Declaration of Richard H. Waring

Dated July 27, 2009

1. I am an ecosystem scientist with expertise in forestry and a number of related fields. I provide this declaration to explain scientific and technical deficiencies in the Environmental Assessment for the proposed "Wildcat Fuels Reduction and Vegetation Management Project" prepared by the U.S. Forest Service and published in March 2009.

2. On June 2nd and 3rd, 2009, I toured the Wildcat sale sites numbered 33, 34, 22, 79 and 133 with Karen Coulter, field coordinator for the Blue Mountains Biodiversity Project, and observed the forest composition including standing dead and fallen trees, as well as the herbaceous vegetation. Trees planned to be thinned were marked for cutting, allowing me to assess expected changes in stand structure and composition.

3. Although the proposed project may temporarily reduce the threat of wildfires, to be effective in the long term, much heavier thinning than proposed is required to reduce the danger of insect outbreaks and to conserve water in the ponderosa pine and mixed conifer types. The present plan lacks an assessment of the effects of selective thinning, whole tree harvesting, and slash disposal on nutrient availability and carbon sequestration.

4. In the long run, the chosen options for management fail to consider the effects of practices that will continue to simplify stand structure and composition, and thereby reduce biodiversity on the Umatilla National Forest. In addition, the Forest Service fails to disclose the need to ameliorate microclimatic conditions to foster the movement of species from their current environments to similar ones that are predicted to shift to higher elevations or out of northeast Oregon within the next few decades.

5. There is a general deficiency in the Environmental Assessment on how managed and unmanaged areas interact across the landscape. Specifically, the proposed plan does not recognize how attempts to maintain high populations of elk and cattle impact aspen groves, the role that roads play as a conduit for plant and animal migration, nor the fact that subalpine forests are adapted to large, but infrequent disturbances.

6. To explain these scientific and technical matters and to underscore what was omitted from the Wildcat Environmental Assessment, I draw on my experience and familiarity with the peer-reviewed literature. For this particular review, I include a few Forest Service publications that counter the proposed management options or summarize state-of-the-art knowledge. My evaluation is organized by management options applied to four forest types, followed by sections on the implications of proposed activities on biodiversity, the implication of climate change, and landscape interactions.

7. The range of vegetation on which activities are proposed include four broad forest types: dry ponderosa pine; moist, mixed conifers; cool and moist subalpine forests; and groves of aspen. On each of these types, the Forest Service has identified trees to cut, with the intention of disposing of slash by burning, by complete tree harvesting, and by extracting deadwood on the forest floor to generate energy.

Dry Ponderosa Pine Forest Type

8. The dry ponderosa pine is a forest type through which a ground fire historically burnt every decade or so, which limited the presence of young trees and species with thin bark. This type occurs on small pockets of shallow soil at mid elevations and more extensively at lower elevations, particularly on aspects exposed in the afternoon to direct solar radiation. Forest Service activities are aimed at removing most of the small trees that have established following years of fire suppression activities. They plan to introduce prescribed fires to mimic historical conditions.

9. Depending on how slash and biomass are disposed of, the plan is biologically sound, assuming sufficient standing dead trees are left to meet wildlife requirements and erosion is minimized during road construction and logging. The proposed practices, however, will reduce soil organic matter, which Jurgensen et al. (1997) consider a critical resource required to sustain forest health and productivity, particularly on drier sites.

10. At some of the sites, the density of large diameter trees that will be left following treatment is more than 50 per cent of the maximum basal area and leaf area that can currently be supported. Additional thinning of larger diameter trees would be required to protect residual trees from being attacked and killed by mountain pine beetle during an outbreak and to accommodate climatic trends leading to increased natural mortality (van Mantgem et al. 2009). Moreover, residual trees need to be evenly spaced to reduce mortality from bark beetles (Larsson et al. 1983), which would be a major departure from historical conditions (Harrod et al. 1999).

Mixed Conifer Forest Type

11. The mixed conifer forest type is one where snowmelt has historically been adequate to recharge the soil profile fully each spring so that drought is normally not a problem (Waring et al. 1992). 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. Less shade- tolerant trees with thicker bark will become relative more dominant, even with some selective removal, with implications that will be discussed later.

12. Experiments in this forest type in northeastern Oregon indicate that nitrogen limits growth and that defoliation of Douglas-fir and true firs by spruce budworm

or tussock moth recycles this limiting element and foster increases in stand growth (Waring et al. 1992). Fire generally encourages the establishment of nitrogen-fixing plants, but it may take decades to centuries to restore the nitrogen capital (Jurgensen et al. 1997), particularly in soils lacking molybdenum, an essential micro-nutrient (Silvester 1989). The Environmental Assessment omits discussion on the loss of nitrogen and other elements associated with whole-tree harvesting and the burning of litter and slash that would affect site productivity and the ability of trees to withstand defoliation (Waring and Running 2007).

Subalpine Forest Type

13. The subalpine forest type rarely burns (Schoennagel et al. 2007), but when it does, most trees are killed (Romme et al. 2006). Larch and lodgepole pine establish on bare soil following a stand replacement fire; Englemann spruce and subalpine fir seed in on duff once shade is provided. Ponderosa pine is not a major component of this forest type because it is subject to snow breakage (Waring 1969).

14. Thinning in subalpine forests creates unnatural conditions because most species are adapted to regeneration following a stand replacement fire. Although century-old lodgepole pine can be thinned and residual trees made resistant to bark beetle attack, this requires that up to two-thirds of all trees be removed (Coops et al. 2009) and often results in accelerated windthrow (Veblen et al. 1991).

15. The subalpine type is usually nitrogen deficient (Waring et al. 1985, Waring and Pitman 1985, Waring et al. 1987) and requires considerable time to restore what is lost following fire (Jurgensen et al. 1997) because the main source of nitrogen in this area is atmospheric deposition (Fenn et al. 2003). The proposed plan would reduce the availability of nitrogen and other nutrients, which is unlikely to improve tree resistance to insects and diseases. This needs to be disclosed, assessed and alternatives considered.

16. The Environmental Assessment does not adequately recognize the departure from historical conditions that the proposed thinning and fuel reduction project would create in subalpine forests. Young lodgepole pine stands generally do not require thinning because small diameter trees lack sufficient resources (phloem tissue) under the bark to support development of bark beetle larvae (Waring and Pitman 1985).

Aspen Groves

17. Attempts to perpetuate aspen by removing competing conifers are likely to prove inadequate. The reason for lack of aspen regeneration is an over abundance of browsing and grazing animals that consume most, if not all aspen regeneration and heavily impact many other species, as noted by Forest Service scientists Shirley and Erickson (2001). Fenced areas are required to allow aspen to regenerate without a reduction in elk and cattle populations. The Environmental Assessments lacks an explanation as to how one can expect to foster successful

aspen regeneration while proposing to improve elk habitat without fencing. It might also recognize the role that predators play in allowing aspen to regenerate even with large populations of elk (Larsen and Ripple 2003).

Biodiversity

18. To be effective, the proposed thinning and fuel reduction program will need to be repeated at frequent intervals over wide areas. This will result in simplification of stand structure and a reduction in biodiversity. What are the implications? Forests of mixed ages and species composition are generally not subject to complete defoliation because native insects have discrete numbers of hosts. As a result, the growth of ponderosa pine increases when spruce budworm attack grand fir, and the reverse happens when Pandora moth attack pine in a stand of mixed composition (Speer et al. 2001). There are similar advantages to multi-species stands when it comes to diseases, as outlined in a recent publication on 'Managing insects and diseases of Oregon Conifers' (Shaw et al. 2009). The disadvantages of repeated thinning and slash disposal need to be considered particularly in the mixed conifer type.

19. A diversity of insects favors a wide variety of bird species, each with different requirements to complete their life cycles. Other animals, both resident and migratory, require a range of conditions not available in a forest with simplified structure and frequent disturbance. These tradeoffs are not adequately addressed in the Environmental Assessment.

Climate Change

20. Discussion of climate change is completely omitted from the Environmental Assessment. Yet, over the last half century, the climate has progressively become warmer throughout most of western United States (http://climatewizard.org). As a result, the snowpack melts more quickly, the growing season starts earlier, and vegetation is subjected to longer periods of drought. Although these changes in climate may not totally explain a doubling of tree mortality across the West in the last two decades (van Mantgem et al. 2009), there is no question that drought can cause an increase in tree mortality (Bigler et al. 2008). Less tree cover may reduce water use, but it will also encourage the growth of understory vegetation which contributes more fine fuels in a given season than do leaves shed slowly from dying trees (Veblen et al. 2000).

21. The trends in climate observed over the last 50 years are likely to accelerate. The Environmental Assessment should consider that peer-reviewed literature indicates that both western larch and Engelmann spruce are predicted to be unable to survive in most of northeastern Oregon by 2030 (Rehfeldt et al. 2006). If shifts in climate are recognized as highly probable, achieving historical conditions through the proposed management may be impossible. Certainly thinning cannot improve residual tree vigor during an extended drought (Kolb et al. 2007).

Landscape Perspective

22. The Environmental Assessment does not consider the ramifications of management practices on areas not directly involved, such as the protected riparian zone and adjacent wilderness area. An enlargement of the protected zone along streams might be considered to maintain populations of species adapted to less disturbed conditions. It might also serve as a corridor, as do roads (Lugo and Gucinski 2000), for allowing species to move up or down slope in a changing climate. At the same time, a connected corridor of dense, multi-storied vegetation is a conduit for the spread of wildfire (Agee 1998). Alternatives that should be considered are large blocks of different aged forests, a shifting mosaic of age classes (Everett et al. 1994) and the advantages of letting fires burn in wilderness areas (Collins and Stephens 2007).

23. The management of National Forests to enhance carbon storage is under discussion with controversy over the relative losses from wildfires versus those associated with harvesting and fuel management. Recent publications from faculty at Oregon State University have clarified these issues, and the kind of management proposed on the Umatilla National Forests should evaluate the proposed plans in light of these findings (Campbell et al. 2007, Mitchell et al. 2009).

Conclusions and Recommendations

24. The Environmental Assessment fails to take into account the longer-term implications of the proposed management options. Climatic conditions are changing and these changes are predicted to accelerate. This makes using historical conditions a questionable benchmark. The dry ponderosa pine type may become more extensive, but if this happens, larch, Engelmann spruce and many other species may become rarer. To assess the impacts and efficacy of the proposed project, the Forest Service must disclose how repeated thinning and fuel reduction efforts will affect tree nutrition, because nutrient-stressed trees will become more susceptible to insect and disease attack.

25. Some modifications of the proposed plan are required, particularly for the mixed conifer and subalpine forest types where stand structure and composition will be highly modified. Even in the dry ponderosa pine type, where thinning and fire are logical management options, the spacing of trees may need to be much wider than proposed to increase resistance to bark beetle attacks and to adapt to trends in climatic conditions. To increase aspen groves will require a significant reduction in elk and cattle on the forest, or extensive fencing. The proposal to remove conifers will have little effect.

26. The Forest Service has not taken into account a landscape perspective in the Environmental Assessment or looked at how blocks of vegetation in different

stages of development can be positioned on the landscape to reduce the spread of fire. Without taking a landscape approach, the Forest Service will not be able to reduce the threat from fire or maintain biodiversity in a changing climate.

27. The Forest Service would be prudent to consider broadening buffer strips along streams and roads to offer maximum protection for areas least likely to burn or to become drought-stressed, and best able to provide corridors for flora and fauna to adjust to on-going climatic change. Large blocks of mixed conifer and most of the subalpine forests would best remain untreated. In this way, benchmarks will be available for comparing response to wildfires and insect and disease outbreaks. The reserved blocks will also offer refuges to flora and fauna not adapted to frequent disturbance.

28. In summary, to meet the stated objectives of the Wildcat Environmental Assessment requires a much broader perspective. The Forest Service must disclose and consider the implications of climate change, the implications of simplifying stand structure, landscape interactions, and the losses of nutrients and organic matter associated with proposed harvesting and fuel reduction efforts.

Respectfully,

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