COMMENTS ON DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR BISCUIT RECOVERY PROJECT

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SUMMARY

I offer these comments on preferred alternative (#7) in the Biscuit Fire Recovery Project DEIS (October, 2003) and with a specific focus on activities in Late Successional Reserves (LSRs). Alternative 7 provides for salvage logging of 29,338 acres of which approximately 2/3 are located within Late Successional Reserves (LSRs) and approximately 2/3 of which belong to Plant Association Groups (PAGs) that are characterized by mixed-severity or stand-replacement (III, IV and V) fire regimes. A stated rationale for post-fire treatments is accelerating restoration of late-successional forest conditions.

The LSR network was designed to accommodate large, intense natural disturbances and allow for natural recovery processes. This is one reason that the FEMAT report and PNW Forest Plan provide for conservative direction with regards to salvage in LSRs and direct that activities should enhance or at least not interfere with natural recovery processes. Chapter and verse are cited in the text of these comments.

Salvage logging of large snags and down boles does not contribute to recovery of late-successional forest habitat; in fact, the only activity more antithetical to the recovery process would be removal of surviving green trees from burned sites. Large snags and logs of decay resistent species, such as Douglas-fir and cedars, are critical as early and late successional wildlife habitat as well as for sustaining key ecological processes associated with nutrient, hydrologic, and energy cycles.

Stand-replacement fires provide large pulses of coarse woody debris (CWD) (snags and logs), which lifeboat dependent species and processes until the regenerating forest begins to produce large dead wood structures, which is typically not for a century. Since this pulse provides all of the large CWD that is going to be available to the ecosystem for the next 100 to 150 years, it is not appropriate to use the levels of CWD found in mature and old stands of a particular PAG as a guide to levels of CWD that should be retained after salvage. Effectively none of the large snags and logs of decay-resistent species can be judged as being in excess of those needed for natural recovery to late-successional forest conditions and, hence, appropriate for salvage on land allocations where ecological objectives are primary, such as LSRs. Retention of large snags and logs are specifically relevant to Northern Spotted Owl since these structures provide the habitat that sustain most of the owl's forest-based prey species.

If large fuels are viewed as a critical fire control issue, this could be dealt by creating appropriate Fuel Management Zones or snag-free corridors. In summary, general salvage of large snags and logs is absolutely antithetical to rapid recovery of late-successional forest habitat.

Extensive reforestation by planting is proposed within the LSRs. Slow re-establishment of forest cover is common following natural stand-replacement disturbances in the Pacific Northwest, however. This circumstance provides valuable habitat for early-successional species, particularly animals that require snags and logs and diverse plant resources, and for many ecosystem processes. Fifty years for natural re-establishment of forest cover is not a particularly long period; many 19th and early 20th century burns are still not fully reforested. In fact, naturally disturbed habitat that is undergoing slow natural reforestation—without salvage or planting—is the rarest of the forest habitat conditions in the Pacific Northwest. Yet, it is increasingly evident from research, such as at Mount St. Helens, that such large, slowly reforesting disturbed areas are important hotspots of regional biodiversity.

Planting may be appropriate within the LSRs to establish tree seed sources for specific species and locations but this should not be done using traditional approaches, which are designed to create uniformly stocked forest stands over large areas, even at low densities. Planting should be done in irregular patterns and variable densities to duplicate the spatial heterogeneity that is characteristic of natural regeneration. Establishment of dense uniform stands is inappropriate, else why would we be engaged in major programs of variable density thinning in existing plantations in LSRs throughout the Pacific Northwest! Of course, establishment of dense, uniform plantations on sites characterized by Fire Regimes I and II is inappropriate, since it would simply recreate the potential for the next uncharacteristic stand replacement fire.

The DEIS does not appear to include some current and extremely relevant information regarding habitat preferences of the Northern Spotted Owl (NSO). Alan B. Franklin et al. (2000) have found that in northwestern California the highest habitat fitness for NSO is found in landscapes that are a mixture of mature & old forest and of open vegetation types, such as brushfields and young forest, not in landscapes dominated by old forests. The fact that an early successional species--the dusky-footed woodrat—is the primary prey for NSO in this region may be the reason that owls prefer a mixed landscape. In any case, the fact that habitat fitness for the owl is actually favored by a landscape mosaic should be factored into decisions regarding establishment of conifer plantations, both within and outside of LSRs.

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INTRODUCTION

I have reviewed the Biscuit Fire Recovery Project DEIS dated October 2003. I offer the following comments based on my experience as a forester, scientist, and educator involved in the study and management of forest ecosystems in the Pacific Northwest.

My comments are focused primarily on activities proposed for the Late Successional Reserves (LSRs), a land use allocation with which I am very familiar having been part of the team that designed the system (Forest Ecosystem Management Assessment Team 1993). *Approximately 68% of the proposed salvage logging in the preferred alternative (#7) is located within Late Successional Reserves—roughly 20,000 out of 29,000 acres*. In part, the logging is justified in the DEIS by the need to rapidly re-establish late-successional forest conditions and Northern Spotted Owl habitat with the LSRs. I have given the scientific rationale for extensive logging in the LSRs careful examination given the important role of LSRs in regional conservation programs.

I utilized a database showing the acreage of various Plant Association Groups (PAGs) within the total area (29,338 acres) proposed for salvage and as well as within the portions of LSRs proposed for salvage (20,070 acres) under alternative #7. The fire regime characteristic of each PAG (I through V) is provided in the DEIS; I used this to assess the extent of salvage area that was actually on stand-replacement or mixed severity habitats. This data base was provided by The Wilderness Society's Center for Landscape Analysis in Seattle, WA.

LATE SUCCESSIONAL RESERVES

A brief review of the conceptual basis for the Late Successional Reserve (LSR) system is appropriate before commenting specifically upon activities proposed for LSRs impacted by the Biscuit Fire. LSRs were established to provide for old-growth ecosystems and related natural processes and constituent species, of which the Northern Spotted Owl is one. The LSR system was designed as a well-distributed geographic network using occurrences of high-quality late-successional forest as a primary criterion for locating boundaries of specific LSRs.

The team that designed the LSR system was certain that large stand-replacing disturbances would impact LSRs and, therefore, that the LSR network needed to be able to accommodate such disturbances. The team had had numerous experiences with such disturbances, including the 1980 Mount St. Helens eruption and the 1988 Yellowstone Fires. Hence, the team built sufficient redundancy into the LSR system so that it could accommodate large disturbances and still remain viable as a regional network. This redundancy also allowed for natural recovery processes within impacted LSRs. Building reserve systems that will accommodate natural disturbance regimes is, of course, a first principle in conservation biology (Lindenmayer and Franklin 2003).

Creating a resilient LSR network ultimately involved a higher density and greater total acreage of LSRs than a reserve system that simply accommodated current habitat needs. This point can be illustrated by comparing the LSR system with the Habitat Conservation Area (HCA) system proposed (and judged to be adequate) for Northern Spotted Owl (NSO) (Thomas et al. 1990). The HCA system was the reserve element in the NSO Recovery Plan (USDI Fish and Wildlife Service 1992) and in Option 7 in FEMAT (1993), while the LSR system was the basis for the reserve system in Option 9 and, eventually, the Northwest Forest Plan. The HCA system would have established approximately 5.5 million acres of reserves in addition to areas already reserved from timber harvest by Congress and the management agencies. The LSR network incorporated 7.4 million acres (in addition to already reserved lands) with an additional estimated contribution of 2.6 million acres of Riparian Reserves. Besides being much larger, the LSR network incorporated the best of the remaining late-successional forests. In contrast, the HCA network was designed to provide for a specific number of NSO pairs and did not attempt to incorporate the best remaining old-growth forests.

The adoption of the LSR network as the basis for the NWFP resulted in a network of reserves that provided for much larger numbers of NSO than

the proposed HCA network (Noon and McKelvey 1996). The superiority of the LSR system was due to several factors including their geographic focus on high-quality old-growth forests, a greater total reserved acreage, and creation of some very large reserves. The potential importance of this last point was illustrated by NSO population modeling: the LSR system included some reserves capable of supporting local populations of 40 to >170 pairs of NSO, whereas the HCAs were designed to provide for only 20 pairs, an estimated minimum number to achieve NSO population stability.

The point of the preceding two paragraphs is to document the basis for my assertion that the LSR system was designed with the capacity to be resilient, i.e. to accommodate significant loss and continue to function as an effective reserve system for old-growth related species. To say it another way, the LSR system was overbuilt in terms of immediate habitat needs.

The expectation of the FEMAT planners was that natural recovery processes could and should be accommodated following major disturbances to LSRs, given the resilient design of the LSR network. Hence, guidelines for salvage included such statements as:

> ***" Management objectives*** **[following natural disturbances in Late Successional Reserves]** ***should focus on either simulating natural succession or allowing it to occur unimpeded."*** **(FEMAT 1993, p. IV-36)**

and

> ***"Because there is much to learn about the development of species associated with these*** **[old-growth]** ***forests and their habitat, it seems prudent to only allow removal of conservative quantities of salvage material from Late-Successional Reserves and retain management options until understanding of the process has improved."*** **(FEMAT 1993, p. III-36)**

One might question the appropriateness of allowing natural recovery processes to proceed if stand-replacement fire behavior with the resulting high levels of fuels were not characteristic of the LSRs. However, approximately _ of the affected area in the LSRs are habitats that belong to Plant Association Groups (PAGs) on which either stand-replacement or mixed fire regimes are characteristic and, therefore, on which large fuel loads are likely in the post-fire environment. Hence, the Biscuit Fire and its effects were characteristic of what would be expected in the majority of the LSR area proposed for salvage.

Based on these facts, it appears inappropriate to carry out an active salvage program that would interfere with natural recovery processes in portions of the Late Successional Reserves impacted by the Biscuit Fire. Such salvage does not appear justified from the standpoint of restoring the viability of the LSR network or providing for reductions in uncharacteristic fire or fuels within impacted portions of the Biscuit LSRs.

SNAGS, LOGS, AND COARSE WOODY DEBRIS

The role of coarse woody debris in the development of late-successional forest habitat is an important consideration in deciding whether to proceed with salvage activities within the LSRs or, for that matter, in any other portion of the Biscuit Fire. Approximately _ of the salvage proposed in the LSRs is on PAGs where large volumes of snags and logs are characteristic.

Large snags and logs are the most important surviving structural elements or biological legacies (Franklin et al. 2002) of a forest disturbance, excepting only large live trees. Importance, in this case, refers to the roles of these structures in:

(1) Providing essential habitat for a immense array of species;
(2) Maintaining important ecosystem functions; and
(3) Structurally enriching the young forest stand, which makes it possible for mid- and late-successional species to re-colonize the stand much earlier in its chronological development than would otherwise be the case (Franklin et al. 1987).

The importance of large snags and down wood for a broad array of species is recognized in the EIS document. These structures provide habitat for early as well as late successional species and sustain many important ecosystem processes (e.g., Harmon et al. 1986). However, the long persistence and multiple roles played by the large pulse of snags, logs, and other CWD provided by the stand-replacement event (Harmon et al. 1986; Maser et al. 1988) do not appear to be adequately recognized in the analysis of how much of this wood should be retained.

The massive input of large dead wood is characteristic and critical to stand development processes and provision of habitat for late-successional species following stand replacement fires (Maser et al., 1988; Franklin et al. 2002). These wood structures may persist and play functional roles for several centuries, particularly in the case of decay resistent species such as Douglas-fir and all cedars. Large pines may also persist as snags for several decades and additional periods as logs on the forest floor.

In fact, the recovering forest ecosystem will depend upon this pulse of CWD until its reaches a point in its development where the new stand

begins to generate snags and logs of comparable size and heartwood content—generally after 100 to 200 years (Maser et al. 1988; Franklin et al., 2002). Consequently, basing snag and CWD retention following salvage on levels of these structures found in existing mature and old forests is not appropriate. This was the approach taken in the DEIS and does not reflect the fact that the recovering forest ecosystem will depend upon this source for one or more centuries

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

> ***"Because of the important role of dead wood in late-successional and old-growth forest ecosystems, and because there is much to learn about the role of dead wood in the development of forests, only limited salvage is appropriate in Late-Successional Reserves . . . <u>The Final Draft Recovery Plan</u>*** **<u>[for the NSO]</u>** ***<u>would allow removal of small-diameter snags and logs, but would also require retention of snags and logs likely to persist until the new stand begins to contribute significant quantities of coarse woody debris</u>."*** **(FEMAT 1993, p. IV-37)**
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> ***"Snags provide a variety of habitat benefits for a variety of wildlife species associated with late-successional forests. <u>Accordingly, following stand-replacing disturbances, management should focus on retaining snags that are likely to persist until late-successional conditions have developed and the new stand is again producing large snags</u>."*** **(FEMAT 1993, p. III-37)**
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> ***"Following a stand replacing disturbance, management should retain adequate coarse woody debris quantities in the new stand so that in the future it will contain amounts similar to natural regenerated stands. <u>The analysis that determines the amount of coarse woody debris to leave must account for the full period of time before the new stand begins to contribute coarse woody debris</u>. . ."*** **(FEMAT 1993, p. III-37)**

In summary, ***general salvage of large snags and logs is absolutely antithetical to the goal of rapid recovery of fully functional late-successional forest habitat and inappropriate within the Late Successional Reserves*****. If large fuels are viewed as a critical fire control issue, than this could be dealt with by creating appropriate Fuel Management Zones or snag-free corridors.**

It is notable that the preferred alternative in the DEIS removes a higher percentage of the total dead wood (23%) than any of the other alternatives (page III-210).

NORTHERN SPOTTED OWLS

Northern Spotted Owl is identified, appropriately, at a species of special interest and one that has been significantly negatively impacted by the Biscuit Fire. The need to restore suitable habitat for NSO has been the justification for proposals for intensive salvage and forest plantation programs, such as in Alternative #6 of the DEIS.

Unfortunately the DEIS does not acknowledge some important new knowledge with regards to the ecology of the NSO in the Klamath-Siskiyou region, either in the literature review or in analyzing effects of various alternatives. For example, the NSO is described in the DEIS (p. III-171) as "commonly found in stands with older forest structure and limited fragmentation." Foraging habitat is described accurately as "the most variable [of the habitat conditions] and is thought to be influenced largely by availability of prey species." But than goes on to describe it as generally including " . . . high canopy closure and enough space to fly below or between the canopy. A stand can be considered foraging habitat as long as a spotted owl can locate and capture prey while remaining in sufficient cover [at least 40% canopy cover] . . . to escape predation."

In fact of matter, dusk-footed wood rats are the most important prey of NSO in this region and this species is found primarily in early successional stages of vegetation development, which are dominated by hardwood shrubs and trees (A. Franklin et al. 2000).

In a recent study of NSO habitat fitness in relation to landscape conditions, A. Franklin et al. (2000) show that a mosaic of older forest interspersed with other, early successional vegetation types promoted high fitness for NSO. Landscapes dominated either primarily or exclusively by older forest or primarily by early successional vegetation provided lower levels of fitness than successional mosaics, based on estimates of survival and fecundity. Hence, landscape mosaics of mature and old forest and early successional habitats dominated, including brush fields, would be the appropriate recovery targets for restoration programs focused on NSO habitat.

In revising the DEIS this new knowledge regarding NSO, as well as documented current and projected impacts of the Barred Owl, need to be

taken account. In this process there needs to be careful consideration of the impacts of: (1) salvage on development of the debris-rich late-successional conditions characteristic of the forested NSO (and northern flying squirrel) habitat; and (2) establishment of conifer plantations which modify the amount and distribution of hardwood-dominated early successional habitat in which the woodrat resides.

REFORESTATION

Extensive reforestation by planting is proposed within the LSRs. Slow reestablishment of forest cover is common following natural stand-replacement disturbances in the Pacific Northwest, however. This circumstance provides valuable habitat for early successional species, particularly animals that require snags and logs and a high diversity of plants to provide fruits, forage, and shelter.

Natural reforestation of large disturbances can take very long periods of time as illustrated by some of the large wildfires of the late 19th and early 20th century and by unplanted portions of the Mount St. Helens devastated zone. Fifty years (a number mentioned in the DEIS) is *not* a long time to wait for establishment of forest cover.

Naturally disturbed habitat that is undergoing natural reforestation is, in fact, the rarest habitat condition in the Pacific Northwest. I am referring here to naturally disturbed areas that have not undergone salvage logging or artificial reforestation—not to clearcuts, which provide very different habitat conditions (Franklin et al. 2000). Most disturbed forest areas during the last century have been subjected to intensive salvage operations whenever feasible followed by artificial reforestation.

Large, slowly reforesting disturbed areas appear to be very important to maintaining regional biodiversity. For example, Mount St. Helens is a biological hotspot for several groups of animals, including bird fauna, amphibians, and medium-sized (meso) predators (Dale and Swanson, in press).

Planting may be appropriate within the LSRs to establish tree seed sources for specific species and locations. However, planting should not be done following traditional approaches, which are directed to establishment of uniformly stocked forest stands over large areas. Extensive, uniform planting—even at the relatively low density proposed for some areas (200 trees/acre)—does not simulate the spatially heterogeneous pattern of natural seedling establishment. If and when planting is carried out it

should be done in irregular patterns and at variable densities to better duplicate the natural spatial heterogeneity.

Establishment of dense, uniform stands is completely inappropriate in the LSRs and on any PAG identified as fire regime types I and II. We are currently engaged in major programs of variable density thinning in dense plantations in existing LSRs, so as to accelerate the development of late-successional structure in these stands; why would we set about creating more acreage of these plantations?! Similarly, establishing uniform stands—even at a density of 200 trees per acre—on sites characterized by frequent fires is obviously inappropriate; this simply recreates the potential for uncharacteristic stand replacement fires on these sites! This is, in fact, what has been done as part of "recovery" programs on many thousands of acres affected by uncharacteristic stand-replacement fires in eastern Oregon in recent years.

CONCLUSIONS

A summary is provided at the beginning of these comments. I would conclude that the salvage activities proposed within the boundaries of the LSRs as part of the Biscuit Fire Recovery Plan are inappropriate. Salvage would be completely antithetical to the goals of reestablishing late-successional forest habitat. Retention of the large snags and logs are essential to natural recovery processes and none of this material can be viewed as in excess to ecological needs. Treatment of medium and fine fuels may be appropriate on sites characterized by PAGs with Fire Regimes I and II. Issues associated with fire suppression could be addressed by creating snag-free corridors or narrow FMZs. Tree planting may be appropriate in some locations to provide seed sources for a variety of tree species but in moderation and, above all, in irregular patterns and with variable density. Establishment of large areas of homogeneous stands, even at low density, is inappropriate within the LSRs. Current knowledge regarding the ecology of the NSO should be considered during revision of the DEIS.

In my view, Alternatives #7 (the preferred alternative) and #6 are the most inappropriate of the alternatives from the standpoint of ecological values in general and LSR management, in particular. Also, it is my opinion that relevant and important ecological science has not been considered in the DEIS process.

LITERATURE CITED

Dale, Virginia, and Frederick Swanson (editors). In press. Recovery processes at Mount St. Helens. Springer-Verlag.

Forest Ecosystem Management Assessment Team. 1993. Forest ecosystem management: an ecological, economic, and social assessment.
Franklin, Alan B., D. R. Anderson, R. J. Guierrez, and K. P. Burnham. 2000. Climate, habitat quality, and fitness in Northern Spotted Owl populations in northwestern California. Ecological Monographs 70(4):539-590.

Franklin, Alan B., David R. Anderson, R. J. Gutierrez, and Kenneth P. Burnham. 2000. Climate, habitat quality, and fitness in northern spotted owl populations in northwestern California. Ecological Monographs 70(4): 539-590.

Franklin, Jerry F., D. E. Berg, D. A. Thornburgh, and J. C. Tappeiner. 1997. Alternative silvicultural approaches to timber harvesting: variable retention harvest systems. Pp. 111-139 in *Creating a forestry for the twenty-first century: the science of ecosystem management*, edited by K. A. Kohm, and J. F. Franklin. Washington, DC. Island Press.

Franklin, Jerry F., D. B. Lindenmayer, J. A. MacMahon, et al. 2000. Threads of continuity: ecosystem disturbances, biological legacies and ecosystem recovery. Conservation Biology in Practice 1:8-16.

Franklin, Jerry F., T. A. Spies, R. Van Pelt, et al. 2002. Disturbances and structural development of natural forest ecosystems with silvicultural implications, using Douglas-fir forests as an example. Forest Ecology and Management 155: 399-423.

Harmon, M. E., J. F. Franklin, and F. J. Swanson. 1986. Ecology of coarse woody debris in temperate ecosystems. Advances in Ecological Research 15:133-302.

Lindenmayer, David B., and Jerry F. Franklin. 2003. Conserving forest biodiversity. A comprehensive multiscaled approach. 351 p. Island Press: Washington, DC.

Maser, C., R. F. Tarrant, J. M. Trappe, and J. F. Franklin. 1988. From the forest to the sea: a story of fallen trees. USDA Forest Service General Technical Report PNW-GTR-229.

Noon, Barry R., and Kevin S. McKelvey. 1996. Management of the spotted owl: a case history in conservation biology. Annual Review of Ecology and Systematics 27:135-162.

Thomas, J. W., E. D. Forsman, J. B. Lint, et al. 1990. A conservation strategy for the Northern Spotted Owl. 427 p. USDA Forest Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, and USDI National Park Service: Portland, OR.

USDA Forest Service and USDI Bureau of Land Management. 1994. Standards and guidelines for management of habitat for late-successional and old-growth forest related species within the range of the Northern Spotted Owl. Various pagination. USDA Forest Service and USDI Bureau of Land Management; Portland, OR.

USDI Fish and Wildlife Service. 1992. Final draft recovery plan for the Northern Spotted Owl. Various pagination. USDI Fish and Wildlife Service; Portland, OR.