidated many existing studies regarding the effects of roads on forest ecosystems. The journal Conservation Biology published a special section in their February 2000 issue regarding the ecological effects of roads. David Havlick's No Place Distant, published in 2002, Sherwood, Cutler, and Burton's Wildlife and Roads: The Ecological Impact, published in 2002, Forman and Sperling's Road Ecology: Science and Solutions, published in 2003, and The National Research Council's Assessing and Managing the Ecological Impacts of Paved Roads, published in 2005, all discuss the impact of roads on natural ecosystems and wildlife. There is no shortage of careful, scientific research describing the negative effects of roads on the landscape. The following is a short, abbreviated synopsis of just some of the road impacts reviewed in the aforementioned articles.

In general, negative effects from roads are both indirect and direct, that is they occur both as a result of the road being on the landscape and the use of the road. Both direct and indirect effects typically fall into several main categories:

Habitat fragmentation and increased human presence

• Roads reduce suitable habitat for a number of wildlife species. Wolves, grizzly bear, elk, lynx, and other large, far-ranging species generally abandon areas when road densities rise past 0.6 km/km^2.

• Roads allow for increased human presence on the forests, thereby increasing the likelihood of mortality through collisions and poaching.

• Roads act as barriers to small mammals, preventing them from accessing suitable habitat and leading to genetic isolation.

Water pollution

• Forest roads are often unpaved and under-maintained contributing both chronic and episodic sedimentation to waterways. Rain events can result in increased road-related sedimentation in rivers and streams and siltation of sensitive stream habitats, reducing effectiveness and even suffocating juvenile fish species. Increased sedimentation also increases water temperature, affecting cold water fish such as salmon and trout.

• Culverts that cross under roads can be clogged and fail during rain or flooding events. Blocked culverts can act like dams, and as the water builds up behind them, the stream crossing may blow out depositing road fill into the stream, or the water may be diverted onto the road, causing significant erosion of the road bed itself.

• Severe storms can cause catastrophic road failures such as those seen in areas with particularly erodible soils, like the Clearwater and Olympic National Forests and Redwood National Park. In areas like this, severe landslides tend to occur every 10-20 years, with many of the landslides being road triggered. For example, 58% of the landslides on the Clearwater National Forest (ID) in 1996-1997 were road-triggered.

Soil compaction

• Soil compaction results from building the road and from driving on it. Soil compaction lasts for many years even if the road is not used. Compacted road surfaces result in increased surface temperatures, reduced productivity, and limited revegetation.

Air and noise pollution, and increased dust

• Each car that passes over a dry gravel road sends dust into the air, covering plants and animals and decreasing habitat effectiveness while also causing health issues.

• Off road vehicles often utilize road systems both as primary travel routes and as access routes to trails and play areas. These machines are noisy and polluting, directly affecting other users and wildlife, and contributing to direct pollution of water bodies and terrestrial landscapes.

• Massive dust storms are increasing in both severity and frequency across the West, driven in part by increased off-road vehicle use and road building for oil and gas exploration.

• Dust coverage can affect snowmelt, changing spring flood patterns, and disrupting fish and other wildlife migrations.

The above list is by no means exhaustive but merely a glimpse at some of the most damaging ecological effects roads have on wildlife and ecosystems. Furthermore, many of these effects are inter-related and accumulate over time. A single, well-built, well-maintained road does not typically cause all of the problems noted above. However, numerous roads, many of which are poorly engineered and under-maintained, have very profound, cumulative landscape-level effects.

Greg Peters, Wildlands CPR, *Managing the Miles: A Review of Forest Service Policies and Practices* 4-5 (Oct. 2009), *available at* http://www.wildlandscpr.org/files/Managing%20the%20Miles.pdf. We suggest that the Forest Service examine the studies that the quoted Wildlands CPR text above summarizes, as well as several other literature reviews of recent science related to roads and the literature cited therein:

- Adam Switlaski, Wildlands CPR, *How Many is Too Many: A Review of Road Density Thresholds for Wildlife* (2006), *available at* http://www.wildlandscpr.org/biblio-notes/how-many-too-many-review-road-density-thresholds-wildlife.
- Sharon Mader, Wildlands CPR, *Comparing the Ecological Effects of Linear Developments on Terrestrial Mammals* (2006), *available at* http://www.wildlandscpr.org/biblio-notes/comparing-ecological-effects-linear-developments-terrestrial-mammals.
- Christine Morris, *The Impact of Roads on Aquatic Benthic Macroinvertebrates and Using Bioassessments as Indicators of Stream Health* (2006), *available at* http://www.wildlandscpr.org/biblio-notes/impact-roads-aquatic-benthic-macroinvertebrates-and-using-bioassessments-indicators-str.
- Adam Switlaski and Reed Noss, *The Evolution of Road Science* (2004), *available at* http://www.wildlandscpr.org/biblio-notes/evolution-road-science.
- Mary Ann Madej, *Erosion at Stream Crossings: The Case for Restoration* (2003), *available at* http://www.wildlandscpr.org/biblio-notes/erosion-stream-crossings-case-restoration.
- Leslie Hannay, *Effect of Roads on Arthropods* (2001), *available at* http://www.wildlandscpr.org/biblio-notes/effect-roads-arthropods.
- Kinza Cusic, *The Ecological Effects of Roads on Wetlands* (2001), *available at*

http://www.wildlandscpr.org/biblio-notes/ecological-effects-roads-wetlands

Given that the Forest Plan should provide suitability determinations, management areas, objectives, standards, and guidelines to address each of the natural resources described above, it is incumbent upon the agency to consider the impacts of the roads system on these resources and how the Forest Plan will serve to minimize and reduce adverse effects on the environment from the system, including through taking such actions as decommissioning unneeded roads.

In addition, Secretary Vilsack and Forest Service Chief Tidwell have articulated a restoration vision for the Forest Service, including a focus on watershed protection and climate change adaptation. In view of that vision and that these are two of the primary areas to be addressed in the LRMP according to the NOI (3/29/09), the Forest Service must also examine the Blue Mountain forests' road system in light of its potential to exacerbate the effects of climate change, as well as the potential ways in which right-sizing the road system could serve as a climate change adaptation strategy. In particular, we believe the Forest Service should examine Wildlands CPR's *Mitigating the Impacts of Roads as a Climate Change Adaptation Strategy*, which describes likely effects of climate change on forest landscapes. Part of the document explains the adaptation potential from decommissioning roads:

Road decommissioning and upgrading as a climate change adaptation strategy

The impacts of climate change and roads on aquatic and terrestrial systems will likely be intensified by their interactions and cumulatively pose more serious threats to many species than either would alone. One adaptation strategy that directly impacts resiliency of many species is decommissioning and upgrading of forest roads. When roads are decommissioned the old roadbeds are ripped and often recontoured to enhance water infiltration (Switalski et al. 2004). Additionally, culverts are removed and natural stream connections and transport processes are restored. This practice lessens risks associated with landslides, erosion of fine sediment, and intensification of peak flows (Madej 2001).

Decommissioning and upgrading roads and thus reducing the amount of fine sediment deposited on salmonid redds can increase the likelihood of egg survival and spawning success (McCaffery et al. 2007). In addition, this would reconnect stream channels and remove barriers such as culverts. Decommissioning roads in riparian areas may provide further benefits to salmon and other aquatic organisms by permitting reestablishment of streamside vegetation, which provides shade and maintains a cooler, more moderated microclimate over the stream (Battin et al. 2007).

For wildlife, road decommissioning can reduce the many stressors associated with roads. Road decommissioning restores habitat by providing security and food for wildlife. Preliminary results suggest that black bear (Ursus americanus) use decommissioned roads extensively in central Idaho (A. Switalski in prep.). In addition to providing early successional foods, such as huckleberries, decommissioned roads when seeded with native species can reduce the spread of invasive species (Grant et al. in review).

One of the most well documented impacts of climate change on wildlife is a shift in the ranges of species (Parmesan 2006). As animals migrate, landscape connectivity will be increasingly important (Holman et al. 2005). Decommissioning roads in key wildlife corridors will improve connectivity and be an important mitigation measure to increase resiliency of wildlife to climate change.

Adam Switalski and Liane Davis, *Mitigating the Impacts of Roads as a Climate Change Adaptation Strategy* (2009), *available at* http://www.wildlandscpr.org/biblio-notes/mitigating-impacts-roads-climate-change-adaptation-strategy. In addition, the U.S. Climate Change Science Program Final Report, developed for several federal agencies including the Department of Agriculture, notes that an important adaptation strategy is to create broad habitat corridors and continuity of habitat in order to increase resistance of animal species to changed conditions as a result of climate change by improving their ability to migrate. U.S. Climate Change Science Program, Preliminary Review of Adaptation Options for Cimate-Sensitive Ecosystems and Resource Final Report, Synthesis and Assessment Product 4.4. p. 69. (June 2008), *available at* http://downloads.climatescience.gov/sap/sap4-4/sap4-4-final-report-all.pdf. Decomissioning unneeded roads would help accomplish this strategy.

Beyond the adaptation benefits that could accrue from right-sizing the road system, reclaiming roads also has important climate change mitigation potential. A variety of studies have examined the important carbon sequestration role forests play, but the Forest Service can enhance and improve the carbon sequestration potential of national forests through decommissioning and revegetating roads and user created trails. The Wilderness Society recently produced a briefing memo using Forest Service information and the Carbon Online Estimator, which estimates that in Region 6 up to 17,929,264 metric tons of carbon could be sequestered if unneeded Forest Service roads were revegetated. The Wilderness Society, *Briefing Memo: Carbon Sequestered When Unneeded National Forest Roads are Revegetated* 2 (2010), *available at* http://wilderness.org/files/brief_carbonandroads.pdf. This is the equivalent of removing approximately 3,259,866 automobiles from our roadways for an entire year. *Id*. at 5. The Forest Service should estimate the carbon sequestration potential of right-sizing the Blue Mountains forests' road systems.

In addition to the serious environmental problems associated with the Forest Service's road system, the agency's inability to maintain that system exacerbates the problem. The Forest Service administers over 350,000 miles of official roads system-wide, but maintains only a small fraction to standard. For instance, according to the Road Accomplishment Reports for all National Forests for 2007, the Forest Service was only able to maintain about 20% of its national road system in FY 2007. Roads that are not maintained adequately incur increasing environmental costs (e.g., damage to watersheds, soils, viewsheds, and wildlife) and economic costs over time; the longer a road fails to receive routine maintenance, the faster it begins to fall into a more expensive condition of disrepair. Further, the cost to taxpayers is untenable. Nationwide, the Forest Service has a multi-billion dollar road maintenance backlog, with $664 million attributed to national forests in Oregon alone, according to a 2004 report by Taxpayers for Common Sense. Each of the national forests covered in the Blue Mountains forest plan revision faces a huge disparity between the available budget and the budget needed to maintain roads to standard. For instance, the Malheur National Forest requires $17,675,720 to maintain roads at their operational maintenance level, but its annual budget as of 2004 for such repairs was $790,000 for all planning, construction, *and* maintenance. Forest Service, Malheur National Forest Roads Analysis Report 29-30 (2004); *see also* Proposed Action at 52-53 (describing significant budget shortfall, but less than those disclosed in the three forests' Roads Analyses). This is less than 5% of what the Forest Service needs in order to properly maintain its roads and avoid the additional environmental impacts caused by unmaintained roads. The Forest Service must consider the fiscal implications of its road system and the environmental costs of budgetary shortfalls in this forest plan revision.

Regulatory Framework for Right-Sizing the Forest Service Transportation System

Given the significant environmental and fiscal problems associated with the Forest Service's transportation system, the time has come to right-size that system, a fact the agency has acknowledged for over a decade. The Forest Service originally decided to reform the way it managed its transportation system in the 2001 Roads Rule because a growing body of scientific evidence demonstrated that roads, as a major source of erosion and sedimentation, were responsible, in large part, for the "decline in the quality of fish and wildlife habitat". 66 Fed. Reg. 3,206, 3,209 (Jan. 12, 2001). Further, the agency sought to gain control over a transportation system the maintenance backlog of which was spiraling out of control because it was in no way connected to the availability of funding. *Id*. at 3,214. The Roads Rule requires the Forest Service to assess the risks, problems, and benefits associated with each of the roads in the system, culminating in the identification of a minimum road system in order to balance the needs of Forest users with the need to "*minimize and begin to reverse adverse ecological impacts from roads*," as well as the need to right-size the road system in order to be responsive to long-term funding expectations. *Id*. at 3,214-15. Furthermore, the Roads Rule requires the agency to identify unneeded roads for decommissioning. *Id*. at 3,202. The Roads Rule is codified at 36 C.F.R. § 212.5(b).

The Roads Rule requires the Forest Service to identify the minimum road system based on a *science-based roads analysis conducted at the appropriate scale*. 36 C.F.R. § 212.5(b)(1). This analysis, the Travel Analysis, then allows the Forest Service to "identify the minimum road system needed for safe and efficient travel and for administration, utilization, *and protection* of National Forest System lands." *Id*. (emphasis added). The Rule further defines the minimum necessary system as the road system needed:

- to meet resource and other management objectives adopted in the relevant land and resource management plan . . . ,
- to meet applicable statutory and regulatory requirements,
- to reflect long-term funding expectations,
- to ensure that the identified system minimizes adverse environmental impacts associated with road construction, reconstruction, decommissioning, and maintenance.

Id. Based on the identified minimum road system, the Forest Service must identify roads for decommissioning. *Id*. § 212.5(b)(2). Specifically, "[r]esponsible officials must review the road system on each National Forest and Grassland and identify roads on lands under Forest Service jurisdiction that are no longer needed to meet forest resource management objectives and that, therefore, should be decommissioned or considered for other uses, such as for trails." *Id*.

The entire analysis described above is ultimately captured and documented in a Travel Analysis Process (TAP) report, which should be made available to the public. The TAP should include an assessment of risks and benefits of each route's effects on water quality and quantity, soils, watersheds, wildlife, connectivity, habitat fragmentation, carbon sequestration, cultural resources, recreation, the Forest's budget, and other appropriate factors, as well as a valuation of whether each route is high-, medium-, or low-risk and high-, medium-, or low-value.[19] Quite clearly,

[19] When the Forest Service finally proceeds with the required comprehensive travel analysis and minimum road system identification, we are concerned that the Wallowa-Whitman or Umatilla National Forests might be tempted to use the Motor Vehicle Use Map (MVUM) as the starting point for complying with the Roads Rule. We must stress that the MVUM is an inappropriate place from which to start this analysis.

low-value/high-risk routes should not be part of the minimum road system, and should be identified for decommissioning. High-value/high-risk routes may be appropriate for the minimum road system, but should be prioritized when apportioning maintenance and mitigation funds. Low-value/low-risk routes should not be included in the minimum system (and should be identified for obliteration) because they provide little benefit to the public, and the environmental risks of the route and future maintenance requirements will likely only increase over time as maintenance dollars are directed at higher-value/higher-risk routes.[20] In addition to completing the route-by-route assessment, the Forest Service should examine the travel system at a landscape scale in order to determine how to best minimize route density and effects on watersheds, analyze potential quiet recreation zones, evaluate opportunities to expand unroaded areas, and provide for the protection and enhancement of wildlife corridors. These issues are difficult to accurately assess in an analysis that considers roads in isolation. It is important for these analyses to be both route-specific but also performed at a higher order watershed level to provide a holistic picture of ecological conditions.

The preamble to the Roads Rule and the 2000 Roads Rule Environmental Assessment (EA) suggest that forest planning is the appropriate process through which to implement the minimum road system and decommissioning priorities identified by each National Forest. In describing how the 2000 NFMA planning rule, 2001 Roadless Rule, and 2001 Roads Rule fit together, the agency indicated that "under the road management policy [i.e., "Roads Rule"], national forests and grasslands must complete an analysis of their existing road system and then incorporate the analysis into their land management planning process." 66 Fed. Reg. 3,206, 3209 (Jan. 12, 2001). Further, the Federal Register notice indicated that the agency should not incur additional costs associated with the analysis because the requirements of the Roads Rule would supplant existing transportation analysis associated with forest planning:

> This final rule requires that the agency use a roads analysis prior to making decisions about road construction, reconstruction, and decommissioning. The agency currently conducts transportation analysis in association with forest planning, ecosystem assessments, and other analyses. Thus, the agency does not expect an incremental increase of administrative costs due to new administrative requirements under this final rule.

Id. at 3,215. Furthermore, the notice indicated that a "comprehensive road inventory and forest-scale roads analysis [would be] completed and incorporated as appropriate into the forest plan." *Id*. The EA noted:

> Specifically, within two years of the effective date of the final road management strategy, each Forest System unit must complete a forest-scale road analysis. The findings of a forest-scale analysis may be applied either to the current forest plan or at the time of a forest plan

[20] We have attached the Mountainair Ranger District's TAP from the Cibola National Forest, which we believe provides a reasonable example of how to complete this aspect of the TAP. Forest Service, *Cibola National Forest Mountainair Ranger District Travel Analysis for Mountain Air Travel Management* (2009), *available at* http://www.fs.fed.us/r3/cibola/travel-management/tm_mt_air/tap_0209/mountainair_tap.pdf; *see also* http://www.fs.fed.us/r3/cibola/travel-management/tm_mt_air/tap_0209/appendix_a/1_added_ mrs_roads.pdf (containing Appendix with route-by-route assessment and minimum road system identification).

> revision or amendment. Further, any future project, ecosystem assessment, or forest plan amendment or revision must be informed by a roads analysis process.

EA at 4. Similarly, a Forest Service technical guide developed to assist the agency with completing its roads analysis noted that "[r]oads analysis, focusing on existing and future transportation systems, can contribute to implementing and revising forest plans." USDA Forest Service. *Roads Analysis: Informing Decisions About Managing the National Forest Transportation System* (FS-643) at 6 (1999). ***Thus, the Forest Service must complete its obligations under the Roads Rule prior to moving forward with developing alternatives for the Blue Mountains LRMP Revision EIS because travel analysis and the identification of the minimum necessary road system and decommissioning priorities are meant to inform Forest Plan development.***

Broad-Based Support for Right-Sizing

Not only has the Forest Service and a host of conservation groups recognized the need to right-size the Forest Service transportation System, but Congress and a diverse array of voices has also called for these actions. Congress expressed its expectation that the Forest Service address its out-sized road system in report language associated with the 2009 and 2010 Appropriations Acts. Report language accompanying the FY 2010 Appropriations Act provides:

> Senate Language (Appropriations Act of 2010, S. Rep. No. 111-038, page 69): The Committee believes that the Forest Service must continue to show progress toward meeting its travel management regulatory requirements, including its requirements **to conduct a science based analysis** of the roads system, **identify unneeded roads**, and comply with appropriate criteria to designate roads and trails, as defined by 36 CFR 212.5 and 212.55. Within 60 days of enactment, the Service is directed to provide a report to the Committee outlining the process that it will use, by region, to ensure compliance with these requirements, including a timeline for implementation.
>
> House Language (Appropriations Act of 2010, H. Rep. No. 111-180): The Committee remains interested in the travel management planning process. **It is vital for the Service to look at the entire road system on a National Forest and determine those roads that are unneeded or which may be harming the environment.** The Committee also feels that the implementation of the travel management plans needs to be user-friendly. The designation of open and closed roads and trails needs to be easily understood by the public.

(emphasis added). Through this language, Congress emphasized that it expects the Forest Service to complete a comprehensive, science-based travel analysis and identify a minimum road system, including identification of roads for decommissioning.

For the past three years, Congress has also dedicated funds necessary for completing Travel Analysis and resulting decommissioning efforts through the Legacy Roads and Trails Remediation Initiative (LRTRI). Thus far, Congress has allocated nearly $180 million to this effort. Thus, Congress has demonstrated its serious and enduring commitment to ensuring the Forest Service's successful identification and implementation of the minimum necessary road system, including prompt decommissioning of unneeded roads.

These existing Congressional funding commitments dovetail nicely with the Forest Service's

own priorities, which recognize the significant fiscal and environmental benefits that will accrue from complying with the Roads Rule. Regarding Presidential initiatives for the FY 2010 Budget, former Forest Service Chief Gail Kimbell emphasized the need to "right size" the Forest Service's transportation system. She testified to Congress that identification of unneeded roads constitutes a key priority for the agency:

> *The National Forest System has a transportation system that is not suited to its modern needs and requires realignment to "right size" the system for the future*.
> * * *
> This initiative demonstrates the Forest Service's commitment to maintaining a healthy environment by addressing critical maintenance and operational components of the Forest Service. These funds will be a cornerstone for sustaining a healthy environment, and will be focused on [among other things] *implement[ing] travel management plans with an emphasis on decommissioning unnecessary roads*. . . . These strategic investments will reduce the agency's overall maintenance and operational costs in future years, result in infrastructure that is more energy efficient, and reduce potential harm to the environment.

Statement of Abigail Kimbell, Chief, U.S. Forest Service, before the House of Representatives Committee on Appropriations, Interior, Environment, and Related Agencies Subcommittee Concerning the US Forest Service Fiscal Year 2010 Budget, May 12, 2009 (emphasis added). In addition, Secretary of Agriculture Tom Vilsack recently stressed the importance of rightsizing the transportation system in order to restore the National Forests, as well. Tom Vilsack, Secretary of Agriculture, Speech on the National Vision for America's Forests, Seattle, WA (Aug. 14, 2009), *available at* http://www.fs.fed.us/video/tidwell/vilsack.doc ("In many of our forests, restoration will also include efforts to improve or decommission roads, to replace and improve culverts, and to rehabilitate streams and wetlands.").

Similarly, in June 2008, the Western Governors' Association (WGA) underscored the importance of the identification and implementation of a minimum, sustainable road system:

> Western Governors urge Congress and the Administration to fund and implement a sustainable roads program. This program should include inventories, identification of roads still needed, upgrading roads to modern construction standards including fish passage, and decommissioning roads causing environmental damage or roads no longer needed.
> * * *
> Western Governors urge the US Forest Service (USFS) to complete an accurate prioritized inventory of federal forest system roads that is sustainable in each state taking into account the needs for fish and wildlife habitat, outdoor recreation, timber and mining and fire suppression/mitigation.

Western Governors' Association Policy Resolution 08-3, "Restoring and Maintaining a Sustainable Road System on National Forest Lands." The Western Governors Association followed up on this policy resolution in December 2009 with a letter to Secretary Vilsack, applauding the restoration vision he articulated and asking for the Forest Service to commit to a right-sizing initiative. Similar letters from the U.S. Conference of Mayors, Taxpayers for Common Sense, and dozens of national and state conservation, recreation and hunting and fishing organizations have all called for the Forest Service to restore our forest watersheds by addressing the failing road system.

Accordingly, within the past three years, a broad-based, diverse, and growing constituency has called for a right-sizing initiative. Thus, the Forest Service should proceed immediately to conduct a comprehensive Travel Analysis and minimum system identification for each of the Blue Mountains national forests, making sure to identify and set objectives and timelines for decommissioning existing routes that are no longer needed or sustainable. Even with the additional LRTRI funding provided by Congress, we recognize that conducting travel analysis, including identification of the minimum system, and prioritizing roads for decommissioning requires staff time and fieldwork. We would like to extend an offer to assist you and your staff with any aspect of this task that you deem appropriate for our involvement. We are truly interested in helping the Forest Service develop a sustainable road and trail network that minimizes harm to the environment and reflects long-term funding expectations, and we believe completing the appropriate analysis of the road system prior to development of alternatives for the Forest Plans is essential.

Comments on the Proposed Action's Treatment of Roads and Decommissioning

Rightsizing the Blue Mountains national forests' road systems would help achieve several of the major goals to be addressed in the LRMP. First, the NOI for the LRMP revision notes that the interdisciplinary planning team intends "[t]o more adequately protect and restore terrestrial plants and animal species and their habitats" by "provid[ing] ecological conditions to sustain viable populations of native and desired nonnative species and to achieve objectives for management indicator and focal species." 75 Fed. Reg. 15,403, 15,404 (Mar. 29, 2009). Second, the LRMP is meant to "more adequately protect and restore watersheds and aquatic habitats" by "restoring processes responsible for creating and maintaining aquatic and riparian habitats and restoring naturally functioning riparian ecosystems." *Id*. In particular, the Forest Service plans to "provid[e] habitat for terrestrial, aquatic, and riparian-dependent species; maintain[] water quality; provid[e] channel stability; reduc[e] erosion; moderat[e] floods; and maintain[] reliable stream flows for downstream users." *Id*. Third, the LRMP must address climate change, such that the forest plans must "maintain or increase the resilience of the national forests in the face of [climate change effects]." *Id*. As described above and in the documents attached to these scoping comments, reducing the road system and maintaining what remains to standard would help achieve each of these goals. Thus, we believe the DEIS should contain strong objectives, standards, guidelines, suitability determinations, and monitoring requirements covering the management of the transportation system in order to help achieve the overarching goals of the LRMP, like protecting terrestrial and aquatic habitat and increasing resiliency to climate change.

Given the goals laid out in the NOI and the Proposed Action's acknowledgment that roads are detrimental to many forest resources such as riparian areas, water quality, and elk habitat, *see* Proposed Action at 15-17, 21, 23, 25, 28, 37, 49, 51-54, 82, 84, we were surprised that the Proposed Action (PA) did not suggest desired future conditions that specifically call for the need to reduce and mitigate the effects of roads on these resources. For example, in the desired future condition for key watersheds, the PA says only that "[r]oads in key watersheds do not present *substantial* risk to aquatic resources." PA at 21 (emphasis added). Given that the PA admits that roads have already caused detrimental impacts to aquatic resources throughout the Blue Mountains landscape, the objective should not contain the word "substantial," and it should be focused more on efforts to actively reduce risk by removing unneeded roads and maintaining needed roads to standard.

The "Roads and Trail Access Desired Condition" indicates that "Road densities are at a level appropriate to avoid causing resource concerns." *Id*. at 54. We believe this needs to be changed to "route" densities, which includes roads, motorized trails, and user-created, not-yet-reclaimed

routes because all of these routes cause similar impacts to forest resources. In fact, several forests, like the Cibola National Forest in New Mexico, used "route densities" in evaluating their travel systems during travel planning. *See, e.g.,* Cibola National Forest, Mountainair Ranger District Travel Management Plan Environmental Assessment 19 (2010), *available at* http://www.fs.fed.us/r3/cibola/travel-management/tm_mt_air/environmental_assessment/mountainair_rd_travel_mgmt_ea_chpt2.pdf. We believe this would be a more scientifically valid standard for the revised LRMPs, and several of the studies we have attached suggest appropriate route densities for various types of management areas.

The "Roads and Trails Access Desired Condition" includes that the road systems be "affordable and efficiently managed, have minimal effect on aquatic and terrestrial systems, and are in balance with available funding." PA at 54. It also says, "Roads needed for the long term are identified and investments are made to minimize their effect on the ecosystem and to meet the mobility requirements anticipated in the future." *Id*. We certainly support these statements as a desired future condition, but we question how the Forest Service will be able to achieve these goals without first honoring its obligations under the Roads Rule, including completion of travel analysis, minimum road system identifications, and prioritizing of unneeded roads for decommissioning.[21]

We believe the Forest Service is on the right track in its "Restoring and Maintaining Watershed Conditions," at least to the extent that it identifies, among other strategies, that: "Land managers should recognize and seek to restore the processes responsible for creating and maintaining aquatic and riparian habitats, as well as the diversity of those habitats. This may include, but is not limited to . . . reducing road-related erosion and sediment delivery to streams through road closure, road obliteration, improved maintenance, and/or improved erosion control [and by] removing barriers that block or restrict access to historically occupied habitats or restrict connectivity between habitats." *Id.* at 86. We believe these are important strategies, but we reiterate that a comprehensive, landscape scale analysis of the travel system, identification of the minimum road system, and a prioritized list of unneeded roads for decommissioning should guide these efforts. These are needed in order to make the most efficient use of the Forest Service's limited resources, as well as to make sure that the agency is targeting and prioritizing key watersheds.

According to the Proposed Action, objectives "should be accomplished during the life of the plan (typically 15 years), unless otherwise indicated within the objective statement." PA at 87. At pages 89 and 90 of the PA, the agency outlines certain objectives regarding roads and their relation to protecting natural resources:

1.1 Watershed Function

[21] The Desired Condition also states that "A system of roads, trails, and areas designated for non-motorized and motor vehicle use is identified and is available for public use. Motor vehicle use that can cause ground disturbance occurs only on roads and trails and in areas designated for motor vehicle use as documented on the motor use vehicle map (MVUM)." PA at 54. We would note that *all* motor vehicle use *can* cause ground disturbance, so the phrase "that can cause ground disturbance" should be removed. Moreover, this is required by the Travel Management Rule, which requires all the national forests to be closed to cross-country use and that all motor vehicle use be limited to designated roads, trails, and areas. Finally, the words "use" and "vehicle" are inverted when describing the MVUM in the PA, and should be corrected.

- Improve watershed function by decommissioning 300 miles of roads and reconstructing or resurfacing 250 miles of road.
- Restore fish access to 700 stream miles by removing or replacing 250 culverts.

1.10 Soil Quality

- Restore soil function on 600 acres by decommissioning 300 road miles (also see objectives for 1.1 Watershed Function).

1.11 Water Quality

- Reduce sedimentation in 200 stream miles by relocating or resurfacing 250 road miles.

2.7 Roads and Trails Access

- Maintain 350 to 775 miles of summer motor vehicle trails per year to standard.
- Maintain 425 to 575 miles of winter motor vehicle trails per year to standard.
- Maintain 720 to 900 miles of summer non-motorized use trails per year to standard.
- Maintain 10 to 50 miles of winter non-motorized use trails per year to standard.
- Maintain 50 to100 miles of high clearance vehicle roads (ML 2) per year to standard.
- Maintain 125 to 250 miles of passenger vehicle roads (ML 3 to 5) per year to standard.
- Close or obliterate 10 to 30 miles of roads on each national forest per year based upon identification of the minimum necessary road network to facilitate national forest management.

While we appreciate that the Forest Service recognizes that it must decommission hundreds of miles of roads and relocate or maintain thousands more in order to reduce effects on such resources as watersheds, soils, water quality, and terrestrial habitat, the public is left to wonder how the Forest Service reached these numbers. Given that the Blue Mountains national forests are some of the most roaded national forests in the country, we believe the number of road miles listed for decommissioning and obliteration may be far too low to achieve the overarching goals of watershed health, terrestrial habitat protection, and resiliency to climate change. Similarly, we believe the Proposed Action's "Table of Annual Anticipated Accomplishments as Related to Objectives," which notes that the forests will "improve riparian habitat and water quality by eliminating, closing, or obliterating" only 10-35 miles of roads per forest per year, might underestimate how many miles of roads would need to be addressed per year to achieve the goals of the LRMPs. PA at 91. We ask that the Forest Service explain, in detail, how it reached these figures and on what analysis and maps it has relied. This analysis should be made available to the public on the Blue Mountains LRMP Revision website, and we ask the Forest to notify us of its availability.

Importantly, we believe that the Forest Service should have completed travel analyses, minimum road system identifications, and lists of unneeded roads for decommissioning prior to developing such objectives. We believe these products will probably demonstrate the Forest Service's 15-year objectives for road decommissioning and obliteration are *far below* what they should be in order to attain the goals and desired future conditions, which is another reason completion of this analysis should occur prior to development of alternatives for the DEIS. Furthermore, we would note that the "minimum necessary road network" described in Objective 2.7 has yet to be identified by any of the Blue Mountains national forests, and we ask that the forests explain when and how they intend to complete this analysis.

In general, we were disappointed by the standards and guidelines for roads management described in the Proposed Action. We hope that many more specific standards and guidelines will be analyzed in the DEIS. In particular, we believe the following changes to the proposed standards and guidelines are warranted (note new language is in bold, deleted language has a line through it):

At page 105 of the PA, S-15 should be changed to:

Key Watersheds

S-15 There shall be ~~no~~ **a** net ~~increase~~ **decrease** in the mileage of Forest Roads in ~~any~~ **all** key watershed**s** ~~unless the increase results in a reduction in road-related risk to watershed condition~~. Priority should be given to **closing and decommissioning** roads that pose the greatest relative ecological risks to riparian and aquatic ecosystems.

At pages 113-114 of the PA, we believe the road management standards and guidelines focus too heavily on new road construction and road reconstruction. While we agree that the Forest Service should do such things as "minimize or avoid disruption of natural hydrological flow paths" if it does engage in such activities (S-51), the Forest Service should be emphasizing and providing standards and guidelines that direct land managers to take every opportunity to close and obliterate unneeded roads, in accordance with the analyses completed under the Roads Rule. In addition, the following changes to the standards and guidelines should be made:

Roads Management

G-119 ~~Generally a~~ **No** new road construction in RMAs, except **to the limited extent** ~~where~~ necessary for **needed** stream crossings.

G-120 Wetlands and unstable areas ~~should~~ **shall** be avoided when reconstructing existing roads or constructing new roads and landings. ~~Minimize impacts where avoidance is not practical.~~

> [Note: Given the Forest Service's understanding of the impacts of roads on natural resources, it should not allow road construction or reconstruction where it cannot practically minimize impacts.]

S-53 ~~Where physically feasible,~~ Construction or reconstruction of stream crossings will avoid diversion of streamflow out of the channel and down the road in the event of crossing failure.

> [Note: Again, the Forest Service should not allow stream crossings if such crossings cannot avoid diversion of streamflow out of the channel.]

G-121 Construction or reconstruction of stream crossings ~~should~~ **shall** allow passage for other riparian dependent species where connectivity has been identified as an issue.

G-123 ~~Generally~~ Minimize hydrologic connectivity and sediment delivery from roads. This includes roads inside and outside of RMAs.

G-124 Road drainage ~~should~~ **shall** be routed away from potentially unstable channels, fills, and hillslopes. This applies both inside and outside of RMAs.

Recommendation

Throughout travel planning on the Umatilla and Wallowa-Whitman National Forests,[22] various conservation and quiet recreation groups repeatedly reminded the Forest Service (at the district, forest, and regional level) of the agency's regulatory obligations to complete travel analysis, identify the minimum road system, and identify roads for decommissioning, as required by the Roads Rule. 36 C.F.R. § 212.5. We believe completion of travel analysis and the minimum road system and decommissioning opportunity identifications logically should have preceded completion of the Travel Management Plans, which not only represented a broad-scale NEPA process through which to implement closures and obliteration of roads identified as unneeded, but which will also set up user expectations on the Forest for years to come.

Since none of the forests in Region 6 satisfied these obligations during travel planning, the next logical place for the Forest Service to meet its decade-old non-discretionary duty is in its Forest Plan revisions. In fact, the preamble to the Roads Rule and its accompanying EA specifically noted the science-based broad-scale analysis, minimum road system identification, and prioritized list of decommissioning opportunities should inform forest planning. In particular, these analyses should guide the development of alternatives, especially the setting of management areas, identification of suitable uses and activities, and the establishment of maintenance and decommissioning objectives, standards, and guidelines in the Forest Plan revision. ***As such, we respectfully request that the Forest Service complete travel analysis, the minimum road system identification, and identification of unneeded roads for decommissioning prior to developing alternatives or releasing the Blue Mountains LRMP DEIS. We also believe the Forest Service should make these analyses available to the public prior to or in conjunction with release of the LRMP DEIS, so that the public can best understand how the analysis guided development of alternatives.***[23]

13. 2000 Resource Planning Act (RPA): Value of Ecosystem Services and Resource Trends

We encourage the Forest Service to consider the important statistics regarding ecosystem services and natural resource trends from the year 2000 RPA. Below are a few highlights. The full report and other info are available at http://www.fs.fed.us/research/rpa/.

- About 53% of the nation's water supply originates on forest land, 26% on agricultural land, and 8% on range land.
- About 24% of the water supply in the contiguous 48 states originates on Federal land, and 18% from land managed by the Forest Service, even though the National Forest System occupies only 11% of the surface area.
- The combination of globalization, consolidation, and structural change has caused dramatic shifts in the U.S. forest sector.

[22] Since the Malheur National Forest has yet to even scope for its travel management plan, forest planning is a logical place for the Forest to meet its duties under the Roads Rule rather than waiting for the forest to finally initiate travel planning.

[23] If, for some reason, the Forest Service is not planning to meet its obligations under the Roads Rule in conjunction with the "Blue Mountains Forests Revised Land and Resource Management Plan" project, we ask the agency to explain, in detail, when it intends to satisfy these obligations and how it intends to implement these findings once both a travel management plan and forest plan are already in place.

- Imports of wood products continue to grow, primarily from Canada, resulting in less domestic timber harvest.
- Even with these changes, the U.S. will continue to be a major wood producer in the future, and that production will continue to rely on private forestlands.
- Ninety-two percent of timber harvested in the U.S. comes from private lands, while only 2% comes from national forests, and 6% from other public lands.
- While total forestland area in the U.S. has been relatively stable in the last century, a net loss of 20 million acres (2.7%) is projected between 2000 and 2050. Most of that loss will be caused by development.
- Several significant recent trends in private forest ownership are expected to continue: the decline in forest industry-owned lands, the increase in the number of non-industrial owners (11% between 1993 and 2003), the decline in average parcel size, and the overall decline in total forestland that provides commercial wood products. The effect of these changes on future domestic wood supply is uncertain.
- Tree plantations will play an increasing role in the global and U.S. wood supply. Fast-growing industrial wood plantations occupy less than 2% of forested area worldwide, but supply 25% of all industrial roundwood.
- By 2050, U.S. plantations will supply one-third of the total U.S. wood supply, but will increase in area only from 6% to 9%. Therefore, commodity production will be concentrated on a relatively small proportion of forestland, decreasing demand for wood from natural forests, and increasing the age of natural forests.

14. Inappropriate Directives

While we appreciate that this Forest Plan revision process is relying on the 2000 NFMA regulations, we believe the Blue Mountains Forest Plan Revision team has failed to fully respond to the consolidated decision in Citizens for Better Forestry v. U.S. Department of Agriculture, No. C 08-1927 CW, N.D. Cal. June 30, 2009.

On June 30, 2009, the U.S. District Court for the Northern District of California ruled as follows:

> "Accordingly, the Court vacates the 2008 Rule, enjoins the USDA from further implementing it and remands it to the USDA for further proceedings."
>
> and
>
> "The 2008 Rule is VACATED and REMANDED to the USDA for further proceedings consistent with this order."
>
> Citizens for Better Forestry v. U.S. Department of Agriculture, No. C 08-1927 CW (N.D. Cal. June 30, 2009) (emphasis in original)

As a result of this decision, forest planning has proceeded under the 2000 NMFA regulations, which allow forests to use the provisions of the 1982 planning regulations to amend or revise plans. The Blue Mountains Forest Plan Revision team has made it clear that they are, indeed, using the 1982 planning regulations in this planning process.

After the decision came down in the Citizens for Better Forestry case, the Forest Service subsequently issued guidance to the field, dated October 23, 2009 (1920-2) that purports to lay out the appropriate sections or chapter of the Forest Service Manual (FSM) or Forest Service Handbook

(FSH) are to be used for planning under the 1982 planning rule. The citations in that guidance letter, however, are to more recent versions of the FSM & FSH and are therefore inappropriate guidance for forest planning under the 1982 planning regulations.

For example, for wilderness evaluations, the correct direction corresponding to the 1982 planning rule is contained in FSH 1909.12, Chapter 7. It is not contained in FSH 1909.12 Chapter 70, which was clearly written to conform to the requirements of first the 2005, and then the 2008 Planning Rule and hence was vacated by the court.

The Forest Service issued interim directives to the Forest Service Handbook to implement the 2005 and later the 2008 Planning Rules. On the topic of wilderness evaluations, on January 31, 2007 the agency issued a final directive (in the form of an amendment) for FSH 1909.12, Chapter 70. Federal Register, Vol. 72, No. 20, pgs 4478-4481. This Federal Register notice made clear that Chapter 70, Wilderness Evaluation, was written to implement the 2005 Planning Rule[24]:

> Need for Direction: Procedural and technical details associated with implementing the 2005 planning rule are needed by NFS units to begin consistent plan amendments or revisions across all NFS units to prevent confusion and to improve public involvement and decision-making associated with developing, amending, or revising a land management plan.
>
> Federal Register, Vol. 72, No. 20, pg 4478.

The Blue Mountains Forest Plan Revision process should proceed under the 1982 regulations, using the appropriate directives. Inventory and evaluation of lands for recommendation as federally designated wilderness should occur under the proper directives. Likewise, other directives—whether from the FSM or FSH—should be drawn from the versions that were written to implement the 1982 plan regulations, not the 2005 or 2008 planning regulations.

15. Recommendations for Standards and Guidelines

- Old Forest G-59 & 60 – p.106 of the PA – that should be a "shall" not a "should"

HCPC appreciates the Forest Service's desire to condense the management area classification into fewer classes for the purpose of simplification. However, there is a delicate balance whereby too few classes will no longer represent the diversity of the landscape.

Management Area 1A

The Desired Condition for Management Area 1A states that "Ecosystems are influenced by natural processes with little or no human intervention. Geological and ecological processes, such as wildfire and insects and disease, operate relatively free from the influence of humans. Predominantly diverse, native vegetation results from natural

[24] The Forest Service re-published the 2005 rule accompanied by a draft environmental impact statement (EIS) in 2007. The final version of the EIS and rule were published in 2008. National Forest System Land Management Planning, 73 Fed. Reg. 21,468, April 21, 2008. This final version (the 2008 rule) differed in some small respects from the initial proposal (the 2005 rule). In the case of wilderness evaluation, the difference between the two rules did not require an update to Chapter 70 of the FSH Planning Handbook for it to apply to the 2008 rule.

succession and disturbance processes" (pg 68). However, the related Standards and Guidelines for MA 1A fail to support this desired condition. In fact the Standards and Guidelines listed on page 108 under subheading *Wildland Fire Management Activities* are entirely focused on wildfire suppression and mitigation from wildfire suppression within Wilderness Areas. Thus the Standards and Guidelines for MA 1A do not provide any guidance for managers to let wildfire and other disturbance processes "operate relatively freely" in Wilderness Areas, a key Desired Condition for this MA. More and more, managers are using wildfire for resource benefit use, and it is very important that the Forest Plan recognizes this direction. Furthermore, fire suppression should be limited in Wilderness Areas to where protection of historical structures, key resource areas, or proximity to settlements may be an overriding issue. If fire suppression is the only Design Criteria included in the Standards and Guidelines, forest managers will be less comfortable to let wildfires burn. In the long run, plant succession and habitat quality and quantity will be drastically impaired without natural disturbance processes operating in Wilderness Areas.

- Why is S-18 limited only to the Wenaha-Tucannon? Please extend to other Wilderness Areas.
- Please change G-69. Roads should not be opened in Wilderness.

Management Area 1C- Wilderness Study Areas

The Homestead WSA on the Wallowa-Whitman is mostly within the Hells Canyon NRA and partially in BLM. We question whether the BLM analysis was sufficient for the purposes of this Blue Mountains Forest Plan Revision Process.

Management Area 2A – Wild and Scenic Rivers

- G-78 – the phrase that says "except when necessary to meet recreation purposes" should be removed or should apply to Scenic Rivers only, definitely not Wild rivers.

Management Area 2B – Research Natural Areas

The description for MA 2B states; Research Natural Areas (RNAs) were established for "research, education, and for the maintenance of biodiversity" and to "conserve unique ecological communities and are intended to promote and protect natural diversity" (pg 71). The Desired Condition (pg 71) states that for RNA's, "ecological processes prevail." The Standards and Guidelines include some actions that should not be authorized in RNA's and includes proactive use of "planned fire." However, there is no mention of natural disturbance processes and the need to let ecological disturbance play its natural role in RNA's if biodiversity is to be maintained, and unique ecological communities are to be protected in the long-term. We understand that some RNA's contain refugia where fire may not be desired in order to protect a specific plant community, but in other RNA's, fire may be the process most critical to maintaining a natural, diverse plant community. Other disturbances such as insect epidemics and windthrow create diverse conditions that generally increase biodiversity and present interesting opportunities for research. Hutto, 1995 addresses the importance of fire:

> Fire is such an important creator of the ecological variety in Rocky Mountain landscapes that the conservation of biological diversity [required by NFMA] is likely to be accomplished only through the conservation of fire **as a process**…Efforts to meet legal mandates to maintain biodiversity should, therefore, be directed toward

maintaining processes like fire, which create the variety of vegetative cover types upon which the great variety of wildlife species depend. (Emphasis added.)

We ask the Forest Service to create a guideline that establishes that natural disturbance should be allowed to fulfill its historic ecological role in RNA's.

Management 2D- Geological Areas

Geological areas are described on page 73 as having "outstanding geological features of the earth's development…" The Desired Condition states that "Developments provide public enjoyment and interpretation opportunities with high scenic, recreational, and historic value. Access within the areas is by non-motorized trails."

HCPC strongly recommends developing Standards and Guidelines for managing these critical Geological areas. It does not make sense for botanical areas and RNA's to have such extensive Standards and Guidelines and Geological Areas to have none. Geological Areas contain resources that in a short period of time can be forever damaged or desecrated. Additionally, Geological Areas such as caves, cliffs can provide unique and important wildlife habitat such as nesting areas for birds and roosts for bats. Please adapt the following Standards and Guidelines for to fit Geological Areas.

- G-91: MA 2C
- G-92: MA 2C
- G-93: MA 2C
- G-94: MA 2C
- G-95: MA2C modified to read "Mineral exploration and development activities should not be authorized or allowed with Geological Areas."
- G-96: MA 2C
- G-97: MA 2C
- G-98: MA 2C
- G-99: MA 2C
- G-100: MA 2C

Management Area 2G – National Designated Trails

Table 31 on page 81 determines that motorized use, summer & winter, is suitable for nationally designated trails – no way! We strongly encourage this determination to be changed.

There are no Standards and Guidelines associated with Nationally Designated Trails. Decades of hard work by local community members has just resulted in the designation of the Blue Mountain Heritage Trail. Nationally Designated Trails are some of the best and most important trails in the National Forest for non-motorized users. There are also critical conservation opportunities in these areas. For example, Nationally Designated Trails could be good areas to prioritize noxious weeds control efforts. Nationally Designated Trails could be protected for solitude and natural quiet. Please consider adapting the following Standards and Guidelines for these areas.

- G-80: MA 2B
- G-88: MA 2B
- G-89: MA 2B
- G-93: MA 2C

- G-96: MA 2C
- G-99: MA 2C

Management Area 2H – Scenic Areas

Table 28 lists the Scenic Areas with the project area. Together these areas include 45,521 acres. These areas overlap critical Inventoried Roadless Areas such as the Grande Ronde IRA, the Greenhorn Mountain IRA and the Jumpoff Joe IRA. Despite overlapping these critical resource areas, Scenic Areas have no Standards and Guidelines. HCPC recommends adoption of the following Standards and Guidelines for Scenic Areas than ensure congruency with the other MA's these areas overlap and to ensure that the Scenic Areas are not degraded.

- For Scenic Areas within or overlapping IRA's, management direction for the IRA should take precedence.
- For Scenic Areas within or overlapping Wild and Scenic Rivers, management direction for the Wild and Scenic River should take precedence.
- Timber harvest roads should not be constructed within Scenic Areas.
- G-88: MA 2B
- G-91: MA 2C
- G-92: MA 2C
- G-93: MA 2C
- G-96: MA 2C
- G-99: MA 2C

Management Area 2J – Municipal Watersheds

Page 76 states that "designation of municipal watersheds recognizes the need to protect public water supplies. Municipal watersheds may be managed for multiple uses so long as management activities do not degrade water quality." Municipal watersheds, such as the Baker City municipal Watershed, and the Walla Walla River watershed overlap Inventoried Roadless Areas. The Standards and Guidelines should include direction for these overlapping MA's. We recommend adopting the following Standards and Guidelines.

- For Municipal Watersheds within or overlapping IRA's, management direction for the IRA should take precedence (see G-85).
- Water conveyance systems, such as pipelines and other supporting facilities should be managed to avoid degradation to the municipal watershed.
- G-99: MA 2C

Management Area 2k – Riparian Management Areas

- G-101: 2nd paragraph- the word "improve" should be replaced with "restore." 3rd paragraph: the phrase "or do not diminish" must be deleted.
- G-112: delete the word "Maintain"
- G-118: Please change "generally avoid" to a phrase worthy of protecting federally listed and threatened or endangered fish redds from the brutality of livestock trampling.
- G-119: Please remove "Generally" from sentence.
- G-128, 129 & S-55: Please replace with the PACFISH & INFISH standards for mineral management.

Management Area 3A – Non-motorized Undeveloped

The Desired Condition for MA 3A and MA 3B states that "Natural ecological processes and resulting landscape patterns predominate, but are also influenced by human use" (pg 79). While the Standards and Guidelines for MA 3A or 3B provide some direction for the human use part of this statement, there is no guidance for managers to let natural ecological disturbance processes occur. As noted on page 79, these areas are remote and often border existing Wilderness areas, making them practical areas for disturbance to operate unimpeded. Managers need to be able to cite to the Forest Plan for supporting future decisions that let natural disturbances operate. We suggest adding the following Standard and Guideline.

- Natural ecological processes such as wildfire and insects and disease disturbance should be allowed to operate freely whenever possible.

Ecosystem service's from these undeveloped areas such as the provisioning service of clean water and the cultural service of solitude, recreational, and spiritual, needs direct consideration. Just as other MA's produce fuel and fiber, undeveloped areas provide valuable benefits that need full recognition in order for these areas to be properly managed. Management direction should consider the impacts of any action proposed to any of benefits nature provides from unroaded areas.

- All management activities shall be designed to protect water quality and wildlife habitat.

Management Area 3B – Limited-Motorized Undeveloped

The Desired Condition states on p.79 that the "road density within watersheds is no greater than 1.5 mi./sq. mi. of open roads." That seems too high a road density and too large of a scale. These areas are roadless areas and we strongly urge you to decrease this road density desired condition. Also consider emphasizing road removal in these areas.

Management Area 4 – General Forest

General Forest areas are where most of the management occurs, making them arguably in greatest need of clear Standards and Guidelines that create accountability for properly managing these areas. General Forest (MA 4) represents the largest management class of any of the MA's and is critically important for the long-term maintenance of biological diversity (Franklin and Lindenmayer, 2009). Franklin and Lindenmayer (2009) state that "Conservation biologists and resource managers need to give major attention to the matrix (General Forest) if programs to conserve the world's biological diversity are to succeed. Prugh et al. (2008) states that "Improving matrix quality may lead to higher conservation returns than manipulating the size and configuration or remnant patches for many of the species that persist in the aftermath of habitat destruction."

- Mangers must realize that conservation of biological diversity is not primarily a set-aside issue than can be dealt with by reserving or modifying management on 10 or 20% of their landscape; rather, it is a pervasive issue that must be considered on every acre of land that they manage" (Franklin and Lindenmayer, 2009).

Management Area 5 – Developed Sites and Administrative Areas

As stated on page 80, these areas are important data collection points that assist with understanding ecosystem function and resiliency. Therefore, it is important to develop some Standards and Guidelines for this MA so that this important practice of understanding ecosystem function and resiliency can be maintained. We suggest the following Standard and Guideline.

- Management proposals should not degrade ongoing important data collection efforts that assist with understanding ecosystem function and resiliency.

This MA has potential for utility corridors. The types of energy projects proposed in Oregon are changing rapidly and the incentives given to alternative energy allow development of areas that otherwise, would not be financially possible. It is imperative that Standards and Guidelines be developed putting sideboards on these proposals and making it clear that the impacts of proposed utility projects on water quality, wildlife habitat and connectivity (corridors) between public and private lands and the impacts to native plant communities must be analyzed. Ski areas proposals such as expansion need to be fully evaluated for impacts to resources. We suggest the following.

- Utility corridor proposals shall be evaluated for impacts on water quality, wildlife habitat and connectivity (corridors) within and between public and private lands and the impacts to native plant communities.
- Newly proposed or expansions of existing ski areas shall be evaluated for impacts on water quality, wildlife habitat and connectivity (corridors) within and between public and private lands and the impacts to native plant communities.

Recommendations for additions to existing Management Areas

Geological Areas

Castle Ridge

Four miles northeast of Cove, Castle Ridge abuts the western edge of the Eagle cap Wilderness. This area contains the upper reaches of Indian Creek, Camp Creek and Warm Creek drainages. Scattered throughout the area are monadnocks, large rock outcrops, which rise above the surrounding timber stands that are a unique geological feature to this area. Please consider designating these unique and rare outcroppings as part of a Geological Area.

Management Area 2G – National Designated Trails

The Chico Trail

The historic legacy of the Chico Trail includes Native Americans, pioneers, Forest Service history, and backcountry quiet recreation. Historically, the Sled Springs Guard Station and the Chico Guard Station were connected via the Chico Trail. Chico was the winter headquarters for the Forest Service Rangers and families of the Rangers sometimes lived there together. There still exists a building where the Chico Guard Station was located, and you can still find remains of the old phone lines. From now highway 3, Chico Trail winds down incredibly scenic vistas, through open grasslands and dry Ponderosa Pine forests, before entering an old growth stand near the moist canyon bottom where flows Davis Creek. The Trail immediately climbs up to Starvation Ridge, gaining incredible views in every direction of the Wallowas and Seven Devils and north into Joseph Canyon. Please evaluate the Chico Trail for National Trail Designation.

Conclusions

Over the next decade or two, society has a narrow window of opportunity to radically redefine our relationship with the planet. The revised Blue Mountains Forest Plan will guide management across 5.5 million acres of National Forest lands during this critical time period when an urgency of greater planetary stewardship is sorely needed. Conservationists, land managers, scientists, concerned citizens, decision makers, and resource harvesters must collaborate to explore solutions to the challenges that lie ahead. Planetary stewardship requires that we be well informed so that we can understand how local actions and reactions to change could feed back to influence the trajectory of change at larger scales. These comments include an amazing depth of science and perspectives that can help the Forest Service develop a more robust understanding of the issues that so greatly concern us. There comments lay the groundwork for further collaboration as the Blue Mountains Forest Plan Revision moves forward.

Our call for increasing recommended Wilderness and Wild and Scenic Rivers, protecting old growth forests, restoring natural disturbance processes to the landscape, moving away from post-fire logging all together, recognizing soils as the foundations of productive, resilient ecosystems, making bold changes to grazing practices that will result in ecosystem-wide recovery, updating riparian protections to reflect the current knowledge-base, focusing on pressing ecological restoration projects that provide jobs while benefitting the resources, and more, are all tied to the understanding of the complex, cross-scale interactions that underpin Earth's life support systems. We must reorient our endeavors- social, economic, scientific, and cultural- as the introductory quote suggests, so that these National Forests are places we wish our grandchildren to inherit. We respectfully request that the Forest Service uses these comments to develop a stronger, long-lasting, less contentious and legally sound Blue Mountains Forest Plan.

David Mildrexler
Ecosystem Protection Coordinator
Hells Canyon Preservation Council
PO Box 2768
La Grande, OR 97850
541-963-3950 x.27
david@hellscanyon.org

Doug Heiken
Oregon Wild
PO Box 11648
Eugene OR 97440
541-344-0675
dh@oregonwild.org

Jeff Juel
Forest Policy Director
The Lands Council
25 W. Main St., Ste. 222
Spokane, Washington 99201
509-209-2401
jjuel@landscouncil.org

Asante Riverwind
Eastern Oregon Forest Organizer
Oregon Chapter Sierra Club
P.O. Box 5534
Bend, Oregon 97708
(541) 322-4065 office
(541) 306-7737 field
asante.riverwind@sierraclub.org

Brent Fenty
Executive Director
Oregon Natural Desert Association
33 NW Irving St.
Bend, OR 97701
541-330-2638
bfenty@onda.org

Jon J. Rhodes, Hydrologist
Planeto Azul Hydrology
PO Box 15286
PDX, OR 97293
www.planetoazul.com

Lori Ann Burd
Mt. Hood Campaign Manager/Staff Attorney
BARK
PO Box 12065
Portland, OR 97212
loriann@bark-out.org

Sarah Peters
Legal Liaison
Wildlands CPR
PO Box 50401
Eugene, OR 97405
541.345.0299
www.wildlandscpr.org

References

Agee, J.K. (2003) Monitoring postfire tree mortality in mixed conifer forests of Crater Lake, Oregon, USA. Natural Areas Journal, 23, 114–120.

Baker, W.L. 2009. Fire ecology in Rocky Mountain landscapes. Island Press, Oxford.

Baker, W.L., T.T. Veblen, and R.L. Sheriff. 2007. Fire, fuels and restoration of ponderosa pine-Douglas fire forests in the Rocky Mountains, USA. Journal of Biogeography 34: 251-269.

Beschta, R.L., J.J. Rhodes, J.B. Kauffman, R.E. Gresswell, G.W. Minshall, J.R. Karr, D.A. Perry, E.R. Hauer, and C.A. Frissell. 2004. Postfire management on forested public lands of the western USA. Conservation Biology 18: 957-967.

Bond, M.L., D.E. Lee, C. M. Bradley, and C.T. Hanson. 2009. Influence of Pre-Fire Tree Mortality on Fire Severity in Conifer Forests of the San Bernardino Mountains, California. The Open Forest Science Journal, 2, 41-47.

Brown, R. T., J. K. Agee, and J. F. Franklin. 2004. Forest Restoration and Fire: Principles in the Context of Place. Conservation Biology. 18: 903-912.

Campbell, J., D. Donato, D. Azuma, and B. Law. 2007. Pyrogenic carbon emission for a large wildfire in Oregon, United States. *Journal of Geophysical Research* 12: G04014, doi:10.1029/2007JG000451.

Cochran, P. H., J. M. Geist, D. L. Clemens, R. R. Clausnitzer, and D. C. Powell. 1994. Suggested Stocking Levels for Forest Stands in Northeastern Oregon and Southeastern Washington. PNW-RN-513.

Cook, C. N., M. Hockings, & R.W. Carter. 2010. Conservation in the dark? Information used to support management decisions. Front Ecol Environ. 8(4): 181-186.

Crist, M.R., T.H. DeLuca, B. Wilmer, and G.H. Aplet. 2009. Restoration of Low- Elevation Dry Forests of the Northern Rocky Mountains: A Holistic Approach. Washington, D.C.: The Wilderness Society.

Cyr, D., S. Gauthier, Y. Bergeron, and C. Carcaillet. 2009. Forest Management is driving the eastern North American boreal forest outside its natural range of variability. Frontiers in Ecology and the Environment. 7(10): 519-524.

DellaSala, D. A., A. Martin, R. Spivak, T. Schulke, B. Bird, M. Criley, C. van Daalen, J. Kreilick, R. Brown, and G. Aplet. 2003. A citizen's call for ecological forest restoration: Forest restoration principles and criteria. Ecological Restoration. 21: 14-23.

Franklin, J.F. & D. B. Lindenmayer. 2009. Importance of matrix habitats in maintaining biological diversity. Proceedings of the National Academy of Science. 106, 349-350.

Gelbard, J.L., and S. Harris. 2005. Invasibility of roadless grasslands: an experimental study of yellow starthistle. *Ecological Applications* 15(5):1570-1580.

Hanson C. 2010. The Myth of "Catastrophic" Wildfire. A New Ecological Paradigm of Forest Health. Report available at

http://www.johnmuirproject.org/documents/Hanson%20White%20Paper%2029Jan10%20Final.pdf.

Hanson, C.T., and M.P. North. 2008. Postfire woodpecker foraging in salvage-logged and unlogged forests of the Sierra Nevada. The Condor 110: 777-782.

Hessburg, P.F., R.B. Salter, and K.M. James. 2007. Re-examining fire severity relations in pre-management era mixed-conifer forests: inferences from landscape patterns of forest structure. Landscape Ecology 22: 5-24.

Heyerdahl, E. K., L. B. Brubaker, and J. K. Agee. 2001. Spatial Controls of Historical Fire Regimes: A Multiscale Example from the Interior West, USA. Ecology. 82: 660-678.

Heyerdahl, E. K., P. Morgan, J. P. Riser II. 2008. MULTI-SEASON CLIMATE SYNCHRONIZED HISTORICAL FIRES IN DRY FORESTS (1650–1900), NORTHERN ROCKIES, USA. Ecology, 89(3), 705-716.

Holling, C.S. and G. K. Meffe. 1996. Command and Control and the Pathology of Natural Resource Management. Conservation Biology 10, no. 2, 328-337.

Hudiburg, T., B. Law, D.P. Turner, J. Campbell, D. Donato, and M. Duane. 2009. Carbon dynamics of Oregon and northern California forests and potential land-based carbon storage. *Ecological Applications* 19(1): 163-180.

Hutto, R.L. 1995. The composition of bird communities following stand-replacement fires in northern Rocky Mountain (U.S.A.) conifer forests. Conservation Biology 9:1041-1058.

Hutto, R.L. 2006. Toward meaningful snag-management guidelines for postfire salvage logging in North American conifer forests. Conservation Biology 20: 984-993.

Hutto, R. L., and S. M. Gallo. 2006. The effects of postfire salvage logging on cavity-nesting birds. Condor 108:817–831.

Hutto, R. L. 2008. The Ecological Importance of Severe Wildfires: Some Like it Hot. Ecological Applications, 18(8); 1827-1834.

IPCC, Climate Change 2007: The Physical Science Basis. Contribution of Working Group 1 to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, S. Solomon et al., Eds. (Cambridge Univ. Press, Cambridge, UK, and New York, NY, 2007).

Karr, J.R. 2009. Natural: a benchmark, not a bias. Northwest Science 83(3):294-297.

Karr, J.R., and E.W. Chu. 1995. Ecological integrity: reclaiming lost connections. Pp. 34-48 in L. Westra and J. Lemons (eds.), *Perspectives on ecological integrity*. Dordrecht, The Netherlands: Kluwer Academic Publishers.

Karr, J.R., J.J. Rhodes, G.W. Minshall, F.R. Hauer, R.L. Beschta, C.A. Frissell, and D.A. Perry. 2004. Postfire salvage logging's effects on aquatic ecosystems in the American West. BioScience 54: 1029-1033.

Kauffman, J.B., R.L. Beschta, N. Otting, and D. Lytjen. 1997. An ecological perspective of riparian and stream restoration in the western United States. Fisheries 22:12-24.

Keeling, E.G., A. Sala, T.H. DeLuca. 2006. Effects of fire exclusion on forest structure and composition in unlogged ponderosa pine/Douglas-fir forests. Forest Ecology and Management, 237, pp. 418-428.

Keith, H., B.G. Mackey, and D. B. Lindenmayer. 2009. Re-evaluation of forest biomass Carbon stocks and lessons from the world's most carbon dense forests. *Proceedings of the National Academy of Sciences* 106 (28):11635-11640.

Klenner, W., R. Walton, A. Arsenault, and L. Kremsater. 2009. Dry forests in the southern interior of British Columbia: historic disturbances and implications for restoration and management. Forest Ecology and Management 256: 1711-1722.

Lindenmayer, D.B. J.F. Franklin, & J. Fischer. 2006. General management principles and a checklist of strategies to guide forest biodiversity conservation. Biological Conservation, 131, 433-445.

Littell, J.S., D. McKenzie, D.L. Peterson, A.L. Westerling. 2009. Climate and wildfire area burned in western U.S. ecoprovinces, 1916-2003. Ecological Applications. 19(4), 1003-1021.

Luyssaert, S., E. Detlef Schulz, A. Borner, A. Kohl, D. Hessenmoller, B.E. Law, et al. 2008. Old-growth forests as global carbon sinks. *Nature* 455:213-215.

MA (Millennium Ecosystem Assessment). 2005. Ecosystems and human well-being. Synthesis. Washington, DC: Island Press.

Mansfield, H. 2000. The Same Ax, Twice. Restoration and Renewal in a Throwaway Age. University Press of New England, Hanover, NH 03755.

McIver J. & L. Starr. 2001. Restoration of degraded lands in the interior Columbia River basin: passive vs. active approaches. Forest Ecology and Management. Vol 153: 15-28.

Meigs, G.W., D.C. Donato, J.L. Campbell, J.G. Martin, and B.E. Law. 2009. Forest fire impacts on carbon uptake, storage, and emission: the role of burn severity in the Eastern Oregon Cascades. Ecosystems 12:1246-1267.

Mildrexler, D. J., Zhao, M., Heinsch, F. A., & Running, S.W. 2007. A new satellite-based methodology for continental scale disturbance detection. Ecological Applications, 17, 235–250.

Mildrexler, D. J., Zhao, M., & Running, S.W. 2009. Testing a MODIS Global Distrubance Index across North America. Remote Sensing of Environment, 113, 2103-2117.

Millar, C. I., N. L. Stephenson, and S. L. Stephens. 2007. Climate Change and Forests of the Future: Managing in the Face of Uncertainty. Ecological Applications. 17:2145-2151.

Mitchell, S.R., M.E. Harmon, and K.E.B. O'Connell. 2009. Forest fuel reduction alters fire severity and long-term carbon storage in three Pacific Northwest ecosystems. *Ecological Applications* 19:643-655.

Morgan, P., E. K. Heyerdahl & C. E. Gibson. 2008. MULTI-SEASON CLIMATE SYNCHRONIZED FOREST FIRES THROUGHOUT THE 20TH CENTURY, NORTHERN ROCKIES, USA. Ecology, 89(3), 717-728.

Muller J, Bubler H, Gobner M, RettelbachT, & P. Duelli. 2008. The European spruce bark beetle *Ips typographus* in a national park: from pest to keystone species. Biodivers Conserv. 17: 2979-3001.

Naficy, C., and A. Sala. 2007. Logging exacerbates the effects of fire exclusion on stand density in ponderosa pine forests of the Northern Rockies over the long term. Annual Meetings of the Ecological Society of America, San Jose, CA.

Noss, R.F., J.F. Franklin, W.L. Baker, T. Schoennagel, and P.B. Moyle. 2006. Managing fire-prone forests in the western United States. Frontiers in Ecology and Environment 4: 481-487.

Pierce, J.L., G.A. Meyer, and A.J.T. Jull. 2004. Fire-induced erosion and millennial-scale climate change in northern ponderosa pine forests. Nature 432: 87-90.

Pimentel, D., L. Westra, and R.F. Noss (eds.). 2000. *Ecological integrity: integrating environment, conservation, and health.* Washington D.C.: Island Press.

Potter, C., Tan, P., Steinback, M., Klooster, S., Kumar, V., Myneni, R., et al. (2003). Major disturbance events in terrestrial ecosystems detected using global satellite data sets. Global Change Biology, 9, 1005–1021.

Noss, Reed F. 2001. Biocentric Ecological Sustainability: A Citizen's Guide. Louisville, CO: Biodiversity Legal Foundation. 12pp.

Noss, R.F., and A.Y. Cooperrider. 1994. *Saving nature's legacy*. Washington, D.C.:Island Press.

Rainville R, R. White, J Barbour. 2008. Assessment of timber availability from forest restoration within the Blue Mountains of Oregon. Gen. Tech. Rep. PNW-GTR-752. Portland, OR: USDA, Forest Service, Pacific Northwest Research Station. 65 p.

Rhodes, J.J. 2007. The watershed impacts of Forest Treatments To Reduce Fuels and Modify Fire Behavior. Commissioned by Pacific River Council, 94 pp.

Rhodes, J. J., W. L. Baker. 2008. Fire Probability, Fuel Treatment Effectiveness and Ecological Tradeoffs in Western U.S. Public Forests. The Open Forest Science Journal. 1: 1-7.

Romme, W. H., J. Clement, J. Hicke, D. Kulakowski, L. H. MacDonald, T. Schoennagel, and T. T. Veblen. 2006. Recent forest insect outbreaks and fire risk in Colorado forests: a brief synthesis of relevant research. *Colorado Forest Restoration Institute*, Fort Collins, CO. 24 pages.

Sanderson E.W., Jaiteh M., Levy M.A., Redford K.H., Wannebo A.V., and G. Woomer. 2002. The Human Footprint and the Last of the Wild. BioScience Vol. 52. No. 10.

Schoennagel, T., T.T. Veblen, D. Kulakowski, and A.S Holz. 2007. Multidecadal Climate Variability And Climate Change Interactions Affect Subalpine Fire Occurrence, Western Colorado (USA). *Ecology* 88: 2891–2902.

Sherriff, R.L., and T.T. Veblen. 2006. Ecological effects of changes in fire regimes in *Pinus ponderosa* ecosystems in the Colorado Front Range. Journal of Vegetation Science 17: 705-718.

Sherriff, R.L., and T.T. Veblen. 2007. A spatially-explicit reconstruction of historical fire occurrence in the Ponderosa pine zone of the Colorado Front Range. Ecosystems 10: 313-323.

Smithwick, E.A.H., M.E. Harmon, and J.B. Domingo. 2002. Changing temporal patterns of forest carbon stores and net ecosystem carbon balance: the stand to landscape transformation. *Landscape Ecology* 22:77-94.

Strittholt, J.R., and D.A. DellaSala. 2001. Importance of roadless areas in biodiversity conservation in forested ecosystems: a case study – Klamath-Siskiyou ecoregion, U.S.A. *Conservation Biology* Vol. 15(6):1742-1754.

Swanson, M.E., J.F. Franklin, R.L. Beschta, C.M. Crisafulli, D.A. DellaSala, R.L. Hutto, D.B. Lindenmayer, and F.J. Swanson. 2010. The forgotten stage of forest succession: early-successional ecosystems on forest sites. Frontiers in Ecology and Environment doi: 10.1890/090157.

United Nations Environmental Programme (UNEP). 2002: Report of the Sixth Meeting of the Conference of the Parties to the Convention on Biological Diversity (UNEP/CBD/COP/6/20). Decision VI/26, UNEP.

Veblen, T. T. and Hadley, K. S. R., M.S. Reid. 1991. Disturbance and stand development of a Colorado subalpine forest. *Journal of Biogeography* 18: 707-716.

Veblen, T.T., T. Kitzberger, and J. Donnegan. 2000. Climatic and human influences on fire regimes in ponderosa pine forests in the Colorado Front Range. *Ecological Applications* 10:1178-1195.

Vitousek, P., C. D'Antonia, L.L. Loope, & R. Westbrooks. 1996. Biological Invasions as Global Environmental Change. American Scientist, Vol. 84.

Wales, B. C., Suring, L. H., and M. A. Hemstrom. 2007. Modeling potential outcomes of fire and fuel management scenarios on the structure of forested habitats in northeast Oregon, USA. Landscape and Urban Planning. 80:223-236.

Waring, R. H., T. Savage, K. Cromack, Jr., and C. Rose. 1992. Thinning and nitrogen fertilization in a grand fir stand infested with western spruce budworm. Part IV. An ecosystem management perspective. *Forest Science* 38:275-286.

Westerling, A.L., H.D. Hidalgo, D.R. Cayan, and T.W. Swetnam. 2006. Warming and earlier spring increase Western U.S. forest wildfire activity. *Science* 313:940-943.

Whitlock, C., J. Marlon, C. Briles, A. Brunelle, C. Long, and P. Bartlein. 2008. Long-term relations among fire, fuel, and climate in the north-western US based on lake-sediment studies. International Journal of Wildland Fire 17: 72-83.

Zhou, G., Liu, S, Li, Z., Zhang, D., Tang, X., Zhou, C., Yan, J., & J. Mo. 2006. Old-Growth Forests Can Accumulate Carbon in Soils. Science, 314, pg 1417.

Oregon Chapter Sierra Club,
Hells Canyon Preservation Council, et al.
Scoping Comments on the Blue Mountains Forest Plan Revision
for the Land Resource Management Plan proposed action.

Science and Legal Exhibits
May 26, 2010

Exhibit I:
Applicable science pertaining to forest plant association groups, mixed severity fire patterns, forest ecological complexity, and natural disturbance cycles; research pertaining to the area's many diverse species of concern, indicator species, and listed species; research pertaining to forest and forest soil carbon sequestration and climate change; legal rulings pertinent to the proposed project; articles addressing scientific, ecological, and legal issues; and a power point presentation addressing forest ecological resilience and the actual impacts of the area's many harmful logging-thinning projects.

Exhibit I-A: A compilation of applicable scientific research, reports, judicial caselaw, and conservation issues:

I. Volume I. Fire Thinning Science *Contents*:

1. Effects of Fire and Post-fire Salvage Logging on Avian Communities in Conifer-dominated Forests of the Western United States (Kotliar, 2002)
2. Fire on the Mountain: Birds and Burns in the Rocky Mountains (Kotliar, 2005).
    1. The collective influence of fire and human activities on the landscape influences avian community structure and dynamics.
3. The Myth of Catastrophic Wildfire (Hansen, 2010)
4. The Effects of Postfire Salvage Logging on Cavity-Nesting Birds (Hutto & Gallo, 2006).
5. Appeal from the United States District Court: Appeal the district court's denial of preliminary injunction to halt the implementation of several United States Forest Service post-fire logging sales in the Umatilla National Forest.
6. Fire, Fuels and restoration of ponderosa pine-Douglas fir forests in the Rocky Mountains, USA (Baker et al, 2005).
    1. *A restoration model based on low-severity fire modeling, focusing on thinning and prescribed burning to restore historical forest structure.*
7. Be careful what you wish for: the legacy of Smokey Bear (Donovan & Brown, 2007).
    1. *An alternate approach to wildfire management.*

8. Postfire management on forested public lands on the western United States (Beschta et al, 2004).
9. Overstory and understory development in thinned and under-planted Oregon Coast Range Douglas fir stands. (Chan, et al, 2006).
10. Postfire logging hinders regeneration and increases fire risk (Donato, et al, 2006)
11. Postfire impacts on forests and wildlife (Hutto, 2005)
12. Executive Summary: Interim protection for late successional forests, fisheries and watersheds (1993).
13. Study: Reforestation rich after fires: looking at the aftermath of wildfires in the forests of southwestern Oregon and Northern California (Barnard, 2007).
14. Fire regime considerations: Key issues in fire regime research for fuels management and ecological restoration (Veblen, 2003).
15. Forest Dreams, forest nightmares: An ecological and economic look at the Blue Mountains and the changes that have taken place since settlement (Langdon, 1995).
16. Logging makes forests more flammable, (Lindenmayer et al, 2010).
17. Preemptive and salvage harvesting of New England forests: When doing nothing is a viable alternative, (Foster & Orwig, 2006).
18. Changes in downed woody material and forest structures after prescribed fire in ponderosa pine forests, analyze changes in downed woody material and forest structure (trees and snags) measured within one year after prescribed fire treatments completed in Arizona and New Mexico in order to see effects on wildlife populations and their habitat (Saab).
19. Toward meaningful snag-management guidelines for postfire salvage logging in North American conifer forests. Effects of postfire logging on black-backed woodpecker and cavity nesting birds (Hutto, 2006).
20. Birds in the black: *Through following avian wildlife, a UM scientist has discovered that burned forests play a critical role in the health and diversity of the Western landscape* (Jamison, 2005).
21. Research Article: A landscape model quantifies error in reconstructing fire history from scars. *Errors in reconstruction may lead to a misunderstanding of the role of fire or*

incorrect restoration prescriptions. Here, a stochastic landscape model is used to quantitatively assess the accuracy of a commonly used statistic (2005).

22. Logging to control insects: The science and myths behind managing forest insect "pests". (Black, the Xerces Society for Invertebrate Conservation, Portland, Oregon, 2005).
23. Neo-tropical migrant and native birds: The impacts of timber logging on neo-tropical migrant and native birds.
24. Fire severity in conifer forests of the Sierra Nevada, California (Odion & Hanson, 2006).
    1. *A study of both spatial and temporal patterns of contemporary fires in the Sierra Nevada Mountains, California and how they are linked to species diversity.*
25. Fire ecology of Ponderosa Pine and the rebuilding of fire-resilient Ponderosa Pine Ecosystems (Fitzgerald, 2005).
26. Research Proposal: Post fire management of snag forest habitat in the Sierra Nevada, (Hanson, 2006).
    1. *Investigation of the association of three woodpecker species with four habitat strata following fire in the Sierra Nevada, assessment whether one species in particular, the Black-backed Woodpecker, may generally be restricted to forest recently burned at high severity ("snag forest habitat"). Also investigates the factors that best explain post-fire conifer mortality, and thus the creation of snag forest habitat, as well as the extent of natural conifer regeneration in snag forest patches that are left unmanaged following severe fire.*
27. Scorched forests best left alone, study finds. Biscuit salvage – Logging after the fire killed seedlings and added tinder, research by an OSU-led team says. (Milstein, 2006, Oregonian).
28. Six European Studies on Forest Soils and the Impacts of "Light-on-the-Land" Machinery.
29. Summary Report – Winter habitat use by Spotted Owls on BLM within the boundaries of the Timbered Rock fire (Andrews & Anthony, OCFWRU, DFW, OSU, 2004).
30. Short-term effects of wildfires on spotted owl survival, site fidelity, mate fidelity, and reproductive success (Bond et al, 2002).

31. Associations between forest fire and Mexican Spotted Owls, (Jennes et al, 2004).
32. Stress (Waring, OSU, 2004)
    1. *A brief analysis of the kinds of tolerance and avoidance mechanisms that trees evolved to withstand specific stresses.*
33. Studies to find danger to forests in thinning without burning (Robbins, New York Times, 2006).
    1. *Missoula, Montana – Thinning forests without also burning accumulated brush and deadwood may increase forest fire damage rather than reduce it, researchers at the Forest Service reported in two recent studies.*
34. Thinning and nitrogen fertilization in a Grand Fir stand infested with Western Spruce Budworm. Part IV: An ecosystem management perspective (Waring, 1992).
    1. *Allowing pine forests to be replaced with fir through fire protection and selective logging has increased the nitrogen demand beyond that readily supplied in the ponderosa pine/true fir type. Fertilizing with one application of nitrogen at the time of an insect outbreak may reduce mortality and associated fire hazard through a period of up to 5 years.*
35. United States Court of Appeals – Oregon Natural Resources vs. Timber Products.
36. Assessment of site index and forest growth capacity across the Pacific and Inland Northwest U.S.A. with a MODIS satellite-derived vegetation index (Waring et al, 2006).
    1. *Foresters, scientists, and policy makers would benefit if region-wide maps of potential forest productivity were available at decadal intervals to record changes, seek causes, and plan for the future.*
37. The watershed impacts of forest treatments to reduce fuels and modify fire behavior (Rhodes, 2007). (Pacific Rivers Council)

    This report examines the effects on watersheds and aquatic resources from forest fuel reduction treatments aimed at modifying wildland fire behavior on public lands.

Exhibit I-B: **Vol. II. Fire & Forest Science *Contents*:**

- Juvenile Salmonid Populations in a Temperate River System Track Synoptic Trends in Climate, E. Clews, 2010
- Livestock Exclusion and Belowground Ecosystem Responses in Riparian Meadows of Eastern Oregon, J. B. Kauffman et al 2004
- Wildfire Charcoal and Soil Processes, Thomas H. DeLuca et al
- Contributions of Pinus Ponderosa Charcoal to Soil Chemical and Physical Properties, Christopher M. Briggs in Briggs, Breiner, Graham, 9 May 2005.
- Chemical composition of forest floor and consequences for nutrient availability after wildfire and harvesting in the boreal forest, E. Thiffault[1] , K. D. Hannam[2], S. A. Quideau[2], D. Paré[1], N. Bélanger[3], S.-W. Oh[4] and A. D. Munson[5] , March 2008.
- Nitrogen mineralization and phenol accumulation along a fire chronosequence in northern Sweden, Zhanna Yermakov[1, 2] and David E. Rothstein[1], May 2006.
- Changes in understory composition following catastrophic windthrow and salvage logging in a subalpine forest ecosystem, Cristina M. Rumbaitis del Rio, 2006
- Contributions of Pinus Ponderosa Charcoal to Soil Chemical and Physical Properties, Christopher Briggs, 2005.
- Biochar: A Soil Amendment that Combats Global Warming and Improves Agricultural Sustainability and Environmental Impacts, recent report compilation of scientific research.
- Communication on BioChar and its implications for forest and societal management, and role in ongoing climatic change.
- Biogeochemical Consequences of Wind and Salvage Logging Disturbances in a Spruce-Fir Forest Ecosystem, C.M. Rumbaitis-del Rio and C.A. Wessman.
- Temperature sensitivity of soil carbon fractions in boreal forest soil, K. Karhu et al, 2010.
- And Several Additional New Studies also….

Exhibit I-C: **Volume III. Neotropical Migrant & Native Birds research.**

Exhibit I-D**: Vol. IV. Sierra Club Presentations and Articles Concerning Oregon's Eastside Forests,** ***Contents:***

- "Forests, Fires, Resilience & Restoration" Sierra Club Presentation.

- "Ecology, Resilience, & Restoration in Oregon's Eastside Forests" Sierra Club Presentation.
- Climate Change, Forest Ecology and Carbon Sequestration, A. Riverwind 4-10
- Restoring Forest Wildlands, A. Riverwind 3-09

.Exhibit I-E: **Vol. V. Forest Ecological Science and Legal.** ***Contents:***

- Obama Order on Scientific Integrity (also within the text of the appeal);
- Avifaunal Response to Fire…, N. Kotliar et al, 2007;
- Oregon Biodiversity in a Changing Climate, J. Lawler et al, 2008;
- Forests and Carbon, Nunnery and Keeton 2009;
- Public land, timber harvests, and climate mitigation: quantifying carbon sequestration potential on US public timberlands, Depro et al, 2007;
- Testimony before the House Subcommittee on National Parks, Forests, and Public Lands… M. Harmon PhD, March 3, 2009;
- Forest fuel reduction alters fire severity and long term carbon storage in three Pacific Northwest ecosystems. S. Mitchell, M. Harmon, K. O'Connell;
- 50 Year Trend in June Temperature, 1951-2006, E. OR, E. CA, ID, S.W. MT, NV, UT, W. WY;
- Olympic Forest Coalition vs. USFS, Case #CO7-5344 RBL, 5-09-08;
- Impacts of timber harvesting on organic matter…, M.F. Jurgensen, 1996;
- Citizens for Better Forestry et al vs. USDA et al, Case # C 08-1927 CW, 6-30-09;
- Surveying the NEPA and the Emerging Issues of Climate Change,…, J. Mendelson III;
- Court Rulings on Climate Change…;
- Fire Ecology in Rocky Mountain Landscapes, W. Baker 2009;
- Historical and Anticipated Changes in Forest Ecosystems of the Inland West of the US, W. Covington et al, 1994;
- Aspen Regeneration in the Blue Mountains of NE Oregon, D. Shirley & V. Erickson, 2001;
- Mountain Pine Beetle Issues in the Western US, G. Wuerthner, 2009;
- Implementation of National Fire Plan Treatments Near the Wildland Urban Interface in the Western US, T. Schoennagel et al, 2009;
- Beetle Infested Forests Are Not "Destroyed", M. Rocca & W. Romme, 2009;
- Changes in Native and Non-Native Fish Assembleges and Habitat Following Wildfire (MT), C. Sestrich, 2005;
- The European Spruce Bark Beetle – From Pest to Keystone Species, J. Muller et al, 2007;
- Bark Beetle Outbreaks and Regeneration, M. Jonasova & K. Prach, 2004;

Exhibit I-F: **Vol. VI. Forest & Insects Science.** ***Contents:***

- Assessing Forest Disturbance (Goetz et al 2010);
- Bark beetles, fire and salvage logging in the greater Yellowstone ecosystem (Turner et al 2008);

- Bark beetles fuel and fires and implications for forest management in the Intermountain West (Jenkins et al 2008);
- Beetle Mania (Wuerthner 2009);
- Spruce Beetle Outbreaks (Berg et al 2006);
- The dynamics of bark beetle eruptions (Raffa et al 2008);
- Delayed conifer mortality after fuel reduction treatments (Youngblood et al 2009);
- Ecosystems; concepts, analyses, and practical implications in IPM (Schowalter 2007);
- Persistence of Quaking Aspen (Kulakowski et al 2004);
- Wildfire's role in creating dead trees and healthy forests (Wuerthner 2009);
- Fire history of white and lutz spruce forests in the Kenai Peninsula (Berg et al 2006);
- Mountain Pine Beetle Infestation in relation to lodgepole pine diameter (USFS Intermountain Forest & Range Experiment Station, Ogden Utah, 1969)

And additional scientific research studies as noted in applicable portions on the comments on the Blue Mountains Forest Plan Revision proposed action.